



**Prince Rupert Gas Transmission  
Project:  
Application for Eastern Route  
Alternative Amendment to  
EAC #14-06**

August 2024

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## Executive Summary

Prince Rupert Gas Transmission Ltd. (PRGT) obtained environmental assessment certificate (EAC) #E14-06 for the Prince Rupert Gas Transmission Project (the Project) on November 25, 2014. The Project, as approved, is a natural gas transmission pipeline and associated infrastructure, extending from the Hudson's Hope area in northeast British Columbia to the proposed Pacific NorthWest LNG project, a natural gas liquefaction and export facility on Lelu Island in the Port of Prince Rupert, British Columbia. The EAC was issued under the former British Columbia *Environmental Assessment Act* (2002). Five amendments to EAC #E14-06 have been approved to date. An extension to EAC #14-06 was also issued, which extends the validity of EAC #E14-06 to November 25, 2024.

The Project is now planned to supply natural gas to the proposed Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project (Ksi Lisims LNG Facility) at Wil Milit on Pearse Island, approximately 14 kilometres (km) west of the Nisga'a village of Gingolx and 82 km north of the Port of Prince Rupert. On June 12, 2024, PRGT filed an Application for Marine Route Alternative Amendment to EAC #14-06 (the Marine Amendment) which presented an alternate route to the proposed Ksi Lisims LNG Facility.

Based on refined project routing and in response to concerns raised by Indigenous Nations, PRGT is proposing an approximately 172 km alternate route (the Eastern Route Alternative), inclusive of a new initiation point that is approximately 37 km west of Chetwynd, British Columbia. The Eastern Route Alternative would follow the Highway 97 corridor from this new initiation point to Tudyah Lake before proceeding west to rejoin the Certified Pipeline Corridor (CPC) southwest of Williston Lake and the town of Mackenzie. As such, PRGT is requesting an amendment to EAC #14-06 in accordance with section 32(1) of the British Columbia *Environmental Assessment Act* (2018) for the Eastern Route Alternative (the Amendment). The Amendment would require changes to the Certified Project Description to incorporate the following as part of the Eastern Route Alternative:

- A new potential initiation point for the Project approximately 37 km west of Chetwynd
- An approximately 172 km long Eastern Route Alternative will be added to the CPC. Consistent with the current CPC, the Eastern Route Alternative will be added generally as a 500-metre wide corridor with some variation in width in certain areas to allow for flexibility in ongoing planning, detailed design, and constructability
- Addition of one new co-located compressor station and meter station near the initiation point of the Eastern Route Alternative

In the event the Eastern Route Alternative is approved and selected, it would replace an approximately 223 km portion of the original approved route. Only one approved route will be constructed. Consistent with PRGT's 2014 EAC Application (the Application), other areas of planned disturbance such as associated temporary ancillary infrastructure may extend beyond the CPC.





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The Amendment has been prepared in accordance with the *Environmental Assessment Act* (2018) and the *Amendments to Environmental Assessment Certificates and Exemption Orders - Guidance for Holders* (Environmental Assessment Office [EAO] 2024). The Amendment assessment generally follows the methods in the Application (PRGT 2014a), but also addresses matters for consideration under section 25 of the *Environmental Assessment Act* that were not assessed in the Application, as applicable. Specifically, the Amendment considers the effects on biophysical factors that support ecosystem function and effects on current and future generations. Potential changes to residual effects resulting from the proposed the Amendment are compared to the findings of the EAO Assessment Report (EAO 2014a).

Table ES-1 summarizes the changes to valued components and associated mitigation measures, effects pathways, and characterization of residual effects from the proposed Amendment. The management plans and mitigations required by EAC#14-06 will be applicable to the Amendment. Due to the schedule of the Amendment, data relied upon for the assessment are primarily gathered from desktop sources. The results of field programs to gather site specific data about environmentally sensitive features will be incorporated into the Construction Environmental Management Plan (CEMP) and other Management Plans as appropriate.

In consideration of the predicted effects on Indigenous interests, the effects associated with the Amendment are consistent with those presented in the EAO's Assessment Report (EAO 2014a). PRGT will continue to engage with Indigenous Nations on the proposed Amendment. As information is shared, PRGT will review the information in the context of the Amendment and associated mitigation, as it is possible that new Indigenous interests may be raised.

**Table ES-1      Summary of Changes to Mitigation, Effects Pathways, and Characterization of Residual Effects from the Proposed Amendment**

Valued Component	Change to Mitigation	Change to Effects Pathways and Characterization of Residual Effects
Air quality	No change	No change
Greenhouse gases	No change	No change
Acoustics	No change	No change
Marine water quality	No change	No change
Freshwater water quality	No change	No change
Hydrology	No change	No change
Freshwater fish and fish habitat	No change	No change
Marine resources	No change	No change
Soil	No change	No change
Vegetation and wetland resources	No change	No change
Wildlife	Surveys for pileated woodpecker nest cavities will be undertaken in suitable habitats prior to clearing. No change to other mitigation measures.	No change



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Valued Component	Change to Mitigation	Change to Effects Pathways and Characterization of Residual Effects
Employment	No change	No change
Community infrastructure and services	No change	Magnitude of effect on health care services has increased from low to moderate considering capacity of Northern Health and increasing demands on health infrastructure and services
Transportation	No change	No change
Visual quality	No change	No change
Land and resource use	No change	No change
Heritage and archaeological resources	No change	No change
Human health	No change	No change

Table ES-2 lists the requirements included in the *Amendments to Environmental Assessment Certificates and Exemption Orders – Guidance for Holders* (EAO 2024) and where they are addressed in this Amendment application.

**Table ES-2 Concordance with the Amendment Application Requirements**

Item Number	Amendment Application Requirement	Location in Amendment Application
1	EAC number, Exemption Order number (if applicable), project name and current name of EAC or Exemption Order Holder.	Section 1
2	Number of prior amendments and a short summary of each one.	Section 1, Section 1.2
3	A short, descriptive name for the proposed amendment (amendments will not be given a number until made).	Section 1.2
4	The reason for the proposed amendment.	Section 1, Section 2
5	A short description of the substance of the proposed EAC or Exemption Order changes (not proposed EAC or exemption order wording changes). That is, what the Holder is proposing to have amended and the rationale for it, including specifics of which sentence or condition is proposed for change, if applicable.	Section 2
6	If the EAC or Exemption Order was issued under a former Act, a request for conditions for the transfer of “project”, an “interest in a project”, or “a significant interest in a project” to be removed.	N/A
7	A description of potential project amendment interactions with any identified Indigenous interests.	Section 4, Section 20
8	The effect of the revised project on relevant valued components and Indigenous interests assessed in the project’s Environmental Assessment (EA) or exemption application and proposed mitigation measures.	Sections 5 – 20
9	A description of any Indigenous knowledge that was used in developing the application and confirmation that appropriate permissions are in place.	Sections 5 – 20



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<b>Item Number</b>	<b>Amendment Application Requirement</b>	<b>Location in Amendment Application</b>
10	A table showing the valued components that have potential to be affected by the proposed amendment and required assessment materials (Section 25 of the Act). The table should include a rationale if the Holder asserts that any required assessment material is not relevant. For more information see the effects assessment policy on the EAO website.	Table 4.1, Table 19.2
11	Any benefits or positive effects that would result from the revised project.	Section 1.1, Sections 5 – 20
12	Any studies or assessments that would be relevant to the revised project that were submitted during the EA or exemption process.	Sections 5 – 20
13	Details of Indigenous nation, stakeholder, public and agency engagement respecting the proposed amendment. That is, with whom did the Holder engage, what did it hear, what responses were provided, and how does the Holder propose to address any issues raised?	Section 3
14	Government approvals that are related to the requested amendment including any permits or licenses that are expected to also need amendment.	Section 1.3
15	Proposed timeline for supplementary submissions in support of the application, and the parties, such as Indigenous nations, that may be engaged in this work.	N/A
16	For a potential simple amendment: rationale why the change is minimal, why there is no possibility of a significant adverse effect, why public interest is unlikely to be affected and why there is limited need for Indigenous or public engagement.	N/A



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Appendix C	Acoustic Environment Technical Data Report
Appendix D	Water Quality - Historical Water Quality Data Summary
Appendix E	Hydrology Technical Appendix
Appendix F	Watercourse Crossings Mapbook
Appendix G	Master Watercourse Crossing Table
Appendix H	Socio-economic Technical Data
Appendix I	Land and Resource Use Figures



## Acronyms / Abbreviations

%HA	percent highly annoyed
°C	degrees Celsius
µg/m <sup>3</sup>	micrograms per cubic metre
AAC	Annual Allowable Cut
AADT	Average Annual Daily Traffic
AAQO	Ambient Air Quality Objectives
ACCI	Area of Critical Community Interest
AIF	Archaeological Information Form
ALR	Agricultural Land Reserve
AOA	Archaeological Overview Assessment
ARD/ML	acid rock drainage / metal leaching
ASL	ambient sound level
BC BBA	British Columbia Breeding Bird Atlas
BC CDC	British Columbia Conservation Data Centre
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy



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BC MFLNRORD	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC WQG FAL	British Columbia Water Quality Guidelines – Freshwater Aquatic Life
BCAS	British Columbia Ambulance Service
BCEHS	British Columbia Emergency Health Services
BCER	British Columbia Energy Regulator
BCER Noise Guideline	British Columbia Noise Control Best Practices Guideline
BCNREB	British Columbia Northern Real Estate Board
BMP	Best Management Practice
CAAQS	Canadian Ambient Air Quality Standards
CAC	criteria air contaminant
CCME	The Canadian Council of Ministers of Environment
CD	census division
CEMP	Construction Environmental Management Plan
CER	Canada Energy Regulator
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
cm	centimetre
CMHC	Canadian Mortgage and Housing Corporation





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CN Rail	The Canadian National Railway Company
CNC	College of New Caledonia
CO	carbon monoxide
COPC	contaminant of potential concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPC	Certified Pipeline Corridor
CPD	Certified Project Description
CR	concentration ratio
CRA	commercial, recreational and aboriginal
CRC	caribou recovery committee
CSA	Canadian Standards Association
CSD	Census Subdivision
CSD	Census Subdivision
CSI	crime severity index
dBA	A-weighted decibels
DFO	Fisheries and Oceans Canada
DM	District Municipality
DPI	Direct Pipe Installation



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EAC	environmental assessment certificate
EAO	Environmental Assessment Office
ECCC	Environment and Climate Change Canada
EDRR	early detection and rapid response
EGBC	Engineers and Geoscientists British Columbia
EMA	Environmental Management Act
EMC	Enhanced Management Corridor
EMD	electric motor drive
EPMR	Environmental Protection and Management Regulation
EVQO	established visual quality objective
FIA	Fossil Impact Assessment
FOR	Ministry of Forests
FPB	Forest Practices Board
FRPA	Forest Range and Practices Act
FRR	Forest Recreation Regulation
FSR	Forest Service Road
GBAA	Grizzly bear assessment area
GBPU	grizzly bear population unit



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GDP	Gross Domestic Product
GHG	Greenhouse gas
ha	hectares
HADD	harmful alteration, disruption, or destruction of fish habitat
HAP	hazardous air pollutant
HCA	Heritage Conservation Act
HDD	horizontal directional drilling
HHRA	Human Health Risk Assessment
HIP	Heritage Inspection Permit
HPW	High Priority Wildlife
IBD	Indigenous Business Directory
ILCR	incremental lifetime cancer risk
IPMA	Invasive Plant Management Area
ISO	International Organization for Standardization
km	kilometre(s)
km <sup>2</sup>	square kilometres
KP	kilometre post
LAA	Local Assessment Area



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L <sub>d</sub>	day sound level
L <sub>dn</sub>	day-night average sound level
L <sub>eq</sub>	equivalent sound level
LICO-AT	low-income cut-offs after tax
LIM-AT	low-income measure after tax
L <sub>n</sub>	night sound level
LNG	Liquefied Natural Gas
LRMP	Land and Resource Management Plan
M	metre
m <sup>3</sup> /s	cubic metres per second
MECCS	Ministry of Environment and Climate Change Strategy
mg/L	milligrams per Litre
mm	millimetre
MNL	Mitigation Noise Level
MOTI	Ministry of Transportation and Infrastructure
MW	megawatt
NCD	non-classified drainages
NHA	Northern Health Authority



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NIHSDA	Northern Interior Health Service Delivery Area
NLC	Northern Lights College
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxide
NTU	Nephelometric Turbidity unit
NVVC	no visible channel
NWIPC	Northwest Invasive Plant Council
OCP	Official Community Plan
OG TAP	Old Growth Technical Advisory Panel
OGDA	Old growth deferral area
OGMA	old growth management area
PAH	polycyclic aromatic hydrocarbon
PARL	Provincial Archaeological Report Library
PM <sub>10</sub>	particulate matter that is 10 micrometres or smaller in diameter
PM <sub>2.5</sub>	particulate matter that is 2.5 micrometres or smaller in diameter
PMT	Peace Moberly Tract
PMTWG	Provincial Moose Technical Working Group



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PPRD	Peace River Regional District
PRGT	Prince Rupert Gas Transmission Ltd.
PSL	Permissible Sound Level
PY	person year
RAA	Regional Assessment Area
RAAD	Remote Access to Archaeological Data
RCMP	Royal Canadian Mounted Police
RDBN	Regional District of Bulkley-Nechako
RMZ	riparian management zone
ROW	right-of-way
RRA	Resource Review Area
SARA	Species at Risk Act
SCC	Supreme Court of Canada
SEEMP	Socioeconomic Effects Management Plan
SLCWG	Soil Landscapes of Canada Working Group
SO <sub>2</sub>	sulfur dioxide
SRMF	Southern Rocky Mountain Foothills
SRPR	Species at Risk Public Registry



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T8FNCAT	The Treaty 8 First Nations Community Assessment Team and The Firelight Group Research Cooperative
TDR	Technical Data Report
TEK	Traditional Ecological Knowledge
TFL	Tree Farm Licence
the Amendment	an amendment to EAC #14-06 in accordance with section 32(1) of the British Columbia Environmental Assessment Act (2018) for the Approximately 172 km alternate route for the Prince Rupert Gas Transmission Project
the Application	the Prince Rupert Gas Transmission Project's 2014 Environmental Assessment Certificate Application
the Eastern Route Alternative	Approximately 172 km alternate route for the Prince Rupert Gas Transmission Project
the Marine Amendment Application	the application for the Marine Route Alternative Amendment
the North Parsnip Alternate Crossing	A preferred alternative crossing location at the Parsnip River
the Project	Prince Rupert Gas Transmission Project
TK	Traditional knowledge
TLE	Treaty Land Entitlement
TLU	Traditional Land Use
TSA	timber supply area



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TUS	traditional use studies
UHNBC	University Hospital of Northern British Columbia
UNBC	University of Northern British Columbia
USFWS	United States Fish and Wildlife Service
UWR	Ungulate Winter Range
VC	valued component
VLI	Visual Landscape Inventory
VQO	Visual Quality Objectives
VSU	Visual Sensitivity Units
WHA	Wildlife Habitat Area
WMA	Wildlife management area
WMU	Wildlife Management Unit
WSA	Water Sustainability Act
WSC	Water Survey of Canada





# 1 Introduction

Prince Rupert Gas Transmission Ltd. (PRGT) obtained environmental assessment certificate (EAC) #14-06 for the Prince Rupert Gas Transmission Project (the Project) on November 25, 2014. The Project as approved is a natural gas transmission pipeline, and associated infrastructure, extending from the Hudson's Hope area in northeast British Columbia to the proposed Pacific NorthWest Liquefied Natural Gas (LNG) project, a proposed natural gas liquefaction and export facility on Lelu Island in the Port of Prince Rupert, British Columbia. As detailed in the application for the Marine Route Alternative Amendment ("the Marine Amendment Application"), the Project is now planned to supply natural gas to the proposed Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project (Ksi Lisims LNG Facility) at Wil Milit on Pearse Island, approximately 14 kilometres (km) west of the Nisga'a village of Gingolx and 82 km north of the Port of Prince Rupert.

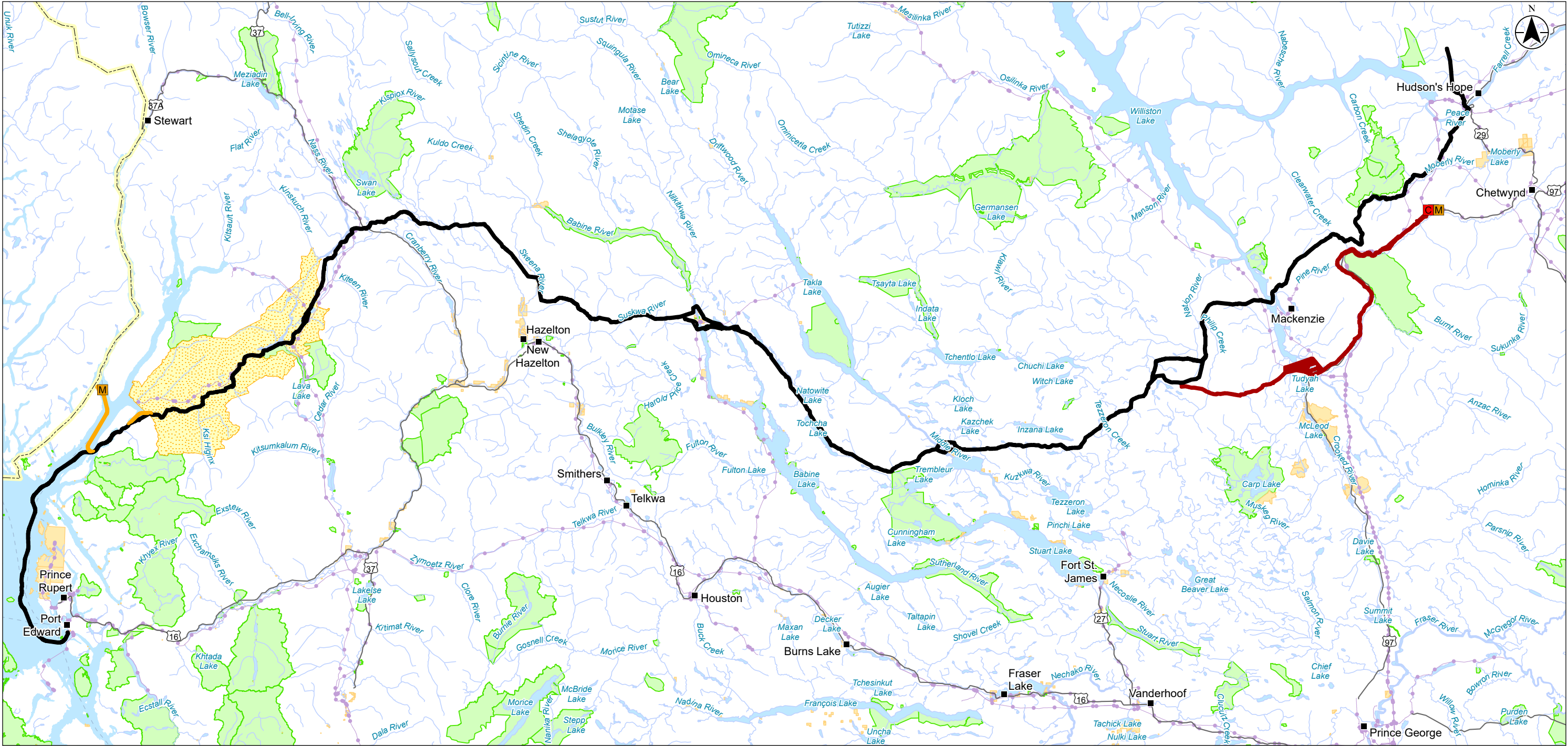
Based on refined project routing and in response to concerns raised by Indigenous Nations, PRGT is proposing an approximately 172 km route alternative (the Eastern Route Alternative), inclusive of a new initiation point that is approximately 37 km west of Chetwynd, British Columbia. As such, PRGT is requesting an amendment to EAC #14-06 in accordance with section 32(1) of the British Columbia *Environmental Assessment Act* (2018) for the Eastern Route Alternative Amendment (the Amendment). An overview of the proposed Eastern Route Alternative is provided in Figure 1.1.

Most of the Eastern Route Alternative is co-located with the Highway 97 corridor which includes other pipeline and powerline rights-of-way (ROW), and road and rail corridors. The Highway 97 corridor is characterized by developments including roads, settlements, recreational facilities, agricultural land uses, powerlines, and natural gas and oil pipeline ROWs. The proposed Eastern Route Alternative is entirely within Treaty 8 lands but outside the Blueberry River First Nations Claim Area. Indigenous Nations engaged on the Amendment include Blueberry River First Nations, Doig River First Nation, Halfway River First Nation, Horse Lake First Nation, McLeod Lake Indian Band, Sauteau First Nations, West Moberly First Nations, Nak'azdli Whut'en, and Takla Nation.

## 1.1 Amendment Overview

This Amendment would require changes to the Certified Project Description (CPD) to accommodate an option for a revised initiation point connecting the Project to Enbridge's T-South gas transmission system at Westcoast Energy Inc.'s Willow Flats Compressor Station (Westcoast CS2), which is an existing natural gas transmission system. The approximately 172 km Eastern Route Alternative would follow the Pine River valley west to Pine Pass, descending southwest following Highway 97 to Tudyah Lake, then west to rejoin the Certified Pipeline Corridor (CPC) southwest of Williston Lake and the town of Mackenzie (Figure 1.2). The Eastern Route Alternative includes major watercourse crossings, including the Pine River, Parsnip River, and Pack River. One compressor station would be located near the initiation point. This compressor station would be natural gas fired or electric motor driven.





**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia;  
Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K  
dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- International Boundary
- Railway
- Transmission Line
- Watercourse

- First Nations Reserve
- Nisga'a Lands
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Meter Station
- Certified Pipeline Corridor (CPC)
- Proposed CPC for Eastern Route Alternative
- Proposed CPC for Marine Route Alternative

0 30 60 km  
1:1,500,000 (at original document size of 11x17)



Project Location Prince George  
British Columbia  
Client/Project/Report  
Project Number 123514678  
Prepared by TQUILICHINI on 20240405  
Requested by TPETERMANN on 20240405  
Reviewed by NFORRESTER on 20240405

Prince Rupert Gas Transmission Ltd.

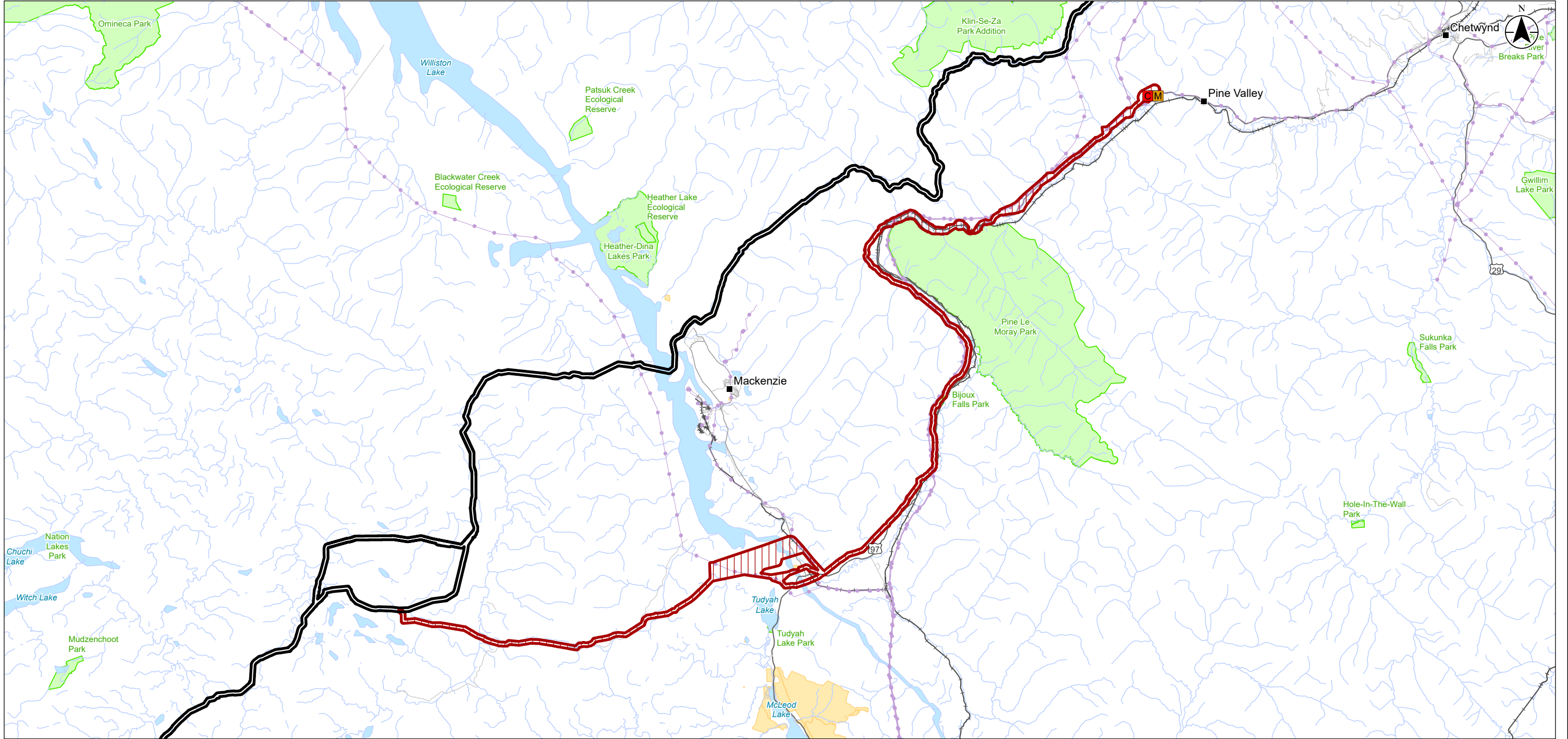
Figure No.  
**1.1**  
Title  
**EASTERN ROUTE ALTERNATIVE  
AMENDMENT OVERVIEW**

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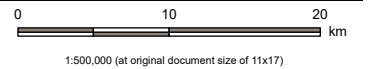
Revised: 2024-08-21 By: aju

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**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia;  
Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K  
dataset from DataBC

- |  |  |  |
|--|--|--|
| ■ City, Town, Village or District Municipality | ■ First Nations Reserve  | ■ Compressor Station                         |
| — Highway                                      | ■ Parks, Protected Areas, Ecological Reserves, and Conservancies | ■ Meter Station                              |
| — Road   | ■ Waterbody  | ■ Proposed CPC for Eastern Route Alternative |
| — Local Street                                 |  | ■ Certified Pipeline Corridor (CPC)          |
| — Railway                                      |  |  |
| — Transmission Line                            |  |  |
| — Watercourse                                  |  |  |



Project Location: Prince Rupert  
Project Number: 123514388  
Prepared by: SLEMAY on 20240813  
Requested by: PBLANCHER on 20240813  
Reviewed by: TQUILICHINI on 20240813  
Client/Project/Report:

Prince Rupert Gas Transmission Ltd.

Figure No.: 1.2  
Title: PROPOSED CHANGES TO THE PRINCE RUPERT GAS TRANSMISSION PROJECT

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This Amendment Application includes the following items to address the requirements for a typical amendment set forth in the document *Amendments to Environmental Assessment Certificates and Exemptions Orders – Guidance for Holders* (Environmental Assessment Office [EAO] 2024):

- Certificate # or Exemption Order #, project name, and name of Holder
- Number of prior amendments, if any, and a concise summary of each one
- Short, descriptive name for the proposed amendment
- A full description of the proposed amendment, including changes to a CPD and/or Table of Conditions
- The reason(s) for the proposed amendment
- A detailed assessment of potential amendment interactions with identified Indigenous interests, developed in consultation with participating Indigenous Nations
- A table showing the valued components (VCs) that have the potential to be affected by the proposed amendment and required assessment matters (section 25 of the British Columbia *Environmental Assessment Act*), including rationale if the Holder asserts that any VC or required assessment matter is not relevant to this amendment
- A detailed assessment of the effects of the Amendment on relevant VCs and Indigenous interests assessed in the Amendment Application and proposed mitigation measures to mitigate these effects, and if any changes to the assessment in the original environmental assessment are needed
- Details of First Nation, public, agency, and any other engagement respecting the proposed amendment
- Any additional government approvals that are related to the proposed amendment including any authorizations, permits or licenses (including municipal, provincial, and federal) that are expected to also need amendment

The effects assessment provided in this Amendment includes consideration of the interests of the Indigenous Nations identified in Section 1, as well as VCs assessed in the original PRGT Application for an Environmental Assessment Certificate (the Application; PRGT 2014a), where the Amendment has the potential to affect the conclusions of the EAO Assessment Report (EAO 2014a).

## **1.2 Amendment Background**

This Amendment Application is for the seventh amendment to EAC #E14-06. Table 1.1 shows a summary of the previous amendments for this EAC. The first five amendments were completed under the former *Environmental Assessment Act* (2002), and a sixth is in progress under the current *Environmental Assessment Act* (2018).



**Table 1.1 Previous EAC Amendments**

Amendment Number	Date Approved	Amendment Description
1	December 16, 2015	<p>The addition of the following to the list of ancillary facilities included in the approved CPD: barge landing sites, material off-loading facilities, docks, jetties. Additionally, Amendment #1 permitted the construction of up to 13 (previously 12) camps in which to house workers during construction, with one of those a main spread camp located on a barge or vessel.</p> <p>Specific infrastructure additions in Amendment #1 included:</p> <ul style="list-style-type: none"> <li>• Material offloading facilities at Iceberg Bay, Nass Harbour, and Nass Bay</li> <li>• Barge landing sites at Monkley Creek and Welda Creek</li> <li>• A jetty at Nass Harbour</li> <li>• A dock at Nasoga Gulf</li> </ul>
2	May 26, 2016	<p>Included the Mt. Milligan Route Alternative and Alternate Witter Lake Compression Station. These alterations constituted changes to the location of the Witter Lake compressor station (a shift of about 15 km southeast) as well as alteration to the proposed pipeline route departing at approximately kilometre post (KP)208 and rejoining at KP235.</p>
3	May 26, 2016	<p>Included the Nass Camp Route Alternative which changes the pipeline route at approximately KP662 and rejoins it at KP668.</p>
4	December 20, 2017	<p>Included two additional main spread construction camps (15 total), eight main spread construction camps will house up to 1,100 workers and three main spread construction camps will house up to 700 workers. As well as standby compressor units at each of the eight compressor stations.</p>
5	June 6, 2017	<p>Included the Ksi Mat'in River Amendment which expanded the CPC to include a crossing of the Ksi Mat'in River.</p>
6	Application submitted June 12, 2024 Review in progress	<p>Addition of two alternate routes (Nass Bay Route and Ksi Lisims LNG Pipeline Connection) such that the Project may terminate at the Ksi Lisims LNG facility rather than at Lelu Island in the Port of Prince Rupert.</p>

## 1.3 Regulatory Setting

The Project was approved under the former *Environmental Assessment Act* (2002). This Amendment Application will be reviewed under the current *Environmental Assessment Act* (2018), which brings additional assessment matters that were not previously required. In accordance with the *Certificate and Exemption Policy* (EAO 2020a), these assessment matters, per section 25 of the *Environmental Assessment Act* (2018) must be considered in this Amendment and are discussed further in Sections 4 and 19.



### 1.3.1 Applicable Legislation

Table 1.2 identifies the federal and provincial legislation that is applicable to the proposed changes identified in this Amendment. Since the filing of the Application (PRGT 2014a), the following key changes to federal and provincial legislation applicable to the Amendment have occurred:

- The *Water Sustainability Act* came into force in 2016, replacing the *Water Act*.
- The *Fisheries Act* was amended in 2019, including protections of fish and fish habitat from death of fish, other than fishing and harmful alteration, disruption or destruction of fish habitat.
- The *Canadian Navigable Waters Act* came into force in 2019, amending the *Navigation Protection Act*.
- The British Columbia *Environmental Assessment Act* came into force in 2019. Modernization under the new Act includes identification of matters for consideration under section 25.
- On February 21, 2020, the Province of British Columbia, the Government of Canada, Saluteau First Nations, and West Moberly First Nations signed a partnership agreement for the Conservation of the Southern Mountain Caribou – Central Group (Province of British Columbia 2023a). The Eastern Route Alternative overlaps with Zone B1 (Sustainable Resource Activity Area).
- The Migratory Birds Regulations were updated in 2022, changing protection from all nests of migratory birds to most nests being protected when they contain a live bird or viable egg and providing specific guidance for the nests of certain migratory bird species when the nests do not contain a live bird or viable egg.
- In September 2023, the *Energy Resources Activities Act* came into force, replacing the *Oil and Gas Activities Act*.

**Table 1.2 Summary of Applicable Legislation**

Legislation	Legislation Relevance
<b>Federal</b>	
<i>Fisheries Act</i>	Sections 34 and 35 of the <i>Fisheries Act</i> (1985) prohibit the “harmful alteration, disruption, or destruction of fish habitat” (HADD) and the “killing of fish by means other than fishing” unless prior authorization is obtained. Section 36 prohibits the introduction of deleterious substances into waters used by fish; it is not possible to obtain an authorization or permit that allows the deposition or discharge of a deleterious substance.
<i>Species at Risk Act</i>	Section 32 of the <i>Species at Risk Act</i> (2002) prohibits the killing, harming, harassment, capture, or take of an individual of a wildlife species that is listed as an extirpated species, an endangered species, or a threatened species unless authorized by permit.
<i>Migratory Birds Convention Act, 1994</i>	Section 5.1 of the <i>Migratory Birds Convention Act, 1994</i> prohibits depositing a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.



Legislation	Legislation Relevance
Migratory Birds Regulations, 2022, under the <i>Migratory Birds Convention Act, 1994</i>	Section 5 prohibits the damage, destruction, removal, or disturbance of a nest of a migratory bird when the nest contains a live bird or viable egg. The nest of a migratory bird may have additional protections if the nest is of a species of migratory bird that is listed in Schedule 1 of the Migratory Birds Regulations or has a residence description under the <i>Species at Risk Act</i> .
<i>Canadian Navigable Waters Act</i>	Section 3 of the <i>Canadian Navigable Waters Act</i> (1985) prohibits the construction, placement, alteration, rebuilding, or decommissioning of a work in, on, over, under, through or across any navigable water unless authorized by a permit
<b>Provincial</b>	
<i>Environmental Assessment Act</i> (2018)	Section 32 of the <i>Environmental Assessment Act</i> (2018) allows the holder of an EAC to apply in writing to the chief executive assessment officer to amend the certificate, providing the holder's reasons for the application.
<i>Land Act</i>	Section 39 of the <i>Land Act</i> requires a permit to enter, occupy and use unoccupied Crown land to carry out permitted Project activities.
<i>Environmental Management Act</i>	Section 6 of the <i>Environmental Management Act</i> regulates air and effluent emissions from oil and gas facilities.
<i>Energy Resource Activities Act</i>	Section 4 of the <i>Energy Resource Activities Act</i> allows the British Columbia Energy Regulator (BCER) to regulate energy resource activities in a manner that protects public safety and the environment, supports reconciliation with Indigenous peoples and the transition to low-carbon energy, conserves energy resources and fosters a sound economy and social well-being.
<i>Water Sustainability Act</i>	Section 6 of the <i>Water Sustainability Act</i> prohibits the diversion/use of ground or surface water unless prior authorization is obtained. Sections 10 and 11 allow for use or diversion of water and changes in and about a stream with prior authorization respectively.
<i>Wildlife Act</i>	Section 9 of the <i>Wildlife Act</i> prohibits the destruction of beaver and muskrat dens as well as beaver dams. Sections 26, 29, 33, and 37 prohibit the injury, killing, capture, possession, or transport of any wildlife without a permit. Section 34 prohibits possessing, taking, injuring, molesting, or destroying a bird or its egg and the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl.
<i>Heritage Conservation Act</i>	The <i>Heritage Conservation Act</i> prohibits the damage, desecration, or alteration of any heritage artifact including evidence of human habitation or use before 1846 without a permit issued under Section 12 of the Act.

### 1.3.2 Applicable Licenses, Permits and Approvals

Table 1.3 identifies the federal and provincial approvals, authorizations, permits and licenses required for the construction of the proposed changes identified in this Amendment application.



**Prince Rupert Gas Transmission Project:**  
**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 1 Introduction**  
August 2024

**Table 1.3 Summary of Applicable Licenses, Permits, and/or Approvals**

<b>License, Permit, and/or Approval</b>	<b>Legislation</b>	<b>Regulator</b>	<b>Purpose</b>
EAC Amendment	<i>Environmental Assessment Act</i>	EAO	Amendment to EAC #E14-06
Pipeline Permit	<i>Energy Resource Activities Act</i>	BCER	Amendment to BCER Permit #9708456/100082204 and #9708458/100082205
License of Occupation	<i>Land Act</i>	BCER	Approval to occupy Crown land
Master License to Cut	<i>Forest Act</i>	BCER	Removal of Crown timber for clearing and construction
Road Permits	<i>Energy Resource Activities Act</i>	BCER	Approval to build new roads and transition/amend road application
Heritage Inspection Permit	<i>Heritage Conservation Act</i>	BCER (as of June 1, 2024)	Required for Archaeological Impact Assessment (AIA) and archaeological chance find response, prerequisite for Alteration permit
Alteration Permit	<i>Heritage Conservation Act</i>	BCER (as of June 1, 2024)	Permit for construction activities within recorded archaeological site boundaries
Approval for Changes in and About a Stream	<i>Water Sustainability Act</i>	BCER	Authorization for changes in and about a stream
Water Withdrawals	<i>Water Sustainability Act</i>	BCER	Authorization for withdrawing water
Highway Use Permit	<i>Transportation Act</i>	MOTI	Temporary or permanent use or occupation of provincial highway right-of-way during construction or operation of the pipeline
Waste Discharge Authorization	<i>Environmental Management Act</i>	BCER	Air contaminant discharge from compressor station
Approvals under the <i>Canadian Navigable Waters Act</i>	<i>Canadian Navigable Waters Act</i>	Transport Canada	Approval to obstruct navigable waters
Request for Review Authorization for a harmful alternation, disruption or destruction of fish habitat	<i>Fisheries Act</i>	DFO	Request for Review is used to obtain the opinion of DFO as to whether proposed activities are likely to result in a HADD under the <i>Fisheries Act</i> .  A <i>Fisheries Act</i> authorization would be necessary if DFO determines proposed activities are likely to result in HADD.

Notes:

BCER = British Columbia Energy Regulator; DFO = Fisheries and Oceans Canada; EAO = Environmental Assessment Office; ECCC = Environment and Climate Change Canada; MOTI = British Columbia Ministry of Transportation and Infrastructure





In *Yahey v British Columbia* (2021 BCSC 1287), the British Columbia Supreme Court determined that the extent of industrial development and associated impacts within the territory of Blueberry River First Nations has infringed upon their exercise of rights to hunt, fish, and trap in their territory as part of their way of life. In response to the *Yahey* decision, the Province of British Columbia has established a cumulative effects framework that involves a new approach to resource management and the protection of Treaty rights in the Blueberry River First Nations Claim Area through measures to address the cumulative effects of past and future resource disturbances through restoration, protection of areas impacted by industrial development, and to manage certain development activities. Similar agreements were made with several Treaty 8 signatories (Consensus Document). The intent of the Implementation Agreement and Consensus Document is to limit further adverse effects on the rights of Indigenous Peoples. In response to the Implementation Agreement and Consensus Document (Doig River First Nation 2023a, 2023b; Halfway River First Nation 2023a, 2023b; Saulteau First Nations 2023a, 2023b), the BCER introduced the Treaty 8 Planning and Mitigation Measures (BCER 2024), which came into effect in April 2024. PRGT will continue to engage with Treaty 8 First Nations and BCER regarding the Project and the proposed Eastern Route Alternative, including with regard to Treaty 8 Planning and Mitigation Measures.



## **2 Proposed Changes to the EAC**

PRGT is proposing the Eastern Route Alternative to include an alternate initiation point. The result is a route that would replace approximately 223 km of the eastern most portion of the approved route if selected. This Eastern Route Alternative is approximately 164 km long, which is 60 km shorter than the approved route. The Eastern Route Alternative would need to be added to the CPD of EAC #14-06 (PRGT 2014b). Only one route will be constructed; that is, if the Eastern Route Alternative is selected, the corresponding eastern 223 km of the original approved route and its associated facilities in the Application (PRGT 2014a) would not be constructed. Within the Eastern Route Alternative there are several micro-route options being assessed at critical locations such as major river crossings. Because of these options being considered, the total length routing assessed in this Amendment is 172 km. The final constructed length of the pipeline will only include one route and will be shorter than the assessed length.

### **2.1 Project Phases**

Project phases would be unchanged from those described in the Application (PRGT 2014a). Construction, including the Eastern Route Alternative if selected, would occur over a period of approximately four years and the operational life of the Project is expected to be greater than 40 years.

### **2.2 Project Components**

Consistent with the CPC, the Eastern Route Alternative will be added generally as a 500 metre (m) wide corridor with some variation in width in some areas to allow for flexibility in ongoing planning, detailed design, and constructability. The use of a corridor-based approach will also allow for route refinement within this corridor to address feedback from Indigenous Nations and environmental, engineering, geotechnical, and other routing considerations.

#### **2.2.1 ROW and Pipeline**

The dimensions of the construction ROW will vary depending on terrain, construction techniques, access, and the extent and nature of adjacent existing ROWs. For the purposes of the effects assessment, a 100 m wide construction ROW has been assumed (see Section 4.2.1), consistent with the Application (PRGT 2014a). PRGT will apply for a 32 m wide permanent ROW containing one 1,219 millimetre (mm) diameter (Nominal Pipe Size 48) pipeline.

#### **2.2.2 Compressor Station**

One compressor station would be constructed near the initiation point of the Eastern Route Alternative. The compressor station would not result in changes to the capacity of the pipeline. PRGT continues to evaluate whether the compressor station will be powered by natural gas-fired turbines or electric motor drive. As such, both options are considered in this Amendment.



### **2.2.3 Meter Station**

An additional meter station would be added to the CPD near the initiation point of the Eastern Route Alternative. A final footprint has not been defined for the compressor station or the meter station near the initiation point of the Eastern Route alternative, but is expected to be within the CPC. Once designed, the total area of the co-located compressor station and meter station footprint is not expected to exceed 20 ha.

### **2.2.4 Other Project Components**

Other areas of planned disturbance, such as associated temporary ancillary infrastructure (e.g., new access roads, bridges, shoo-flies, temporary storage, and construction camps) may extend beyond the CPC.

## **2.3 Proposed Changes to the Certified Project Description**

In the CPD, Section 1.0 would need to be revised to include the potential initiation point west of Chetwynd. Section 1 of the CPD currently references one meter station and would need to be revised to include meter stations.

Paragraph 2 of Section 2 of the CPD currently reads:

*“The pipeline from Hudson’s Hope to the marine entry point in Nasoga Gulf has a Nominal Pipe Size of 48 inches (1219 mm Outside Diameter). The pipeline within Nass Bay to Echo Cove and Iceberg Bay has a Nominal Pipe Size of 48 inches (1219 mm Outside Diameter).”*

This paragraph would be revised to also reference the potential initiation point west of Chetwynd in northeastern British Columbia.

In the CPD, Section 2.1. (Location), paragraph 2 reads:

*“Where two options for the Certified Pipeline Corridor are set out in Appendix A on Mapsheets 1-69 to 1-74, 1-97, 1-98 to 1-106, the pipeline is constructed within one of the options, not both.”*

This paragraph would be revised to mention the new applicable page ranges for this Amendment.

Section 3 of the CPD currently references compressor station locations for the existing approved route. This section would be revised to include the new compressor station location near the initiation point west of Chetwynd which may be powered by natural gas-fired turbines or electric motor drive and may include a high voltage substation and stand-by compressor units.

Section 4 of the CPD currently references one meter station located at the delivery point. This section would be updated to reference one potential additional meter station near the Eastern Route Alternative initiation point. Section 4.1 of the CPD would be updated with the location of the potential meter station near the Eastern Route Alternative initiation point.



## **3 Engagement and Consultation**

PRGT is in the process of engaging with potentially affected Indigenous Nations, regulators, landowners and other stakeholders to identify interests, concerns or issues they may have regarding this Amendment. The intent of engagement is to facilitate open discussions and collaboration with potentially affected parties. This may include identification of potential Project effects and mitigation measures. As engagement with Indigenous groups, regulators, landowners, and other stakeholders continues, Project -related concerns will be addressed.

### **3.1 Indigenous Nation Engagement**

PRGT undertook a rigorous multi-year Environmental Assessment process to study and assess potential environmental, economic, social, heritage, and health effects, as well as effects on Indigenous rights and interests associated with the Project. Through this review process, PRGT engaged and consulted Indigenous Nations in accordance with EAO's Order under section 11 and the approved Aboriginal Consultation Plan for the Project. PRGT identified and assessed the effects on Indigenous interests, including Traditional Land Use (TLU) and Traditional Ecological Knowledge (TEK) as well as other interests and concerns with respect to the Project.

During the engagement process for the Project, PRGT received feedback and concerns from Indigenous Nations about project routing for the eastern most portion of the route. Based on the feedback received, PRGT identified the Eastern Route Alternative as a route that would avoid identified areas of cultural and environmental importance.

PRGT has received feedback from several Indigenous Nations about the Eastern Route Alternative. Information shared through PRGT's Project-specific engagement, Project-specific TLU studies, and literature review, where available, is used in the Amendment to identify whether any new Indigenous interests and concerns have been identified. This information has also been considered in the assessment of related environmental and socioeconomic VCs, such as vegetation and wetland resources (Section 11), wildlife and wildlife habitat (Section 12), heritage and archaeological resources (Section 17) and human health (Section 18).

Indigenous Nations engaged on the Amendment include the Treaty 8 First Nations of Blueberry River First Nations, Doig River First Nation, Halfway River First Nation, Horse Lake First Nation, McLeod Lake Indian Band, Sauteau First Nations, and West Moberly First Nations. Non-treaty Nations engaged include Nak'azdli Whut'en and Takla Nation.

PRGT has been reviewing historical information and re-engaging with Indigenous Nations since early 2023 to understand issues, concerns, and interests as some time has passed since previous engagement on the Project. Through historical reviews and recent engagement, several Indigenous Nations have raised concerns with the approved route through their traditional territories. These concerns include routing through areas of cultural importance, caribou habitat, areas of environmental importance, impacts to areas of traditional importance, the creation of new linear disturbances and cumulative impacts



associated with the Project since the time the EAC was originally issued, and the current changing context for industrial development within Treaty 8 territory in light of the 2021 decision in *Yahey v. British Columbia* that determined that the Government of British Columbia had infringed on the rights of Blueberry River First Nations under Treaty 8 through cumulative effects from provincially authorized developments.

Since April 2023, PRGT has been carrying out technical feasibility studies focused on reviewing areas of concern identified by Indigenous Nations, constructability flyovers, reviewing technical data, and historical routing engagement. Through these efforts, PRGT identified two route alternatives for the eastern portion of the Project to address routing concerns shared to date. These two potential alternative route options were known at the time as Option 1 and Option 2. These alternatives were carefully considered as broad corridors with the potential for flexibility. Option 1 is reflected in this Amendment. Option 2 would have followed the existing Highway 97 corridor until it reached Callazon Creek (70 km west of Chetwynd). It then would have paralleled Callazon Creek Forest Service Road (FSR) for approximately 4 km before rejoining the approved route near KP 115. PRGT engaged with affected Indigenous Nations on these options, resulting in the selection of the route alternative included in this Amendment.

PRGT shared a draft copy of this Amendment with Blueberry River First Nations, Doig River First Nation, Halfway River First Nation, Horse Lake First Nation, McLeod Lake Indian Band, Sauteau First Nations, West Moberly First Nations, Nak'azdli Whut'en, and Takla Nation for comment prior to finalizing for submission to EAO. Feedback received from Indigenous Nations on that draft has been integrated into this Amendment.

The following provides a summary of engagement activities undertaken with each of the affected Indigenous Nations.

### **3.1.1 Blueberry River First Nations**

On October 12, 2023, PRGT sent an email to Blueberry River First Nations providing an update regarding re-route options, sharing that the Project is actively analyzing options for an eastern route alternative which includes carrying out technical feasibility studies, flyovers and review of areas of concern, and historical routing studies. PRGT invited Blueberry River First Nations to a meeting for further discussion.

On October 17, 2023, PRGT sent a follow up email to Blueberry River First Nations, offering to discuss the information provided in PRGT's October 12, 2023 email.

On October 24, 2023, PRGT sent an email to Blueberry River First Nations, requesting a meeting to review and discuss the Project, including potential eastern alternative route options.

On October 27, 2023, PRGT sent an email to Blueberry River First Nations providing a map and spatial files identifying the approved route, as well as two eastern alternative route options for consideration. PRGT offered the opportunity to discuss any questions, concerns or feedback Blueberry River First Nations may have.



A meeting was scheduled on March 19, 2024, to discuss the Amendment with PRGT and Blueberry River First Nations. At the request of Blueberry River First Nations, this meeting was postponed. PRGT followed up with Blueberry River First Nations proposing alternate dates for the meeting.

On April 9, 2024, PRGT sent an email to Blueberry River First Nations highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On June 10, 2024, PRGT provided Blueberry River First Nations with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by Blueberry River First Nations on the draft.

An online meeting was scheduled on June 26, 2024, to discuss the amendment with PRGT and Blueberry River First Nations, but Blueberry River First Nations participants were unable to attend. In the following weeks, PRGT followed up with Blueberry River First Nations requesting alternate dates for the meeting.

PRGT will continue to incorporate feedback from Blueberry River First Nations gathered in the course of ongoing engagement in project planning.

### **3.1.2 Doig River First Nation**

On October 12, 2023, PRGT sent an email to Doig River First Nation providing an update regarding re-route options, sharing that the Project is actively analyzing options for an eastern route alternative. PRGT invited Doig River First Nation to a meeting for further discussion.

On October 18, 2023, PRGT met with Doig River First Nation to provide a PRGT Project update and overview of the eastern alternative route options, benefits, and upcoming engagement. Doig River First Nation did not raise any concerns about the eastern alternative route options but advised that they would need the spatial files to review in more detail.

On October 19, 2023, PRGT sent an email to Doig River First Nation providing a map and spatial files of the two eastern alternative route options under consideration for review.

On February 27, 2024, Doig River First Nation noted it is gathering feedback from community members regarding the eastern alternative route options and will provide this feedback to PRGT in March 2024.

On April 9, 2024, PRGT sent an email to Doig River First Nation highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On June 10, 2024 PRGT provided Doig River First Nation with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by Doig River First Nation on the draft.

PRGT will continue to incorporate feedback from Doig River First Nation gathered in the course of ongoing engagement in project planning.



### **3.1.3 Halfway River First Nation**

On October 12, 2023, PRGT sent an email to Halfway River First Nation providing an update regarding re-route options, sharing that the Project is actively analyzing options for an eastern route alternative. PRGT invited Halfway River First Nation to a meeting for further discussion.

On October 24, 2023, PRGT sent an email to Halfway River First Nation requesting a meeting to discuss the PRGT Project and review the two eastern alternative route options for consideration.

On October 27, 2023, PRGT sent an email to Halfway River First Nation providing Halfway River First Nation with a map and spatial files of the Project's eastern alternative route options for review and discussion, in anticipation of a schedule meeting on November 20, 2023.

On November 20, 2023, PRGT held a meeting with Halfway River First Nation to share a Project update. Halfway River First Nation asked what PRGT is doing to reduce cumulative effects regarding the currently permitted route. PRGT responded that, to address concerns heard from Indigenous Nations, the Project is exploring routing options that are within existing disturbances to reduce potential cumulative effects.

On April 9, 2024, PRGT sent an email to Halfway River First Nation, highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On June 10, 2024, PRGT provided Halfway River First Nation with a copy of the draft Amendment for review and comment. PRGT received feedback from Halfway River First Nation on the draft Amendment on August 2, 2024. PRGT is reviewing the feedback received from Halfway River First Nation and will work with Halfway River First Nation to address their feedback.

PRGT will continue to incorporate feedback from Halfway River First Nation gathered in the course of ongoing engagement in Project planning.

### **3.1.4 Horse Lake First Nation**

On January 9, 2024, PRGT sent an email to Horse Lake First Nation providing an update regarding re-route options and sharing that the Project is actively analyzing options for an eastern route alternative.

On April 9, 2024, PRGT sent an email to Horse Lake First Nation, highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On June 10, 2024, PRGT provided Horse Lake First Nation with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by Horse Lake First Nation on the draft.

PRGT will continue to incorporate feedback from Horse Lake First Nation gathered in the course of ongoing engagement in project planning.



### **3.1.5 McLeod Lake Indian Band**

On October 12, 2023, PRGT sent an email to McLeod Lake Indian Band providing an update regarding routing options to address McLeod Lake Indian Band's previous feedback and sharing that PRGT is actively analyzing options for an eastern route alternative. PRGT invited McLeod Lake Indian Band to a meeting for further discussion.

On October 12, 2023, McLeod Lake Indian Band sent an email to PRGT expressing concerns with the Project's approved route crossing into the Callazon and/or Mugaha valleys, recommending a re-route through the Pine Pass. PRGT responded via email, acknowledging McLeod Lake Indian Band's feedback and reiterated PRGT's ongoing analysis of re-routing to address identified concerns. PRGT and McLeod Lake Indian Band scheduled a meeting for November 8, 2023 to review the potential eastern route alternative.

On October 27, 2023, PRGT sent an email to McLeod Lake Indian Band and shared spatial data and maps depicting the approved route, as well as two alternative route options in advance of the upcoming meeting set to take place on November 8, 2023.

On November 8, 2023, PRGT met with McLeod Lake Indian Band to discuss two eastern alternative route options. PRGT provided an overview of the original approved route, as well as information regarding two potential alternative route options. PRGT indicated its intent to maintain existing permits to preserve the Project's corridor, and to apply for new permits for a potential alternative route if approved and selected. McLeod Lake Indian Band confirmed that Option 1, the alternative route that avoids the Callazon and Mugaha valleys, addressed their concerns. McLeod Lake Indian Band stated their intent to thoroughly review the Option 1 alternative route and provide further feedback.

On January 25, 2024, PRGT met with McLeod Lake Indian Band to discuss feedback regarding the alternative route options. McLeod Lake Indian Band expressed the following ecological and environmental concerns and recommendations regarding an eastern alternative route:

- Requested avoidance of an ecologically sensitive area (drinking water stream) and recommended that PRGT use horizontal directional drilling (HDD) or bore the section to completely avoid the area and expressed concerns for erosion and sediment control, recommending a trenchless option.
- Requested access controls to be implemented, with revegetation to occur following the completion of construction.

PRGT anticipates being able to address McLeod Lake Indian Band's concerns regarding the drinking water stream through a combination of construction techniques, crossing methods, micro-routing, and workspace allocation.

On April 9, 2024, PRGT sent an email to McLeod Lake Indian Band highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.





On May 27, 2024, PRGT met virtually with McLeod Lake Indian Band representatives to discuss the Eastern Route Alternative. McLeod Lake Indian Band requested additional information on project planning and the benefits to McLeod Lake Indian Band and other Nations in northeast British Columbia.

On June 10, 2024, PRGT provided McLeod Lake Indian Band with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by McLeod Lake Indian Band on the draft.

PRGT will continue to incorporate feedback from McLeod Lake Indian Band gathered in the course of ongoing engagement in project planning.

### **3.1.6      Saulteau First Nations**

During initial routing discussions with Saulteau First Nations in advance of filing the Application (PRGT 2014a), Saulteau First Nations identified a key concern related to the proposed corridor through their traditional territory. Saulteau First Nations requested PRGT consider routing the Project through Pine Pass as a potential alternative route. PRGT undertook routing and engineering studies that determined that the proposed route was not feasible. At Saulteau First Nations' request, PRGT provided funding to Saulteau First Nations to undertake an independent routing review. Helicopter flyovers were completed with Saulteau First Nations representatives as part of this review.

On October 12, 2023, PRGT sent an email to Saulteau First Nations to provided an update regarding route options. PRGT indicated that it is actively analyzing options for an eastern route alternative. PRGT invited Saulteau First Nations to a meeting for further discussion.

On October 17, 2023, PRGT met with Saulteau First Nations to discuss two eastern alternative route options. PRGT provided an overview of the approved route, as well as information regarding two potential route alternatives. PRGT indicated its intent to maintain existing permits to preserve the Project's corridor, and to apply for new future permits for an alternative route if approved and selected. During the meeting, Saulteau First Nations expressed environmental and cultural concerns with the approved route. PRGT responded by reiterating commitments to work together on feasible alternate route options. PRGT shared the following contextual changes regarding the route options:

- Both alternative route options do not impact Saulteau First Nations Treaty Land Entitlement (TLE)
- Both alternative route options do not impact/affect any Saulteau First Nations Area of Critical Community Interest (ACCI)
- Impacts to Caribou Partnership Agreement area are reduced with both options

On October 19, 2023, PRGT sent an email to Saulteau First Nations providing maps of the Project's eastern alternative route options, as well as spatial files to review in anticipation of a proposed a follow-up meeting to discuss outstanding questions, concerns, or feedback.

On November 3, 2023, PRGT emailed Saulteau First Nations to follow up on the maps and spatial files that were sent on October 19, 2023.



On November 9, 2023, PRGT emailed Saulteau First Nations with a commitment to not begin construction in any permitted section of the approved route within Saulteau First Nations traditional territory until the conclusion of the amendment process for an eastern route alternative. PRGT requested a meeting with Saulteau First Nations, Ksi Lisims, BCER, and the EAO to further discuss Saulteau First Nations's concerns and establish a path forward together.

On November 15, 2023, PRGT called Saulteau First Nations to confirm a meeting with Ksi Lisims, BCER, Saulteau First Nations, and PRGT for December 4, 2023, in Vancouver.

On November 16, 2023, PRGT emailed Saulteau First Nations with regard to a communication between PRGT and BCER. In the email, PRGT reiterated the commitment to progress an eastern alternative route through the EAO amendment process.

On December 4, 2023, PRGT met with Saulteau First Nations, BCER, and the EAO to discuss the Project's eastern route alternative options. Saulteau First Nations requested a commitment that PRGT not pursue construction in Pipeline Section 1 under any scenario. Saulteau First Nations expressed a preference for route alternative Option 1 (the alternative included in this Amendment), stating it was a better route. Saulteau First Nations indicated they would like to see an eastern alternative amendment application actioned as soon as possible.

On January 22, 2024, PRGT sent an email to Saulteau First Nations to confirm PRGT's intent to advance an amendment for an eastern route alternative to address issues identified by Saulteau First Nations. As well, subject to conditions outlined in the agreement, PRGT committed to not initiating construction activity associated with the Section 1 and Johnson Creek facility permit extensions.

On April 9, 2024, PRGT sent an email to Saulteau First Nations highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On June 10, 2024, PRGT provided Saulteau First Nations with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by Saulteau First Nations on the draft.

PRGT will continue to incorporate feedback from Saulteau First Nations gathered in the course of ongoing engagement in project planning.

### **3.1.7 West Moberly First Nations**

On October 24, 2023, PRGT sent an email to West Moberly First Nations requesting an introductory meeting to review and discuss the Project, including two eastern alternative route options.

On October 27, 2023, PRGT sent an email to West Moberly First Nations providing them with a map and spatial files of the Project's eastern alternative route options for review, as well as additional context in anticipation of a planned meeting on October 30, 2023.



On October 30, 2023, PRGT met with West Moberly First Nations to review the Project, including two eastern alternative route options. West Moberly First Nations indicated that the Project is still proposing routes through some areas of concern and inquired further if the Caribou Partnership Agreement and Peace Moberly Tract (PMT) layers could be added to the spatial data. PRGT shared that the PMT and Caribou Partnership Agreement areas are included on the map and that those layers will be included in the spatial data.

On November 1, 2023, PRGT met with West Moberly First Nations to review the Project's eastern route alternative options. PRGT provided an overview of the approved route and the alternative route options. PRGT addressed West Moberly First Nations's routing concerns, reiterated the requirement for an EAC amendment for the selected eastern alternative route option, and BCER pipeline and facility permit extensions. West Moberly First Nations indicated that, based on the high-level review, the alternatives addressed their concerns, adding that Option 1 (the alternative included in this Amendment) appeared reasonable as it avoids Upper Moberly and the caribou area. West Moberly First Nations indicated they would need time to review the alternatives in detail to provide a thorough assessment.

On April 9, 2024, PRGT sent an email to West Moberly First Nations highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On May 9, 2024, PRGT met virtually with West Moberly First Nations to discuss the eastern route alternative. West Moberly First Nations informed PRGT that they have a TLE claim in the eastern route alternative area. West Moberly First Nations inquired about the need for additional compression at Enbridge Willow Flats CS2 and also inquired about capacity funding and opportunity to review documents associated with the eastern route alternative. PRGT stated that it is not sure about additional compression at Enbridge Willow Flats CS2 and confirmed that a funding agreement has been drafted and West Moberly First Nations will be given opportunity to review and provide feedback on the draft Amendment before filing.

On June 10, 2024 PRGT provided West Moberly First Nations with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by West Moberly First Nations on the draft.

PRGT will continue to incorporate feedback from West Moberly First Nations gathered in the course of ongoing engagement in project planning.

### **3.1.8 Nak'azdli Whut'en**

On October 24, 2023, PRGT sent an email to Nak'azdli Whut'en and provided a map and spatial files identifying the approved route and two eastern alternative route options under consideration. PRGT invited Nak'azdli Whut'en the opportunity to discuss any questions, concerns, or feedback they may have regarding the Project.



On April 9, 2024, PRGT sent an email to Nak'azdli Whut'en, highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On April 24, 2024, PRGT met with Nak'azdli Whut'en Chief and Council and Keyoh holders to share information about the eastern alternative route and amendment process. PRGT committed to continued dialogue and engagement with Nak'azdli Whut'en once the Nation has had the opportunity to thoroughly review the alternative route.

On June 10, 2024, PRGT provided Nak'azdli Whut'en with a copy of the draft Amendment for review and comment. At the time of filing, no feedback had been provided by Nak'azdli Whut'en on the draft.

On July 4 and July 17, PRGT met virtually with the Nak'azdli Whut'en Chief and Council, Keyoh Liaison, and Keyoh Holders to discuss the Amendment and fieldwork associated with the Eastern Route Alternative. Keyoh holders wanted to understand the reasoning for the amendment. Keyoh holders expressed concerns including communicating Project updates, cumulative impacts, routing, and gaps in the spawning habitat assessment. Concerns were raised that fieldwork to support the Eastern Route Alternative were being conducted without prior notification to Keyoh holders. PRGT has committed to sending notifications to Keyoh holders prior to field work taking place with the intention that a Keyoh holder have the opportunity, where possible to attend as a Keyoh monitor. PRGT has also committed to work with Nak'azdli Whut'en and Keyoh holders to develop and implement the Construction Monitoring and Community Liaison Program and to providing Project updates and engaging on these updates on a regular basis. Keyoh Holders also indicated that the alternative route brought the pipeline close to a family cabin, that the proposed alternative route crosses the Philip Lake Trapline, is too close to lakes and streams, and that there was a preference to see the alternative route shifted to the other side of this area. A Keyoh Holder also expressed that the individual is not in support of the Amendment.

On August 20, 2024, Nak'azdli Whut'en provided the location of the cabin identified in the July 17 meeting by email. PRGT will work with Nak'azdli Whut'en to address their concern related to this cabin during ongoing project planning.

PRGT will continue to incorporate feedback from Nak'azdli Whut'en gathered in the course of ongoing engagement in project planning.

### **3.1.9 Takla Nation**

On October 28, 2023, PRGT sent Takla Nation a map and spatial file identifying the approved route and two eastern alternative route options. PRGT requested the opportunity to discuss any questions, concerns, or feedback Takla Nation may have.

On December 19, 2023, PRGT met with Takla Nation and provided a presentation outlining the Project and an update on the eastern route alternative. PRGT committed to continuing to seek feedback from Takla Nation.

On January 18, 2024, PRGT met with Takla Nation. During that meeting, PRGT asked for Takla Nation to review two proposed route options and provide feedback when able.



On January 23, 2024, PRGT emailed Takla Nation staff and leadership to provide further information regarding the Eastern Route Alternative .

On February 1, 2024, PRGT confirmed that Takla Nation had access to all maps, spatial files, and presentations related to the eastern route alternative through the TC Energy Sharepoint site.

On February 27, 2024, PRGT spoke with Takla Nation's consultant requesting comments regarding the eastern route alternative. Takla Nation's consultant indicated that he would raise the issue with Takla leadership and staff on February 28, 2024.

On February 28, 2024, PRGT spoke with Takla Nation and PRGT re-iterated the interest in receiving Takla Nation's comments and feedback regarding the eastern route alternative. Takla Nation indicated that the Lands and Resources team is still reviewing the documentation on the TC Energy Sharepoint site and would be able to respond once they had completed their review.

On February 29, 2024, PRGT received an email from Takla Nation indicating that a key reviewer in the Takla Nation Lands Department is on holidays until March 6.

On April 9, 2024, PRGT sent an email to Takla Nation, highlighting the opportunity for subcontracting opportunities regarding field work participation in the environmental surveys of the Eastern Route Alternative.

On May 22, 2024, PRGT met virtually with Takla Nation representatives to discuss the Eastern Route Alternative. Takla Nation inquired about the procurement process for fieldwork contracts and PRGT confirmed that they welcome further discussions on the topic. Takla Nation also stated they are interested in completing an updated TLU study that considers cumulative effects. PRGT responded that Takla Nation will have the opportunity for their TLU report to be updated or a new TLU Report shared and future meetings will be scheduled to discuss.

On June 10, 2024, PRGT provided Takla Nation with a copy of the draft Amendment for review and comment.

On July 17, 2024, Takla Nation provided feedback on the draft Amendment to PRGT by email. Takla Nation noted that caribou are an integral component of Takla Nation's culture and acknowledged that the Eastern Route Alternative has been routed to avoid the Moberly caribou herd. Takla Nation also noted that the many herds located in Takla Nation's territory are in decline, particularly the Takla herd.

PRGT will continue to incorporate feedback from Takla Nation gathered in the course of ongoing engagement in project planning.

### **3.1.10 Summary of Indigenous Nations' Feedback on the Eastern Route Alternative Amendment**

Table 3.1 provides a summary of the feedback received by Indigenous Nations on the Amendment and PRGT's response to these concerns. Where feedback applies to the VCs considered in the Amendment, a cross-reference to the relevant section(s) is included.



**Table 3.1 Summary of Indigenous Nations Feedback on the Eastern Route Alternative Amendment**

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Halfway River First Nation	November 20, 2023	Halfway River First Nation inquired what PRGT is doing to reduce cumulative effects regarding the currently permitted route.	PRGT acknowledges this comment. To address concerns heard from Indigenous Nations the Project is exploring routing options that are within existing disturbances to further reduce potential cumulative effects.
McLeod Lake Indian Band	October 12, 2023	McLeod Lake Indian Band expressed concerns with the Project's approved route crossing into the Callazon and/or Mugaha valleys, recommending a re-route through the Pine Pass.	PRGT is committed to ongoing engagement and analysis of re-routing to address identified concerns. The Eastern Route Alternative avoids the Callazon and Mugaha valleys.
McLeod Lake Indian Band	January 25, 2024	McLeod Lake Indian Band expressed concerns of the route passing through an ecologically sensitive area (drinking water stream), erosion and sediment control, and recommended a trenchless option.	PRGT is committed to ongoing engagement and analysis of re-routing to address identified concerns. Erosion and sediment control are addressed in Section 7.0 (Water Quality) and the Erosion and Sediment Control Management Plan.
McLeod Lake Indian Band	January 25, 2024	McLeod Lake Indian Band requested access controls to be implemented, with revegetation to occur following the completion of construction.	The Application (PRGT 2014a) included mitigation measures related to access management, which will be applied to the Amendment. In addition, the effectiveness of reclamation and access control measures will be monitored by PRGT during post-construction monitoring.
Nak'azdli Whut'en	April 24, 2024	Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en expressed concern for impacts to upstream water as a result of the electrification and power draw required for compressor stations.	PRGT will continue to engage with Nak'azdli Whut'en in relation to their feedback about potential impacts associated with future power requirements.
Nak'azdli Whut'en	April 24, 2024	Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en expressed concern about drought.	Water use will be proposed and evaluated under the <i>Water Sustainability Act</i> permitting process, as outlined in Section 8.3.1.2 of the hydrology assessment.
Nak'azdli Whut'en	April 24, 2024	Nak'azdli Whut'en raised concerns around gaps in the spawning habitat assessment.	Data gathered from field-based fish and fish habitat assessments will be incorporated into construction planning to avoid and mitigate potential adverse effects to fish and fish habitat (see Section 9.0).
Nak'azdli Whut'en	April 24, 2024	Keyoh Holders also indicated that the reroute brought the pipeline close to a family cabin, that the proposed reroute crosses the Philip Lake Trapline.	Habitation areas, including cabins, are considered in Section 20.0 (Indigenous Interests). The Philip Creek Trapline is considered in Section 16.0 (Land and Resource Use).



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Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Nak'azdli Whut'en	July 4, 2024	Nak'azdli Whut'en Keyoh Holders raised concerns regarding cumulative impacts and routing, stating the route is located too close to some lakes and streams.	Cumulative effects are addressed in the VC chapters of the Amendment (see Section 4.0). The proposed Eastern Route Alternative has been selected to parallel existing disturbance where feasible (see Section 1.0).
Nak'azdli Whut'en	July 4, 2024	Nak'azdli Whut'en indicated that salmon numbers have declined to a point of collapse and expressed concern for caribou.	Amendment-related effects of increased access on mortality risk for caribou are assessed in wildlife Sections 12.3.1.3 and 12.3.2.3. Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in wildlife Sections 12.3.1.1 and 12.3.1.2.
Saulteau First Nations	October 17, 2023	Saulteau First Nations expressed environmental and cultural concerns with the approved route.	PRGT responded by reiterating commitments to work together on feasible route options. PRGT shared the following contextual changes regarding the route options: <ul style="list-style-type: none"> <li>Both alternative route options do not impact Saulteau First Nations TLE</li> <li>Both alternative route options do not impact/affect any Saulteau First Nations ACCI</li> <li>Impacts to the Caribou Partnership Agreement area are reduced with both route options</li> </ul>
Takla Nation	May 22, 2024	Takla Nation also stated they are interested in completing an updated TLU study that considers cumulative effects.	PRGT responded that Takla Nation will have the opportunity for their TLU report to be updated or a new TLU Report shared and future meetings will be scheduled to discuss.
Takla Nation	July 17, 2024	Takla Nation noted that caribou are an integral component of Takla Nation's culture and acknowledged that the Eastern Route Alternative has been routed to avoid the Moberly caribou herd. Takla Nation also noted that the many herds located in Takla Nation's territory are in decline, particularly the Takla herd.	As noted, the eastern route alternative have been routed to avoid the Moberly caribou herd.
West Moberly First Nations	October 30, 2023	West Moberly First Nations expressed concerns with routing, citing areas of concerns in the Caribou Partnership and Peace Moberly Tract areas.	The eastern route alternative includes consideration of areas of interest identified by Indigenous Nations, including the Peace Moberly Tract, Moberly River, Treaty Land Entitlements, and the Caribou Partnership Agreement area. PRGT is committed to ongoing engagement and analysis to address identified concerns.



## **3.2 Consultation with Regulators**

PRGT has been consulting with the EAO as the Eastern Route Alternative will require an EAC amendment through the EAO prior to permitting the alternative. In May and October of 2023, the Eastern Route Alternative was discussed with the EAO. On March 1, 2024, PRGT met with the EAO to discuss the Amendment.

PRGT met with the BCER in October 2023 to discuss ongoing engagement with Treaty 8 First Nations and the potential for an eastern route alternative which would avoid previously identified areas of importance to Treaty 8 First Nations. In November 2023, PRGT sent a letter to the BCER providing additional context around Indigenous Nation Engagement on routing for a potential eastern alternate route. In December 2023, PRGT met with the BCER to provide an update on the status of permits for the overall project, the Marine Amendment, and routing and Indigenous Nation engagement activities for the Eastern Route Alternative.

In December 2023, PRGT met with BC Parks to discuss the Project overall as well as potential eastern reroute. In January 2024, PRGT met with BC Parks and confirmed that current routing for the Eastern Route Amendment is being planned to avoid the Twin Sisters Park Expansion, if possible.

## **3.3 Public Consultation**

A mail-out regarding the Amendment was provided to the Regional District of Peace River, the Regional District of Fraser-Fort George, and the Regional District of Bulkley-Nechako in early May 2024. A letter was sent to landowners and Rights Holders on June 26, 2024. No feedback had been provided at the time of filing the Amendment.





## 4 Valued Component Assessment Methods

This section addresses the assessment methods for positive and negative direct and indirect environmental, economic, social, cultural, and health effects and adverse cumulative effects as required under Section 25(2)(a) of the *Environmental Assessment Act* (2018).

The VC assessment methods for environmental, economic, social, heritage, and health effects of the Project have been developed based on the VCs identified in the Application (PRGT 2014a). This section describes the methods used in the VC assessments and identifies interactions between the proposed Amendment and VCs.

The VC assessment methods for the Amendment generally follow those used in the Application (PRGT 2014a), and thus the conclusions presented herein are comparable to the effects considered by the EAO in the Assessment Report (EAO 2014a).

Amending an EAC under the *Environmental Assessment Act* (2018) requires consideration of all the assessment matters identified in Section 25 of that Act as they relate to the proposed changes. While the Project was assessed under the *Environmental Assessment Act* (2002), many of these assessment matters were prescribed in the Project's Application Information Requirements (PRGT 2014b), considered as part of PRGT's 2014 Application, and relevant findings were presented in the EAO Assessment Report (EAO 2014a). A summary of these matters and how they are considered in the context of this Amendment is included in Section 20.

### 4.1 Selection of Valued Components

Potential interactions between the Amendment and the VCs identified in the Application (PRGT 2014a) are identified in Table 4.1, using the criteria below. Rationale is provided for inclusion or exclusion in this Amendment:

- 0 – No interaction with VC, no further consideration warranted.
- 1 – Potential interaction identified but negligible change relative to the potential effects previously assessed in the Application, therefore no further consideration warranted.
- 2 – Potential interaction identified with potential to result in changes to previously assessed effects in the Application, therefore warrants further consideration and carried forward in the Amendment environmental assessment.



Table 4.1 Interactions of the Amendment with Valued Components

Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Air Quality	Section 5	Section 5	2	Yes	The Amendment includes a new compressor station location which may result in changes to the characterization of effects or cumulative effects on air quality.
Greenhouse Gases	Section 6	Section 20	1	N/A	Greenhouse Gases are not considered a VC requiring assessment under section 25(2)(a) of the <i>Environmental Assessment Act</i> (2018). Instead, they are required to be considered under section 25(2)(h) of that Act.  The Eastern Route Alternative is shorter than the existing approved route, resulting in a reduction in the Project's contribution to greenhouse gas emissions from land clearing and construction emissions if the Eastern Route Alternative was to be constructed. A discussion of the Project's operational greenhouse gas emissions, including the potential effects on the Province being able to meet its targets under the <i>Greenhouse Gas Reduction Targets Act</i> , is provided in Section 19.
Acoustic Environment	Section 7	Section 6	2	Yes	The Amendment includes a new compressor station location and new horizontal directional drill locations, which may result in changes to the characterization of effects or cumulative effects on acoustics.
Water Quality	Section 8	Section 7	2	Yes	The Amendment includes several new watercourse crossings, which could result in changes to the characterization of effects on water quality.
Hydrology	Section 9	Section 8	1	Yes	The Amendment includes several new watercourse crossings. See Section 8 for interaction rationale and a discussion of the information required in the EAO Application Information Requirements (PRGT 2014b).
Freshwater Aquatic Resources	Section 10	Section 9	2	Yes	The Amendment includes several new watercourse crossings, which could result in changes to the characterization of effects on freshwater aquatic resources.
Marine Resources	Section 11	N/A	0	No	The Amendment does not affect marine portions of the Project and will not interact with marine resources.
Soil	Section 12	Section 10	2	Yes	The Amendment route will cross both forested and agricultural soils, which could result in changes to the characterization of effects on soils.
Vegetation and Wetland Resources	Section 13	Section 11	2	Yes	The Amendment route overlaps vegetation and wetland resources and could result in changes in the characterization of effects on vegetation and wetlands.
Wildlife and Wildlife Habitat	Section 14	Section 12	2	Yes	The Amendment route overlaps wildlife habitat and could result in changes to the characterization of effects on wildlife and wildlife habitat.
Employment	Section 17	Section 13	2	Yes	The Amendment route is in proximity to different population centres, which may result in changes to the characterization of effects on employment.
Community Infrastructure and Services	Section 20	Section 14	2	Yes	The Amendment route is in proximity to different population centres, which may result in changes to the characterization of effects on community infrastructure and services.
Transportation	Section 21	Section 15	2	Yes	The Amendment route is in proximity to different population centres, which may result in changes to the characterization of effects on transportation.
Visual Quality	Section 22	Section 16	2	Yes	Given the linkages between visual resources and other land and resource uses, visual quality is included in the Land and Resource Use valued component.
Land and Resource Use	Section 23	Section 16	2	Yes	The Amendment route will cross different planning areas and may result in changes to the characterization of effects on land and resource use, including change in visual quality.
Heritage and Archaeological Resources	Section 26	Section 17	2	Yes	The Amendment route could result in changes to the characterization of effects on heritage and archaeological resources.
Human Health	Section 29	Section 18	1	Yes	The Amendment includes a new compressor station location. See Section 18 for interaction rationale and a discussion of the information required in the EAO Application Information Requirements (EAO 2014b).



## 4.2 Assessment of Project-Specific Effects

For each VC, a description of changes to baseline information or Project activities associated with the Amendment is included. Mitigation measures that will be implemented because of changes to Project activities are included where relevant. Mitigation measures are based on existing approved mitigation in the PRGT Construction Environmental Management Plan (CEMP) (PRGT 2016) and other management plans developed by PRGT to meet the conditions of the EAC. In the event existing, approved mitigation measures do not adequately address potential Project effects associated with the Amendment, additional mitigation measures are proposed based on industry best practices, regulatory requirements, and the professional experience of the assessment team.

Although the VC assessment methods for this Amendment generally follow those used for the PRGT EAC Application submitted to the EAO in 2014 (Section 3 [PRGT 2014a]), they will differ from the Application in that the Amendment will not make significance determinations for potential project effects, consistent with the EAO Effects Assessment Policy version 1.0 (EAO 2020b).

### 4.2.1 Assessment Boundaries

The Amendment follows the same boundaries as defined in the Application (PRGT 2014a). Spatial and temporal boundaries are described below. Administrative and technical boundaries, where applicable, are discussed in the relevant VC chapters.

#### 4.2.1.1 Spatial Boundaries

Spatial boundaries are defined for each VC following the methods outlined in the Application (PRGT 2014a). The spatial boundaries for each VC identify the geographic extent within which the potential environmental, economic, social, cultural, and health effects of the Project are assessed. These include the project footprint for consideration of direct physical effects within the area of disturbance; the Local Assessment Area (LAA) for consideration of localized and direct project effects on selected VCs; and the Regional Assessment Area (RAA) which provides a broader context for determining the extent of Project-related effects, as well as for the assessment of potential cumulative effects. The LAAs and RAAs are described in each VC chapter.

Consistent with the Application (PRGT 2014a), the Project footprint is the area that will be directly disturbed by construction and operation activities, including the construction right-of-way, compressor station, and associated temporary ancillary infrastructure. For the purposes of this assessment, an average cleared construction ROW of 100 m is assumed for the entire length. Although this width of construction ROW will not be required for most of the corridor, PRGT applied this conservative estimate to facilitate robust spatial analysis and discussion of the potential effects of clearing and ground disturbance.



A final footprint has not been defined for the compressor station or the meter station near the initiation point of the Eastern Route Alternative, but they are expected to be within the revised CPC. Once designed, the total area of the co-located compressor station and meter station footprint is expected to not exceed 20 ha.

#### **4.2.1.2 Temporal Boundaries**

Temporal boundaries identify when an effect may occur in relation to Project phases and activities. Based on the Project schedule, the temporal boundaries for the assessment are:

- Construction: the duration is expected to be four years following commencement of construction.
- Operation: The project is anticipated to have an operational life greater than 40 years.

#### **4.2.1.3 Technical Boundaries**

Technical boundaries refer to the constraints imposed on an environmental assessment by limitations that could affect the ability to predict the effects of a project.

The Eastern Route Alternative will be added to the CPC as a variable width corridor that is generally 500 m wide with some variation in width in key areas to allow for flexibility in ongoing planning, detailed design and constructability. For example, the width of the CPC is expanded at the preferred alternative crossing location at the Parsnip River (the North Parsnip Alternate Crossing), beginning approximately 104 km from the initiation point, to accommodate the planned avoidance of Tse Ke Dene's reserve. The Project footprint is a 100 m wide corridor that may be routed within the CPC. The assessment approach is anticipated to provide a representative understanding of the residual effects of the Eastern Route Alternative. Site-specific environmental features within the final alignment will be identified based on field assessment prior to construction, and mitigation will be incorporated into the CEMP and Environmental Management Plans as appropriate.

#### **4.2.2 Characterization of Residual Effects**

The assessment approach is structured to identify changes in potential effects and mitigation measures as well as positive effects that were not assessed under the previous *Environmental Assessment Act*. The amendment will assess residual effects from the Project including the proposed Amendment, cumulative effects, and the proposed Amendment's contribution to cumulative effects. Following the implementation of mitigation measures, residual effects are characterized following the criteria defined in the EAO Assessment Report (EAO 2014a). Potential changes to residual effects due to changes resulting from the Amendment are compared to the findings of the EAO Assessment Report (EAO 2014a).



## 4.3 Assessment of Cumulative Effects

The assessment will evaluate if the contributions of the Amendment to cumulative effects are likely to be similar to, less than, or greater than those associated with the project as Approved. Following the methods outlined in the Application (PRGT 2014a), each VC contains an assessment of the Amendment's likely contribution to cumulative effects on the VC, and an assessment of cumulative effects relative to those considered in the EAO Assessment Report (EAO 2014a).

### 4.3.1 Project and Activities Inclusion List

The Amendment assesses potential environmental, economic, social, heritage, and health cumulative effects resulting from residual effects of the Amendment interacting cumulatively with similar effects of past (existing), present, and reasonably future projects and activities. Reasonably foreseeable projects and activities considered in the cumulative effects assessment have been identified following the same methods outlined in the Application (PRGT 2014a). The Project and Activities Inclusion List for the Amendment includes projects and activities that are in the Application (PRGT 2014a), as well as new projects or activities proposed since 2014. A list of additional projects and activities is provided in Appendix A. The list includes three additional linear infrastructure projects (Enbridge's Frontier Project and Westcoast Energy's Aspen Point Program and Sunrise Expansion Project) and one additional infrastructure project (the McLeod Lake Community Wellness Centre Onsite Sewage System).

Reasonably foreseeable projects were identified from the following sources:

- Canadian Impact Assessment Registry (Government of Canada 2023)
- BC Data Catalogue (Government of British Columbia 2024a)
- BC Major Projects Inventory (Government of British Columbia 2024b)
- Natural Resource Online Services (Government of British Columbia 2024c)
- Environmental Assessments in British Columbia (EPIC) (Government of British Columbia 2024d)
- British Columbia Economic Atlas (Government of British Columbia 2024e)
- British Columbia Hydro Projects (BC Hydro 2024)

### 4.3.2 Assessment and Characterization of Cumulative Effects

The assessment and characterization of cumulative effects follows the same methods as outlined in the Application (PRGT 2014a). The projects and activities identified in the Project and Activities List in the Application (PRGT 2014a) and other projects and activities listed in Appendix A are considered for the cumulative effects assessment for all VCs. An assessment of cumulative effects resulting from the Project in combination with other projects and activities is undertaken on a VC-by-VC basis.

Not all residual effects will contribute to measurable cumulative effects. Adverse cumulative effects of concern are defined as those effects that have the potential to affect the viability or sustainability of a VC. In general, the viability or sustainability of a VC may be affected if residual or cumulative effects alter the status or integrity of the VC beyond an acceptable level in the RAA.



A cumulative effects assessment is undertaken for all VCs. The level of detail provided in the analysis of cumulative effects for all VCs is based on:

- the probability of the effect
- the likely scale or magnitude of the effect, and
- the extent to which these effects can be accurately or reasonably quantified and described within the receiving environment

A detailed cumulative effects assessment for a VC is only undertaken if all the conditions listed below are met for the effects under consideration:

- the Amendment would result in a demonstrable or measurable increase in adverse residual effects
- the residual effects from the Amendment do, or are likely to, act in a cumulative fashion with the effects of other past, existing, or reasonably foreseeable future projects and activities in the area, and
- there is a reasonable expectation that the contribution (i.e., addition) of the residual effect from the Amendment to the residual effects from past, present and reasonably foreseeable future projects and activities would result in adverse cumulative effects of concern to the VC.

## **4.4 Risk and Data Uncertainty**

The Amendment characterizes risk and data uncertainty associated with each VC assessment. Where there is a greater degree of uncertainty in the characterization of residual effects from that assessed in the Application (PRGT 2014a) additional context is provided. The level of confidence in effects predictions and any risks associated with the assessment are discussed, based on scientific information, statistical analysis, professional judgment, effectiveness of mitigation, and assumptions. The level of confidence is based on:

- scientific certainty relative to quantifying or estimating the potential effect, including the quality or quantity of data and the understanding of the effect mechanisms
- scientific certainty relative to the effectiveness of the mitigation measures
- professional judgment from prior experience, including standard mitigation measures or best management practices

The EAO Assessment Report (EAO 2014a) described confidence in its characterization of residual effects for each VC. The characterization of residual and cumulative effects as per Sections 4.2.2 and 4.3.2 includes evaluation of potential change in the level of confidence in effects predictions. Where there is a reduction in confidence in the characterization of residual effects (e.g., based on data uncertainties), additional analysis is completed to characterize the potential risk.



## **5 Air Quality**

Air quality was identified as a VC in the Application Information Requirements (PRGT 2014b) for the EAC Application (PRGT 2014a) due to emissions produced from the Project during construction and operations and potential impacts to human and ecological health, and vegetation resources.

As part of the air quality assessment for the Amendment, an updated description of baseline conditions based on more recent ambient data from monitoring stations near the Eastern Route Alternative's proposed compressor station is provided. This assessment also includes air dispersion modelling for compressor station operation emissions of sulfur dioxide (SO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), particulate matter that is 2.5 micrometres or smaller in diameter (PM<sub>2.5</sub>), and carbon monoxide (CO). Changes to ambient air quality are assessed for air pollutants (i.e., SO<sub>2</sub>, nitrogen dioxide (NO<sub>2</sub>), PM<sub>2.5</sub>, particulate matter that is 10 micrometres or smaller in diameter (PM<sub>10</sub>), and CO) in accordance with the British Columbia Ministry of Environment and Climate Change Strategy's (BC ENV) Air Quality Dispersion Modelling Guideline (BC ENV 2022). Details about the air dispersion modelling methods and results are described in the Air Quality Technical Data Report (TDR) in Appendix B.

The LAA is defined by a 20 km by 20 km area centred on the Eastern Route Alternative's proposed compressor station site and a 1.0 km band that fully encompasses the Eastern Route Alternative's pipeline footprint to address concerns related to fugitive emissions and construction air emissions (PRGT 2014a). The RAA is defined as a 50 km by 50 km area centred on the Eastern Route Alternative's compressor station site and a 5 km band that fully encompasses the Eastern Route Alternative's pipeline footprint to address concerns related to fugitive emissions and construction air emissions. The extents of the LAA and RAA for air quality are the same as those presented in the Application (PRGT 2014a); however, the locations for the LAA and RAA are specific to the Eastern Route Alternative.

### **5.1 Baseline Conditions**

#### **5.1.1 Baseline Data Sources**

The characterization of baseline ambient air quality focuses on substances of interest relative to the Eastern Route Alternative emissions, including NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and CO.

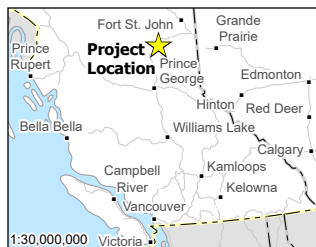
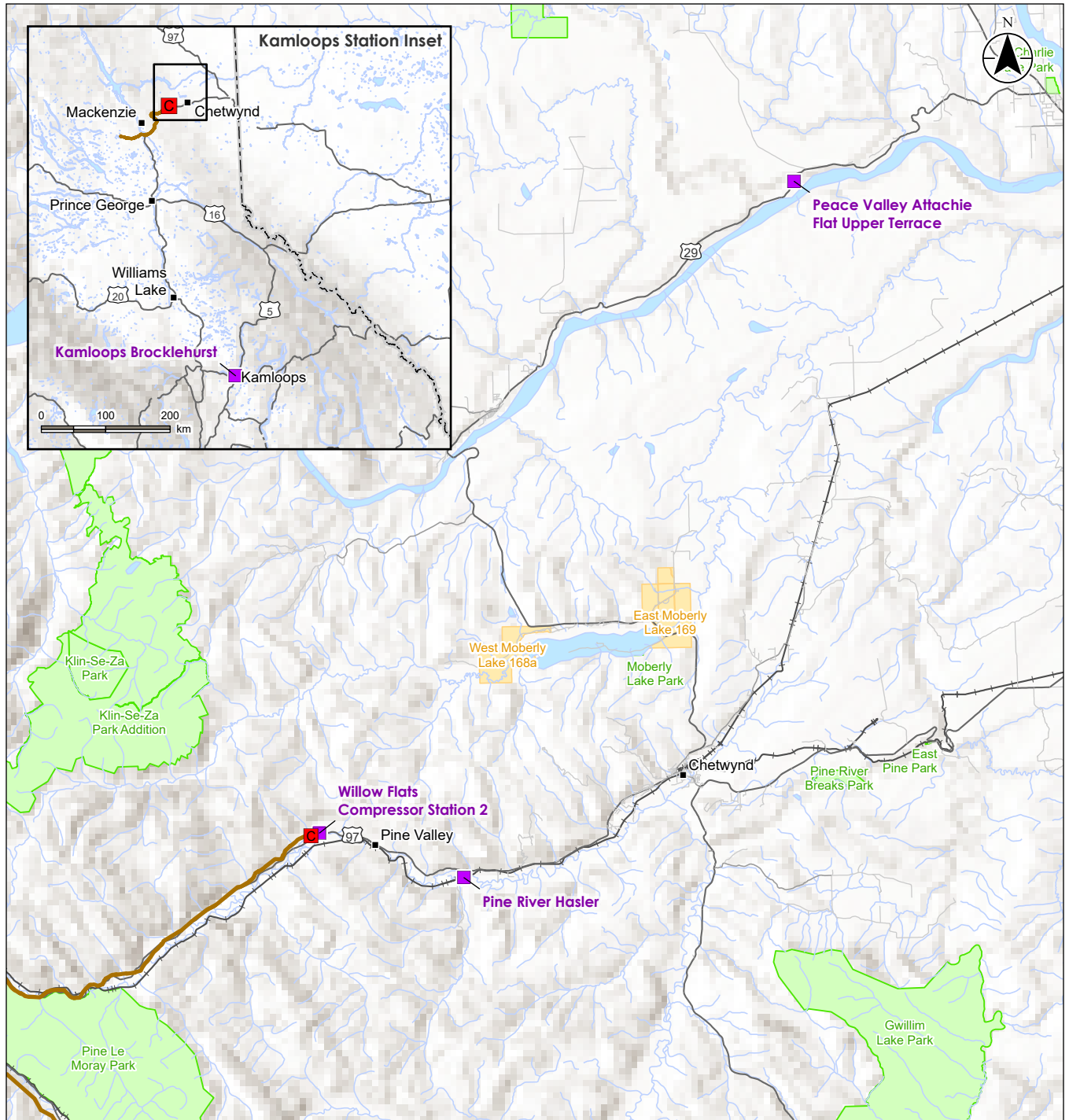
Baseline ambient air quality data is obtained from monitoring stations operating in British Columbia at locations near the compressor station. No one station measures all substances of interest, and therefore a suite of data from a variety of stations was reviewed. Continuous monitoring data from the BC ENV 1998 to 2021 Air Quality Statistical Summaries (BC ENV 2024a) and the British Columbia Air Data Archive (BC ENV 2024b) were analyzed to establish representative baseline concentrations for each contaminant. The locations of the chosen monitoring stations are shown on Figure 5.1. Further details about baseline determination are included in the Air Quality TDR (Appendix B).



Historical average climate data are available from nearby Canadian Climate Normal stations, collected by Environment and Climate Change Canada (ECCC). The climate of the compressor station site was characterized using the 30-year Climate Normals (1981 to 2010) for the Chetwynd station. The most recent 1991 to 2020 climate normal dataset for the Chetwynd station was not available at the time of reporting and the previous climate normal dataset (1981 to 2010) was used instead.







**Notes**

1. Coordinate System: NAD 1983 UTM Zone 10N
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- Road
- Local Street
- Railway
- Watercourse
- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Ambient Air Quality Monitoring Station Reported by BC ENV
- Compressor Station
- Project Footprint

0 10 20 km  
1:600,000 (at original document size of 8.5x11)



Project Location: British Columbia  
Project Number: 123514678  
Prepared by LLUZ on 20240502  
Requested by KCHUEN on 20240502  
Reviewed by TQUILICHINI on 20240503  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Air Quality

Figure No.

5.1

Title

**LOCATIONS OF AIR QUALITY MONITORING STATIONS**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

## 5.1.2 Existing Air Quality

The baseline data characterize the existing ambient conditions and help establish a link between the effects of existing regional emissions and potential changes in ambient air quality within the LAA and RAA due to the proposed Eastern Route Alternative. Table 5.1 summarizes the baseline concentrations representative of the LAA and RAA. The rationale for selection of baseline concentrations is provided in Section 2.4.2 of the Air Quality TDR (Appendix B).

**Table 5.1 Air Quality Baseline Concentrations**

Substance	Averaging Period	Baseline Concentration (µg/m³)
NO <sub>2</sub>	1-hour	37.0 A 288-value array was used for modelling.
	Annual	5.1
SO <sub>2</sub>	1-hour	10.3
	Annual	0.8
PM <sub>2.5</sub>	24-hour	18.6
	Annual	4.5
PM <sub>10</sub>	24-hour	26.0
CO	1-hour	512.2
	8-hour	512.2

Note:

See Section 2.4.2 of the Air Quality TDR (Appendix B) for details about the baseline concentrations, the 288-value NO<sub>2</sub> array, and the metrics used for calculating the averaging periods.

## 5.1.3 Existing Climate

The climate of the Eastern Route Alternative and proposed compressor station site is summarized in the following sections.

### 5.1.3.1 Air Temperature

The average daily temperature in Chetwynd is 3.0 degrees Celsius (°C). On average, January is the coldest month, and July is the warmest (-10.2°C and 15.4°C daily average temperature respectively). Extreme temperatures range from -52.0°C (January 25, 1997) to 33.8°C (June 15, 1991).

### 5.1.3.2 Precipitation

The average annual total precipitation in Chetwynd is 440.6 mm, of which 69% falls as rain. On average, July is the wettest month (76.9 mm) and February is the driest (16.2 mm). The extreme daily precipitation was 64.4 mm (July 31, 1987). The extreme daily snowfall was 34.3 centimetres (cm) (October 27, 1986) and the extreme snowpack depth was 67 cm (February 22, 1994).



## 5.2 Influence of Consultation and Engagement

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including this Amendment. Since filing the Application, no new interests and concerns specifically related to air quality (see Section 12 for wildlife health concerns) have been shared by Indigenous Nations. PRGT will continue to engage with Indigenous Nations on this Amendment. As information is shared, PRGT will review the information in the context of the Amendment and associated mitigation.

## 5.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, residual effects, changes to the EAO Assessment Report (EAO 2014a), Application effects characterizations (PRGT 2014a), anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment.

### 5.3.1 Potential Effects and Mitigation Measures

The Application (PRGT 2014a) and EAO Assessment Report (EAO 2014a) considered one potential effect on air quality: a change in ambient air quality in the airsheds along the pipeline corridor and compressor station location (i.e., a change in air quality). Table 5.2 outlines the potential effects and measurable parameters for air quality for the Amendment. The listed effect and measurable parameters for the Amendment are the same as those identified in the Application (PRGT 2014a).

**Table 5.2 Potential Effects and Measurable Parameters for Air Quality**

Potential Effect	Measurable Parameter
Change in air quality	Ambient ground-level concentrations of SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , CO in micrograms per cubic metre (µg/m <sup>3</sup> )

Mitigation measures applicable to change in air quality are identified in the Application (Section 5.5.2.2 in PRGT 2014a) and are applicable to this Amendment. No new mitigation measures applicable to change in air quality have been identified.

### 5.3.2 Residual Effects

The potential for a change in air quality during construction was assessed in the Application (Section 5 [PRGT 2014a]) and remains valid; as such, that residual effect is not assessed further for the Amendment.

The residual effects from operation of the Eastern Route Alternative’s compressor station, releasing emissions to the ambient air and potentially causing a change in air quality, are assessed for this Amendment.



The Eastern Route Alternative proposed compressor station would not result in changes to the capacity of the pipeline. There are two scenarios that PRGT is evaluating for the Eastern Route Alternative. In the first scenario, the compressor station does not connect to the BC Hydro electrical grid and the facility relies on the on-site natural gas fired generators for electricity and natural gas fired turbines for natural gas compression resulting in the release of air pollution emissions. In the second scenario, the proposed compressor station is connected to the BC Hydro electrical grid and the compressor station is equipped with an electric motor drive that is not a source of air pollution emissions. PRGT continues to evaluate whether the compressor station will be powered by natural gas fired turbines or electric motor drive.

The air dispersion modelling assessment considers only the first scenario (gas-fired generators and turbines) and focuses on the emissions from the compressor station during operation. This approach is used because gas-fired generators and turbines will generate air pollution emissions, and electric driven turbines will not. Effects of the Eastern Route Alternative are assessed by comparing predicted concentrations in the LAA and RAA to the British Columbia Air Quality Objectives (AQO).

The British Columbia AQOs are a suite of ambient air quality criteria that have been developed provincially and nationally to inform decisions on the management of air contaminants (BC ENV 2021). The British Columbia AQOs are used to gauge current and historical air quality and guide decisions on environmental impact assessments and authorizations. In 2021, British Columbia adopted the Canadian Ambient Air Quality Standards (CAAQS; CEPA 2017) as the British Columbia AQOs for NO<sub>2</sub> and SO<sub>2</sub>.

The BC ENV have stated that the British Columbia AQOs are applicable beyond a facility's fence line (BC ENV 2020). Where exceedances of the British Columbia AQO are predicted through dispersion modelling, BC ENV considers the context of magnitude, frequency, timing, and proximity to sensitive receptors. Should there be exceedances, BC ENV would manage, in accordance with the federal Air Zone Management Framework (The Canadian Council of Ministers of Environment [CCME] 2019), for improvements in air quality across the affected area and would include all important sources (BC ENV 2020).

The CAAQS are used to manage air quality such that human health is protected, and clean air remains clean. This is managed through the federal Air Quality Management System (CCME 2020a and 2020b). CCME have stated that achievement of the CAAQS is determined on an airshed and air zone basis, which covers broad geographical areas. They are not intended to be facility-level regulatory standards to determine regulatory compliance (CCME 2019). Rather, they are used by provinces and territories to guide air zone management actions intended to reduce ambient concentrations below the CAAQS and to prevent CAAQS exceedances.

Ambient air quality monitoring stations located at or near the property (fence) line of an industrial facility should not be used for CAAQS reporting unless the monitoring station is near a populated area or a sensitive ecosystem (CCME 2020a and 2020b). The closest residential dwelling is approximately 110 m away from the compressor station's fence line.



Table 5.3 provides a summary of the British Columbia AQOs that are used in this Amendment.

**Table 5.3 British Columbia Air Quality Objectives**

Substance	Averaging Period	British Columbia AQO ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	1-hour	113 <sup>a</sup>
	Annual	32 <sup>b</sup>
SO <sub>2</sub>	1-hour	183 <sup>c</sup>
	Annual	13 <sup>d</sup>
PM <sub>2.5</sub>	24-hour	25 <sup>e</sup>
	Annual	8 <sup>f</sup>
PM <sub>10</sub>	24-hour	50
CO	1-hour	14,300
	8-hour	5,500

Notes:

- <sup>a</sup> Achievement for 1-hour NO<sub>2</sub> is based on 3-year average of the annual 98<sup>th</sup> percentile of daily 1-hour maximum. This requires the extraction of the highest predicted 1-hour value at each location for each day, followed by the calculation of the 98<sup>th</sup> percentile (the eighth highest) of those 365 values for each year, then average the three annual values.
- <sup>b</sup> Achievement for annual NO<sub>2</sub> is based on the average of all 1-hour average concentrations over a single calendar year.
- <sup>c</sup> Achievement for 1-hour SO<sub>2</sub> is based on 3-year average of the annual 99<sup>th</sup> percentile of daily 1-hour maximum. This requires the extraction of the highest predicted 1-hour value at each location for each day, followed by the calculation of the 99<sup>th</sup> percentile (the fourth highest) of those 365 values for each year, then average the three annual values.
- <sup>d</sup> Achievement for annual SO<sub>2</sub> is based on the average of 1-hour concentrations averaged over one year.
- <sup>e</sup> Achievement for 24-hour PM<sub>2.5</sub> is based on annual 98<sup>th</sup> percentile of daily average, average over one year.
- <sup>f</sup> Achievement for annual PM<sub>2.5</sub> is based on annual average, average over one year.

Dispersion modelling is used to predict the change in ground-level air pollutant concentrations as a result of the addition of the Eastern Route Alternative's proposed compressor station operation. This assessment uses the CALPUFF modelling system as recommended in the British Columbia Air Quality Dispersion Modelling Guideline (BC ENV 2022). The CALPUFF model is a non-steady-state Gaussian puff dispersion model that incorporates simple chemical transformation mechanisms, complex terrain algorithms, and building downwash.

For the air quality assessment, two modelling scenarios are used to understand changes to air quality as a result of the Eastern Route Alternative, including:

- Project-Alone Case
- Application Case (the Project-Alone Case plus baseline)



The air quality assessment methods used in the Application (PRGT 2014a) have been updated for this Amendment to reflect new guidance from BC ENV. The CALPUFF dispersion modelling assessment follows methods outlined in the Dispersion Modelling Plan for the Eastern Route Alternative (Appendix D of the Air Quality TDR [Appendix B]), which was developed using the British Columbia Air Quality Dispersion Modelling Guideline (BC ENV 2022). CALPUFF dispersion modelling methods and results are described in detail in the Air Quality TDR (Appendix B). The results are summarized below.

#### **5.3.2.1 Project-Alone Case**

The Project-Alone Case emission scenario consists of proposed emission sources at the compressor station during operation. The predicted concentrations for the Project-Alone Case are based on the maximum operating time for each equipment. The dispersion modelling results for Project-Alone Case are provided in Table 5.4 and Figures C-1 through C-9 in the Air Quality TDR (Appendix B). All predicted pollutant concentrations are below the applicable British Columbia AQOs in the 50 km by 50 km CALPUFF model domain (LAA and RAA) and at the identified sensitive receptors. The highest concentrations were predicted to be located at the proposed compressor station's fence line.

The proposed compressor station will have a total of three natural gas turbines and three natural gas generators. The modelling scenario includes emissions from two GE LM2500+G4 natural gas turbines and two Waukesha natural gas generators because during normal operations, only two turbines and two generators will be in use. The third turbine and third generator are stand-by units.

Occasionally, the stand-by compressor unit or power generator will become operational to take the load off an operating unit so that the operating unit can be shut down. These transfer events (when three units are operating) are infrequent (i.e., 70 events per year), and short duration (approximately 20 minutes per event). Because of the infrequent and short duration of the transfer event, the emissions of the transfer event (with all three units running) are not included in the modelling. Based on the dispersion modelling results (Table 5.4 and Table 5.5), it is anticipated that these additional infrequent and short duration transfer events will not cause air pollutant concentrations to be higher than the British Columbia AQOs.



**Table 5.4 Project-Alone Case Dispersion Modelling Results for Compressor Station**

Pollutant	Averaging Period	Maximum Predicted Concentrations ( $\mu\text{g}/\text{m}^3$ )	British Columbia AQO ( $\mu\text{g}/\text{m}^3$ )	Percentage of British Columbia AQO (%)
NO <sub>2</sub>	1-hour	55.8 <sup>a</sup>	113	49
	Annual	3.0 <sup>b</sup>	32	10
SO <sub>2</sub>	1-hour	1.9 <sup>a</sup>	183	1
	Annual	0.03 <sup>b</sup>	13	0.3
PM <sub>2.5</sub>	24-hour	0.2 <sup>b</sup>	25	1
	Annual	0.03 <sup>b</sup>	8	0.3
PM <sub>10</sub>	24-hour	0.3 <sup>b</sup>	50	1
CO	1-hour	1,073 <sup>b</sup>	14,300	8
	8-hour	404 <sup>b</sup>	5,500	7

Notes:

See Section 2.4.2 of the Air Quality TDR (Appendix B) for details about the metrics used for calculating the averaging periods.

<sup>a</sup> 2011 - 2013 averaged values

<sup>b</sup> Maximum value of 2011 – 2013

### 5.3.2.2 Application Case

The Application Case emission scenario consists of emission sources from the proposed compressor station in combination with baseline concentrations (Table 5.1). The predicted concentrations for the Application Case are based on the maximum operating time for each equipment piece, plus the baseline. The dispersion modelling results for Application Case are provided in Table 5.5, and Figures C-10 through C-18 in the Air Quality TDR (Appendix B). All predicted pollutant concentrations are below the applicable British Columbia AQOs in the 50 km by 50 km CALPUFF model domain (LAA and RAA) and at the sensitive receptors. The highest concentrations were predicted to be located at the proposed compressor station's fence line.



**Table 5.5 Application Case Dispersion Modelling Results for Compressor Station**

Pollutant	Averaging Period	Maximum Predicted Concentrations ( $\mu\text{g}/\text{m}^3$ )	Baseline ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentrations Including Baseline ( $\mu\text{g}/\text{m}^3$ )	British Columbia AQO ( $\mu\text{g}/\text{m}^3$ )	Percentage of British Columbia AQO (%)
NO <sub>2</sub>	1-hour	55.8 <sup>a</sup>	NO <sub>2</sub> 288 array values <sup>c</sup>	77.2	113	68
	Annual	3.0 <sup>b</sup>	5.1	8.1	32	25
SO <sub>2</sub>	1-hour	1.9 <sup>a</sup>	10.3	12.2	183	7
	Annual	0.03 <sup>b</sup>	0.8	0.8	13	6
PM <sub>2.5</sub>	24-hour	0.2 <sup>b</sup>	18.6	18.8	25	75
	Annual	0.03 <sup>b</sup>	4.5	4.5	8	57
PM <sub>10</sub>	24-hour	0.3 <sup>b</sup>	26.0	26.3	50	53
CO	1-hour	1,073 <sup>b</sup>	515.2	1,588.4	14,300	11
	8-hour	404 <sup>b</sup>	515.2	918.8	5,500	17

Notes:

See Section 2.4.2 of the Air Quality TDR (Appendix B) for details about the baseline concentrations, the 288-value NO<sub>2</sub> array and the metrics used for calculating the averaging periods.

<sup>a</sup> 2011 - 2013 averaged values

<sup>b</sup> Maximum value of 2011 – 2013

<sup>c</sup> See Table 2.4 in the Air Quality TDR (Appendix B)

### 5.3.3 Changes to Characterization of Residual Effects

The EAO Assessment Report (EAO 2014a) concluded that Project effects on air quality are predicted to be not significant. Based on the air dispersion modelling results for the Eastern Route Alternative, the characterization of residual effects for the Eastern Route Alternative Amendment is unchanged from the EAO Assessment Report (EAO 2014a). Characterization of residual effects for each criteria are summarized in Table 5.6.





**Table 5.6 Changes to EAO Assessment Report Characterization of Residual Effects – Air Quality**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<i>High resilience and low sensitivity</i>	<i>The airsheds affected by the proposed Project are remote and have minimal disturbance at present. The current baseline ambient air quality in the region is considered good and therefore is considered resilient to additional disturbance (up to relevant air quality objectives).</i>	No change
Magnitude	<i>Low to Moderate</i>	<i>Project construction and operational activities are predicted to result in low to moderate increases of CACs and HAPs for a limited extent. The maximum predicted ground level concentrations for all CACs and HAPs at all proposed compressor stations are below the applicable ambient air quality objectives. The predicted ground level concentrations for NO<sub>2</sub> and SO<sub>2</sub> at all proposed compressor stations are below supplemental British Columbia interim objectives.</i>	No change
Extent	<i>Local and regional airshed</i>	<i>Residual effects from construction are not expected to extend beyond LAA. Although the maximum predicted ground level concentrations for CACs and HAPs would be mostly limited to local areas there would be low increases of CACs and HAPs within the regional study area as indicated by the air dispersion modelling.</i>	No change
Duration	<i>Construction: short-term Operations: long-term</i>	<i>The duration of residual effects on air quality from construction activities would occur over four years, but construction activities at any specific location would last only several months or less. The duration of residual effects on air quality from operational activities would be for the life of the proposed Project (40 years).</i>	No change
Reversibility	<i>Reversible</i>	<i>Effects of the proposed Project are considered reversible upon completion of construction and following closure, for construction and operational effects, respectively.</i>	No change
Frequency	<i>Construction: Semi-continuous Operation: Continuous</i>	<i>The frequency of residual adverse effects are considered semi-continuous because the effects on air quality from construction activities would occur only very regularly during construction at specific construction areas. Effects on air quality from the operation of compressor stations would be continuous.</i>	No change

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a).



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**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 5 Air Quality**  
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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Likelihood</i>	<i>It is certain that residual air quality effects would occur throughout construction and operation.</i>		No change
<i>Significance Determination</i>	<i>The air emissions associated with the proposed Project would result in residual adverse environmental effects, although these residual adverse effects would not be significant, as the identified objectives and thresholds would not be exceeded, with one exception which was marginally exceeded.</i> <i>EAO concludes that the proposed Project would not have significant residual effects on air quality.</i>		-
<i>Confidence</i>	<i>High Confidence – Confidence is based on the use of current base available Project design information, monitored background air quality information, and emissions estimation and air modelling methods that have been deemed to be appropriate.</i>		No change

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a).



### **5.3.4 Cumulative Effects Assessment**

The cumulative effects assessment for air quality follows the same general process as described in the Application (PRGT 2014a). To account for emission sources within the LAA and RAA, and at distances further away, baseline concentrations have been added to Application Case modelling results to account for these emissions cumulatively interacting with the emissions sources at the Eastern Route Alternative's proposed compressor station. Activities and projects listed as likely to act cumulatively with the Project were listed in the Application (PRGT 2014a). Additional activities and projects that may interact cumulatively with the Amendment are listed in Section 4.0 of the Amendment.

The Application and EAO Assessment Report determined that adverse cumulative effects related to air quality were not anticipated (PRGT 2014a; EAO 2014a). Based on the current understanding of the activities proposed by the Amendment, cumulative effects on air quality are predicted to be consistent with the conclusions of the EAO Assessment Report (EAO 2014a).

### **5.3.5 Risks and Data Uncertainty**

The ability of a plume dispersion model to predict ambient concentrations depends on the accuracies of the source and emission inventory, the meteorology, and the assumptions used to represent the atmospheric physics and chemistry processes. The U.S. EPA (2005) indicates that the application of regulatory dispersion models is viewed as a "best estimate" approach and that this approach should be viewed as "acceptable to the decision maker." The application of CALPUFF in this assessment is consistent with the British Columbia Air Quality Dispersion Modelling Guideline (BC ENV 2022). Care has been paid to conservatively estimate emission rates and emission parameters. The use of conservative emission estimates, a comprehensive database of meteorological conditions, modelling guidelines, and the CALPUFF regulatory dispersion model likely result in predicted concentrations in the assessment that are conservative, meaning the Project's Eastern Route Alternative effects are likely overpredicted. The confidence in the assessment remains high.



## 6 Acoustic Environment

The acoustic environment is the combination of the natural and anthropogenic sound in an area. Noise is defined as unwanted or harmful sound (Health Canada 2023). The acoustic environment is a VC because Project activities will generate noise that has the potential to affect the health and well-being of humans and/or wildlife. The indicator identified for this assessment is sound level. Noise from oil and gas activities in British Columbia is regulated by the British Columbia Energy Regulator (BCER) under the *British Columbia Noise Control Best Practices Guideline* (BCER Noise Guideline 2023). The BCER Noise Guideline prescribes Permissible Sound Levels (PSLs) as noise limits at the nearest or most impacted residential dwellings. Noise generated during the construction phase of a project is evaluated using guidance contained in Health Canada (2023). This assessment focusses on potential effects on human receptors. Potential effects of noise on wildlife are addressed in the assessment for wildlife and wildlife habitat (Section 12.0).

The acoustic environment was identified as a VC in the Application because of the anticipated noise emissions from the Project during construction and operation, as well as the potential impacts to human health (PRGT 2014a). This Amendment includes an update to the baseline conditions and the predicted residual effects of the compressor station associated with the Amendment. This Amendment also assesses noise that will be associated with pipeline construction, including where trenchless crossings (e.g., HDD and Direct Pipe Installation [DPI]) are planned.

The LAA for the acoustic environment is a 1.5-km buffer area around the compressor station and the pipeline footprint and is the same as that presented in the Application (PRGT 2014a). The RAA for the acoustic environment is a 3-km buffer area around the compressor station and the pipeline footprint, which has been reduced from 5 km in the Application (PRGT 2014a). The RAA has been reduced to 3 km because there are no other third-party regulated facilities within the 3 km-to-5 km boundary.

### 6.1 Baseline Conditions

The existing ambient acoustic environment along large portions of the Amendment area is characterized by a combination of sounds from the natural environment and human activities. Human activities include vehicle and truck traffic along major highways and active Forest Service Roads, as well as industrial activities such as mining and forestry. For assessment areas close to industrial activities, ambient noise levels depend on the acoustic emissions associated with the specific type of industrial development.

#### 6.1.1 Baseline Data Sources

Baseline conditions for noise receptors within the LAA are established based on the BCER Noise Guideline. Baseline sound level is a combination of ambient sound level (ASL) and noise contributions from existing regulated facilities within the RAA. The BCER Noise Guideline defines ASL as the sound level that is a composite of different airborne sounds from many sources far away from and near the point of measurement, with consideration of population density and proximity to transportation. The ASL does not include an energy-related industrial component. Noise contributions associated with existing regulated



facilities will be considered in conjunction with the ASL that is recommended in the BCER Noise Guideline, to establish the baseline sound levels in the LAA and RAA.

The BCER Noise Guideline prescribes that the average rural ASL is 5 A-weighted decibels (dBA) below the rural PSL of 50 dBA daytime and 40 dBA nighttime; therefore, the ASL of 45 dBA ( $L_{eq}$ ) and 35 dBA are assumed for rural receptors during daytime and nighttime without adjustment for dwelling density or proximity to transportation. Using a similar approach, the ASL for other receptors with dwelling density or proximity to transportation adjustments are assumed to be 5 dBA less than the PSLs.

The BCER Noise Guideline also indicates that the daytime ASL is commonly 10 dBA higher than the nighttime ASL.

The dwelling density, proximity to transportation category, ASL, and PSL values for each receptor are summarized in Table 6.1. All PSLs are applicable for operational noise from the Project; however, they are not applicable for construction noise effects.

**Table 6.1 Permissible Sound Levels at Receptors**

Receptor Location	Dwelling Density Per Quarter Section	Proximity to Transportation (Category) <sup>1</sup>	Category Adjustment	Permissible Sound Levels		Ambient Sound Levels <sup>2</sup>	
				Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)
CS_R1	1 to 8	2	5	55	45	50	40
CS_R2	1 to 8	3	10	60	50	55	45
CS_R3	1 to 8	2	5	55	45	50	40
CS_R4	1 to 8	2	5	55	45	50	40
CS_R5	1 to 8	2	5	55	45	50	40
CS_R6	1 to 8	2	5	55	45	50	40

Notes:

- <sup>1</sup> Category 1—dwelling units more than 500 m from heavily travelled roads and/or rail lines and not subject to frequent aircraft flyovers  
Category 2—dwelling units less than 500 m but more than 100 m from heavily travelled roads and rail lines and/or not subject to frequent aircraft flyovers  
Category 3—dwelling units less than 100 m from heavily travelled roads and/or rail lines and/or subject to frequent aircraft flyovers
- <sup>2</sup> Ambient Sound Level (ASL): ASL is 5 dBA below the PSL as prescribed in BCER Noise Guideline

The PSLs at the receptors listed in Table 6.1 include the proximity to transportation adjustments (i.e., Categories 2 and 3). The PSLs for five Category 2 receptors (i.e., CS\_R1, CS\_R3, CS\_R4, CS\_R5, and CS\_R6) are 55 dBA daytime and 45 dBA nighttime, with a 5 dB adjustment. The PSLs for Category 3 receptor CS\_R2 are 60 dBA daytime and 50 dBA nighttime, with a 10 dB adjustment.



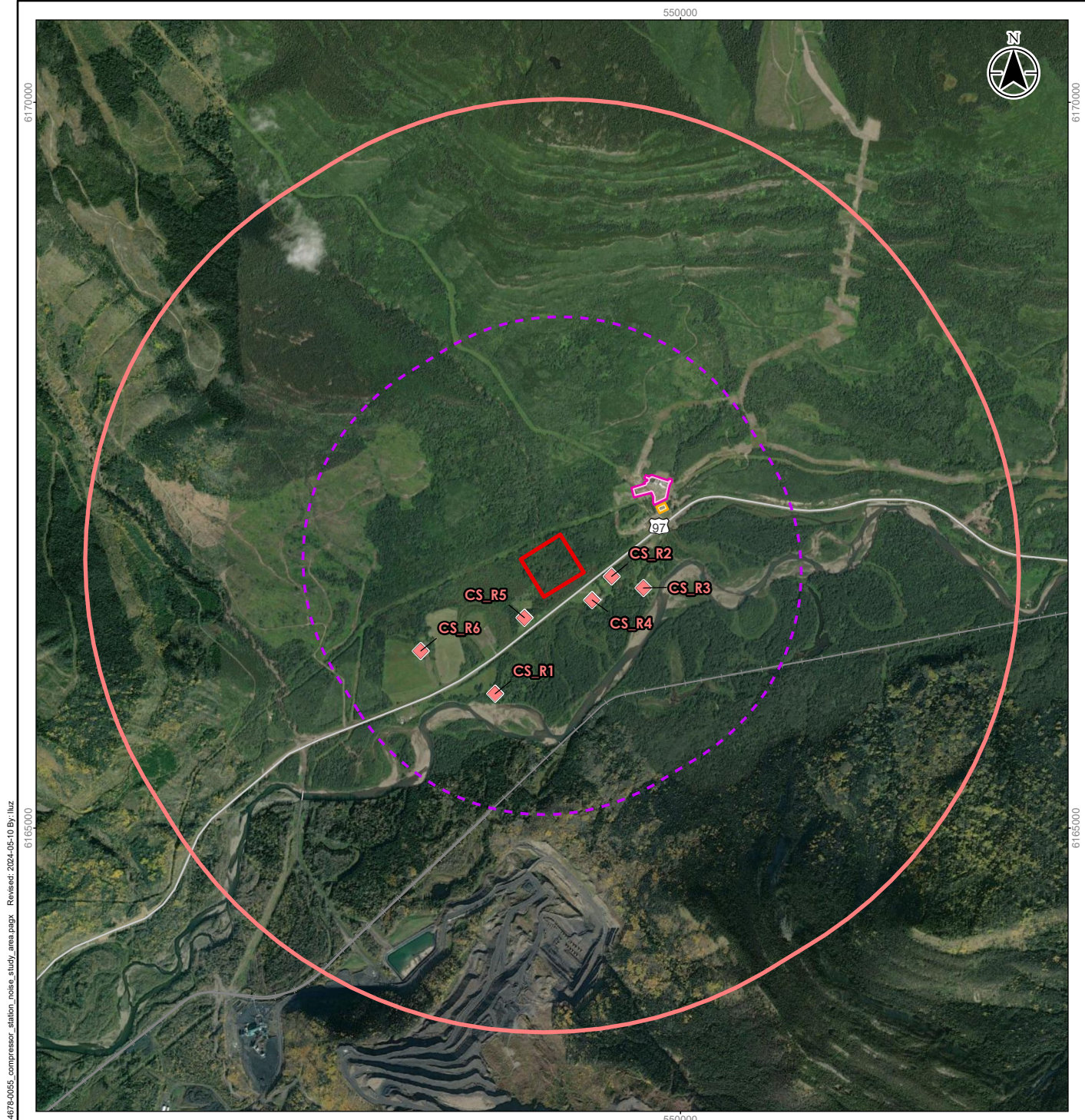
Health Canada (2023) guidance does not require determination of baseline sound levels for construction activities lasting less than one year. Further discussion on baseline overview of the construction phase is described in Section 6.4.2.1.

### **6.1.2 Baseline Overview**

There are six residential dwellings, or noise receptors, within the LAA (Figure 6.1). Noise receptors along the pipeline, including HDD and DPI locations, have not been identified. The assessment uses a distance-based approach to assess the impact of pipeline noise on potential receptors within the LAA.







**Notes**  
1. Coordinate System: NAD 1983 UTM Zone 10N  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

— Highway  
— Local Street  
— Railway

- ◆ Noise Sensitive Receptor
- Acoustic Local Assessment Area
- ▭ Acoustic Regional Assessment Area
- ▭ Compressor Station
- ▭ Pembina Station 2 Fenceline
- ▭ Westcoast CS2 Fenceline

0 0.5 1 km  
1:40,000 (at original document size of 8.5x11)



Project Location: British Columbia  
Client/Project/Report: Prince Rupert Gas Transmission Ltd.  
Project Number: 123514678  
Prepared by LLUZ on 20240501  
Requested by SZABANI on 20240430  
Reviewed by TQUILICHINI on 20240502

Figure No. 6.1  
Title  
**COMPRESSOR STATION NOISE STUDY AREA**

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## 6.2 Regulatory Framework

### 6.2.1 Construction Phase

The BCER Noise Guideline does not provide a quantitative threshold for noise from construction activities. Evaluation of construction noise is based on guidance from Health Canada (2023), which depends on two factors: 1) the presence of noise receptors; and 2) the duration of construction activities. The activities and duration associated with construction of the Amendment are summarized in Appendix C. Based on the construction activity duration, Health Canada's suggested Mitigation Noise Level (MNL) for short-term construction would be applicable to activities less than 12 months in duration, and percent highly annoyed (%HA) for long-term construction would be applicable to activities more than 12 months in duration, during the construction phase of the Project.

The MNL is measured by the day-night average sound level ( $L_{dn}$ ). A basic MNL of 47 dBA is recommended for a quiet suburban or rural community. A correction factor can be applied to the basic MNL depending on receptor location, construction duration, noise source characteristics, and seasonality. The correction factors that can be applied to the basic MNL are:

- Construction activities less than two months: +10 dB  $L_{dn}$  correction
- Negligible tonal or impulsive noise: + 5 dB  $L_{dn}$  correction
- Winter season construction: +5 dB  $L_{dn}$  correction

A buffer distance-based approach was used to assess noise from construction of the pipeline, including trenchless crossing (i.e., HDD and DPI) activities.

A buffer distance from the edge of the pipeline footprint to the noise receptor was used to identify the distance from the pipeline where noise effects equal the MNL. The applicable MNL is 57 dBA for the pipeline activities. Noise effects resulting from pipeline construction activities are expected to last less than 2 months. According to Health Canada 2023, where the construction duration is less than 2 months, 10 dBA may be added to the suggested basic MNL of 47 dBA, resulting in the MNL of 57 dBA  $L_{dn}$  for pipeline construction activity.

HDD construction activities may take longer than 60 days and will not be limited to daytime hours. Far field tonality associated with HDD construction is not expected. According to Health Canada (2023), where the contribution from tonal and/or impulsive noise may be negligible, for example, due to backup alarms, 5 dBA may be added to the suggested basic MNL. Correspondingly, a +5 dBA  $L_{dn}$  correction factor is applied to the basic MNL of 47 dBA, resulting in an MNL of 52 dBA  $L_{dn}$  for HDD crossings.

The noise effects resulting from DPI construction activities are expected to last less than 60 days. According to Health Canada (2023), where the construction duration is less than two months, 10 dBA may be added to the basic MNL. With the inclusion of the negligible tonal correction factor (+5 dBA) and the duration correction factor (+10 dBA), a +15 dBA  $L_{dn}$  correction factor is applied to the basic MNL of 47 dBA, resulting in an MNL of 62 dBA  $L_{dn}$  for DPI crossings.





Table 6.2 lists the applicable MNLs and the buffer distances required to meet the MNLs for pipeline and trenchless crossing activities.

**Table 6.2 Construction Noise MNL for Pipeline and Trenchless Crossings HDD and DPI**

Construction	Buffer Distance (m)	Community Description	Activity Duration	MNL, L <sub>dn</sub> (dBA)
Pipeline	185	Quiet suburban and rural community	<2 months	57
HDD	680	Quiet suburban and rural community	>2 months and <1 year	52
DPI	130	Quiet suburban and rural community	<2 months	62

Compressor station construction is anticipated to be 24 months in duration; therefore, the percent highly annoyed (%HA) metric is used to quantify annoyance for the closest or most impacted residential dwellings (noise receptors) within the LAA. As pile driving during compressor station construction is expected to last less than 2 months, the assessment results are presented separately for two periods: 1) the period longer than 12 months, with no pile driving activities; and 2) the less than 2-month period with pile driving activities.

The suggested applicable MNL is 57 dBA for the less than 2-month period (i.e., the basic MNL of 47 dBA with +10 dBA L<sub>dn</sub> correction), and the metric of %HA was used to quantify noise effects associated with the longer construction period for the Amendment. The baseline %HA values are based on results from the baseline sound level. To calculate the relevant change in %HA values resulting from construction noise, L<sub>dn</sub> values are needed for baseline and for construction ≥1 year in duration.

The baseline and total %HA are calculated using the following equations with the L<sub>dn</sub> corresponding to the baseline or Project inclusion:

$$\%HA_{(baseline)} = \frac{100}{1 + e^{[10.4 - 0.132 * L_{dn}(baseline)]}}$$

$$\%HA_{(baseline+Project)} = \frac{100}{1 + e^{[10.4 - 0.132 * L_{dn}(baseline+Project)]}}$$

The change in %HA for construction is calculated by subtracting %HA (baseline) from %HA (baseline and Project). Therefore, the change in %HA is calculated by using the following equation:

$$\text{Change in \%HA} = \%HA_{(baseline + Project)} - \%HA_{(baseline)}$$



Receptors in rural areas could be considered to have a greater expectation of “peace and quiet” than receptors in urban areas. Health Canada (2023) considers a “quiet rural area” to be an area with an  $L_{dn}$  of 45 dB or less due to human-made sounds. Due to the heightened sensitivity to noise, baseline levels in quiet rural areas are adjusted by adding 10 dBA. This +10 dBA adjustment also applies to the predicted construction noise levels for all project construction phases in determining %HA. The effect of this +10 dBA adjustment in quiet rural areas is to produce a greater change in %HA than would otherwise occur with unadjusted noise levels. Taking a conservative approach, noise receptors with  $L_{dn} < 45.4$  dBA are considered for the +10 dBA adjustment, to account for this heightened sensitivity to increases in noise levels.

Health Canada (2023) noise guidance recommends that the highest increase in %HA is 6.5% at a noise receptor for project activities with a duration of more than one year. If the change in %HA exceeds 6.5%, then noise effects may require mitigation. Health Canada (2023) also recommends mitigation if Project noise exceeds  $L_{dn}$  of 75 dBA at a receptor, even if the change in %HA does not exceed 6.5%.

Construction at the compressor station is expected to last for 24 months, but to occur only during the daytime period.

### **6.2.2 Operation Phase**

Two regulated facilities, Westcoast CS2 and the Pembina Flats Compressor Station 2 (Pembina Station 2), are within the RAA. Existing third-party regulated facilities that are within the RAA are expected to interact cumulatively with the residual effects from the Project. Publicly available data from the Westcoast Spruce Ridge Program Environment and Socio-economic Assessment (Westcoast 2017) was used to establish noise effects from the Westcoast CS2 and Pembina Station 2 facilities.

A noise survey was completed in April 2024 to investigate the acoustic environment within the RAA, including noise effects from the operation of the Westcoast CS2 and Pembina Station 2 facilities. At the Westcoast CS2 facility, only Unit 10 was in operation during the April 2024 site visit (Units 1, 2, and 4 were not in operation). The assessment case presented in Westcoast (2017) indicated the operation of Units 1, 2, and 10 as the representative operating condition. It was also observed that the Pembina Station 2 facility was not in operation during the April 2024 site visit. In a typical operating condition, one of the two gas turbine compressor units would operate at the Pembina Station 2. As such, noise survey results were insufficient to quantify the noise effects from both facilities; therefore, the prediction results from Westcoast (2017) are used to establish the baseline sound level.

Table 6.3 summarizes the baseline sound level and applicable PSL at the noise receptors.



**Table 6.3 Baseline Sound Level and PSL for Compressor Station Noise Receptors**

Receptor ID	Ambient Sound Level		Other Regulated Facility Daytime or Nighttime Noise Level (dBA)	Baseline Case Sound Level		BCER PSL Limits	
	Daytime (dBA)	Nighttime (dBA)		Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)
CS_R1	50	40	32.7	50.1	40.7	55	45
CS_R2	55	45	44.8	55.4	47.9	60	50
CS_R3	50	40	42.0	50.6	44.1	55	45
CS_R4	50	40	42.0	50.6	44.1	55	45
CS_R5	50	40	35.6	50.2	41.3	55	45
CS_R6	50	40	34.1	50.1	41.0	55	45

## 6.3 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to the acoustic environment. This feedback has been considered and summarized in Table 6.4 and has been integrated into the acoustic environment effects assessment.

**Table 6.4 Summary of Engagement Feedback Related to Acoustic Environment**

Comment	Sources	PRGT Response
Doig River First Nation previously expressed concern about increased noise and loss of enjoyment of the land due to development and increased human presence on the land.	Fasken Martineau 2013a, Firelight 2014a	PRGT will continue to work with Doig River First Nation to address feedback received regarding increase in noise levels and loss of enjoyment of the land due to Project-related development and increased human presence on the land.
Nak'azdli Whut'en members have expressed concerns about potential Project effects on cabins and cabin use, including from increased noise.	CSTC 2014b	PRGT will continue to work with Nak'azdli Whut'en to address feedback received regarding potential Project effects on cabins and cabin use, including from increased noise.
Nak'azdli Whut'en reported concerns about the potential effects of gas leaks, noise, vibration, and dust pollution on terrestrial wildlife species.	CSTC 2014b	Information on how potential effects of noise may affect wildlife is presented in Section 12.0 (Wildlife and Wildlife Habitat).
Takla Nation has expressed concern about effects on wildlife health, wildlife movement, and wildlife access as a result of Project activities including potential increase in noise.	Takla Lake First Nation and Sharp. 2014	Information on how potential effects of noise may affect wildlife is presented in Section 12.0 (Wildlife and Wildlife Habitat).



## 6.4 Amendment Effects Assessment

This section describes changes to the assessment methods, anticipated potential effects, anticipated residual effects, changes to the effects characterizations in the EAO Assessment Report (EAO 2014a) and Application (PRGT 2014a), anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment of the Amendment.

### 6.4.1 Potential Effects and Mitigation Measures

The Application (PRGT 2014a) considered changes in the acoustic environment along the pipeline corridor and at each compressor station location. The EAO Assessment Report (EAO 2014a) considered the same potential effects. Table 6.5 outlines the potential effects and measurable parameters for the acoustic environment for the Amendment. The potential effects and the measurable parameters do not differ from the Application (PRGT 2014a).

**Table 6.5 Potential Effects and Measurable Parameters for Acoustic Environment**

Potential Effect	Measurable Parameter
Change in acoustic environment	Day ( $L_d$ ), night ( $L_n$ ), and $L_{dn}$ sound level

The mitigation measures identified in the Application (Section 7.5.2.2 in PRGT 2014a) that are applicable to a change in the acoustic environment are expected to be applicable to the Amendment. No new mitigation measures applicable to a change in the acoustic environment have been identified.

Detailed mitigation to be incorporated in the design of the compressor station will be evaluated as the design of the compressor station progresses. Specific mitigation measures will be included in a future Noise Impact Assessment submitted to the BCER in support of permitting.

### 6.4.2 Residual Effects

The potential for a change in the acoustic environment during construction was assessed in the Application (PRGT 2014a) and remains valid. The effects from construction and operation of the compressor station are assessed for the Amendment. In addition, pipeline and trenchless crossings in proximity to noise receptors are also assessed in this Amendment. Predictions for construction and operational noise effects were completed using Computer Aided Noise Abatement (Cadna/A) acoustic modeling software (DataKustik 2021), which is based on internationally accepted sound propagation algorithms (International Organization for Standardization [ISO] 1993, 1996) that are well accepted by BCER and Health Canada (2023) in performing noise propagation calculations. The acoustic model considers temperature, humidity, wind speed, ground condition, terrain effect, and the reflection of sound.

#### 6.4.2.1 Construction Phase

For the Amendment, the construction phase noise assessment includes the compressor station and the pipeline construction activities, including trenchless crossing activities.



Construction noise associated with the compressor station includes equipment such as excavators, cranes, articulated trucks, dozers, graders, loaders, a smooth drum packer, pile drivers, and welding rigs. Construction noise for the pipeline focuses on grading activities, which was predicted to result in the highest noise emission levels compared with other phase of the construction activities. Grading equipment includes trucks, dozers, excavators, graders, and utility task vehicles. Trenchless crossing activities will require equipment such as generators, drill rigs, pump trucks, diesel pumps, conveyor trucks, water trucks, cranes, and hydrovac trucks.

The Health Canada (2023) suggested MNL for short-term construction is applicable to the noise receptors for short-term activities during the construction phase. If the assessment results exceed the MNL, mitigation measures to reduce the noise effects to acceptable MNLs will be recommended. The results presented in this Amendment include noise mitigation measures.

The compressor station is anticipated to take 24 months to construct. As pile driving activities are expected to last less than 2 months, the assessment results are presented separately for two periods: 1) the period longer than 1 year, with no pile driving activities; and 2) the less than 2-month period with pile driving activities. The suggested applicable MNL is 57 dBA for the less than 2-month period. The results of the longer-term period (i.e., more than 1 year) are used to determine the change in %HA associated with the construction. The predicted changes in %HA are compared to the 6.5% target as stated in the Health Canada (2023) noise guidance. Health Canada also recommends mitigation of construction noise if it exceeds  $L_{dn}$  of 75 dBA at a receptor, even if the change in %HA does not exceed 6.5%.

The construction noise results for short-term pile driving activities and longer-term construction related activities are presented in Table 6.6 and Table 6.7, respectively.

The changes in %HA associated with the Project long-term construction phase are summarized in Table 6.7. The change in %HA at all receptors is below the 6.5% target. The construction noise levels at all receptors are also below the Health Canada recommended day-night sound level threshold of 75 dBA.

**Table 6.6 Short-Term Pile Driving Noise Prediction Results**

Receptor ID	Pile Driving Period, $L_{dn}$ (dBA)	Meets MNL of 57 dBA?
CS_R1	43.7	Yes
CS_R2	54.6	Yes
CS_R3	45.6	Yes
CS_R4	52.4	Yes
CS_R5	51.3	Yes
CS_R6	46.6	Yes



**Table 6.7 Longer-Term Construction Noise Prediction Results (Not Including Pile Driving)**

Receptor ID	Baseline		Project Construction L <sub>dn</sub> (dBA)	Total (Baseline and Project)		Change in %HA (between Total and Baseline)	Below Change in %HA Threshold of 6.5 %
	L <sub>dn</sub> (dBA)	%HA (%)		L <sub>dn</sub> (dBA)	%HA (%)		
CS_R1	50.3	2.3	43.4	51.1	2.5	0.2	Yes
CS_R2	56.5	5.0	48.6	57.2	5.4	0.4	Yes
CS_R3	52.3	2.9	40.5	52.6	3.0	0.1	Yes
CS_R4	52.3	2.9	46.3	53.2	3.3	0.4	Yes
CS_R5	50.6	2.4	47.8	52.4	3.0	0.6	Yes
CS_R6	50.5	2.3	42.9	51.2	2.5	0.2	Yes

Noise receptors along the pipeline, including for trenchless crossing locations, have not been identified. The assessment uses a distance-based approach to assess noise effect for noise receptors within the LAA. A buffer distance from the edge of the pipeline footprint to the noise receptors was used to identify the distance from the pipeline where the noise effects equal the MNL (see Table 6.2).

The noise assessment for pipeline construction activities uses the MNL of 57 dBA to identify the minimum buffer distance from the pipeline; sound levels from pipeline construction activities are predicted to be at an acceptable MNL beyond this buffer. Buffer distances vary according to the type and duration of the construction activity. The noise model considered grading activities (e.g., the felling and mulching of timber) to be representative of pipeline construction, because grading activities have the highest noise emission level.

The predicted results indicate that L<sub>dn</sub> are at or less than the MNL of 57 dBA beyond a buffer distance of 185 m from the edge of the pipeline footprint for grading activities. The assessment results indicate that the L<sub>dn</sub> for pipeline construction are less than the MNL at all noise receptor locations outside of the minimum specified buffer zone.

The noise assessment for trenchless crossing activities uses the MNLs of 52 dBA and 62 dBA, respectively, to identify a minimum buffer distance beyond which sound levels of HDD or DPI construction activities are at an acceptable MNL. Buffer distances vary according to the type and duration of construction activity.

For HDD construction activities, the predicted results indicate that L<sub>dn</sub> are at or below the MNL of 52 dBA beyond a buffer distance of 680 m from the HDD construction site boundary. The predicted results for DPI construction activities, indicate that L<sub>dn</sub> are at or below the MNL of 62 dBA beyond a buffer distance of 130 m from the DPI construction site boundary. The assessment results indicate that the L<sub>dn</sub> for trenchless crossing activities are below the MNLs at any receptor location outside the minimum specified buffer zone.



Construction noise is expected to be below the MNLs when the minimum buffer distances are maintained between the receptor and HDD or DPI construction activities. However, receptors located within the minimum distance may experience a  $L_{dn}$  level exceeding the MNL guideline. Additional mitigation measures may be implemented near these receptor locations to meet the established noise level recommendation.

#### **6.4.2.2 Operation Phase**

Noise effects near the compressor station during the operation phase are assessed in accordance with the requirements of the BCER Noise Guideline. The assessment approach is summarized as follows:

- Define the project footprint, LAA, RAA, and noise receptors.
- Determine the applicable noise threshold (i.e., the PSL) at the receptors.
- Establish a baseline sound level at the receptors (Baseline Case).
- Establish the noise effects of the project at the receptors (Project Case).
- Determine the Application Case results by combining the Baseline Case with the Project Case sound level at the receptors.
- Assess conformance of the project by comparing the Application Case to the PSL.

In the operation phase, noise emitting equipment at the compressor station includes the compressor units, gas turbines or electric motor drives (EMD), building ventilation units, suction and discharge piping, process coolers, transformers, and other ancillary equipment. Noise effects of the operational phase for the compressor station were quantified by noise models, which predict noise levels from the noise emission sources at the compressor station. If the predicted noise levels exceed the PSL, noise mitigation measures will be considered for the compressor station to reduce the noise effects and to meet the PSL. The results presented in the Amendment include conceptual noise mitigation measures. Detailed mitigation will be evaluated as the design of the compressor station progresses. Specific mitigation measures will be included in a future Noise Impact Assessment submitted to the BCER in support of permitting for the proposed compressor station location.

#### **6.4.2.3 Project Case**

The noise assessment considers two options: Option 1 includes two 33 megawatt (MW) gas turbine compressor units and associated equipment; Option 2 includes two 33 MW EMD compressor units and associated equipment.

Table 6.8 and Table 6.9 summarize the predicted noise level at the noise receptors due to the proposed gas turbine compressor units and the EMD compressor units, respectively. The model assumes that all noise sources are operating continuously during both daytime and nighttime periods; therefore, the predicted sound levels at the noise receptors will be the same for both periods. Conceptual mitigation measures are included in the model results.



**Table 6.8 Project Case Noise Level Results – Gas Turbine Option**

Receptor ID	Predicted Noise Level	
	Daytime (dBA)	Nighttime (dBA)
CS_R1	36.5	36.5
CS_R2	38.0	38.0
CS_R3	33.6	33.6
CS_R4	37.2	37.2
CS_R5	40.3	40.3
CS_R6	36.4	36.4

**Table 6.9 Project Case Noise Level Results – EMD Option**

Receptor ID	Predicted Noise Level	
	Daytime (dBA)	Nighttime (dBA)
CS_R1	35.8	35.8
CS_R2	38.6	38.6
CS_R3	33.2	33.2
CS_R4	37.4	37.4
CS_R5	39.8	39.8
CS_R6	39.5	39.5

#### 6.4.2.4 Application Case

The Application Case includes the combined noise effects from the Project Case and the Baseline Case sound levels. The Application Case results are the cumulative sound levels including the noise contributions of the ASL, the existing third-party regulated facilities, and the compressor station components inclusive of noise mitigation measures. The Application Case results are compared to the PSLs at each noise receptor.

Table 6.10 and Table 6.11 summarize the Application Case sound levels at the noise receptors for the gas turbine and the EMD options, respectively. Results of the Application Case indicate that the cumulative sound levels are below the daytime and nighttime PSLs; therefore, the operation noise levels at the compressor station meet the BCER Noise Guideline requirements.





**Table 6.10 Application Case Noise Level Results – Gas Turbine Option**

Receptor ID	Baseline Case Sound Level		Project Case		Application Case Sound Level		BCER PSL Limits		Meets PSL?
	Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)	
CS_R1	50.1	40.7	36.5	36.5	50.3	42.1	55	45	Yes
CS_R2	55.4	47.9	38.0	38.0	55.5	48.3	60	50	Yes
CS_R3	50.6	44.1	33.6	33.6	50.7	44.5	55	45	Yes
CS_R4	50.6	44.1	37.2	37.2	50.8	44.9	55	45	Yes
CS_R5	50.2	41.3	40.3	40.3	50.6	43.9	55	45	Yes
CS_R6	50.1	41.0	36.4	36.4	50.3	42.3	55	45	Yes

**Table 6.11 Application Case Noise Level Results – EMD Option**

Receptor ID	Baseline Case Sound Level		Project Case		Application Case Sound Level		BCER PSL Limits		Meets PSL?
	Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)	Daytime (dBA)	Nighttime (dBA)	
CS_R1	50.1	40.7	35.8	35.8	50.2	41.9	55	45	Yes
CS_R2	55.4	47.9	38.6	38.6	55.5	48.4	60	50	Yes
CS_R3	50.6	44.1	33.2	33.2	50.7	44.5	55	45	Yes
CS_R4	50.6	44.1	37.4	37.4	50.8	44.9	55	45	Yes
CS_R5	50.2	41.3	39.8	39.8	50.5	43.6	55	45	Yes
CS_R6	50.1	41.0	39.5	39.5	50.5	43.3	55	45	Yes



### 6.4.3 Changes to Characterization of Residual Effects

The EAO Assessment Report (EAO 2014a) concluded that project effects on the acoustic environment are predicted to be not significant. The characterization of residual effects for the Amendment is unchanged from the 2014 EAO assessment and is summarized in Table 6.12.

**Table 6.12 Changes to EAO Assessment Report Characterization of Residual Effects – Acoustic Environment**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<i>Low to moderate sensitivity</i>	<i>The acoustic environment is generally of a low sensitivity, as the receiving environment is relatively undisturbed and generally not sensitive to noise. However, some human receptors may be sensitive to additional noise disturbance, given the relatively undisturbed context.</i>	No change
Magnitude	<i>Low to moderate</i>	<i>The magnitude of potential adverse effects is generally predicted to be low. Noise from pipeline and compressor station construction and compressor station operations is perceptible, but predicted to be within OGC Noise Control Best Practices Guideline or Health Canada's MNL guideline. The exception is noise from construction for six receptors within 500 m of the Project, where the magnitude of effects would be moderate. The Proponent would design additional mitigation measures during permitting to bring these areas into compliance.</i>	No change
Extent	<i>Local</i>	<i>The facilities of the proposed Project would comply with the OGC Noise Control Best Practices Guideline and potential effects would generally not be detectable outside the LAA of 1.5 km.</i>	No change
Duration	<i>Short term to long term</i>	<i>Construction and testing activities for the pipeline would temporarily affect the area's acoustic environment; however, once these activities end, the acoustic environment would return to its original state with no residual effects. Construction activities would be generally limited to 12 hours a day, except during HDD at watercourse crossings, which would be conducted 24 hours a day. Potential noise effects from drilling, testing and servicing would be short term. Construction of compressor stations and meter stations is expected to take up to two years. There would be a long-term increase in ambient noise levels during operation of the proposed compressor stations.</i>	No change
Reversibility	<i>Reversible</i>	<i>The potential adverse effects would be fully reversible upon cessation of construction or operational activity.</i>	No change

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Assessment Report for the Prince Rupert Gas Transmission Project (EAO 2014a).



Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Frequency	Construction – Semi-continuous Operations – continuous	Potential adverse effects are expected to be occasional or semi-continuous for construction, and continuous during operations at compressor station locations. Construction activities would take place during daytime hours (with the exception of HDD and marine pipeline construction), while proposed compressor stations would operate 24 hours a day	No change
Likelihood	The likelihood of residual effects to the acoustic environment is high.		No change
Significance	EAO is satisfied that the proposed Project is not likely to have significant residual adverse noise effects, as adverse effects would be highly localized, and the effects assessments predict compliance with the OGC's Noise Control Best Practices Guideline and the Health Canada guidance at all compressor stations and during pipeline construction.		-
Confidence	High confidence – EAO has a high confidence in the prediction of significance and likelihood taking into consideration the medium to high confidence in the noise prediction model and that the Proponent would be required to implement mitigation controls to meet the noise thresholds under the OGC's Noise Control Best Practices Guideline.		No change

#### 6.4.4 Cumulative Effects Assessment

The cumulative effects assessment for acoustic environment follows the same general process as described in the Application (PRGT 2014a). Activities and projects that are likely to act cumulatively with the Project were listed in the Application (PRGT 2014a). Additional activities and projects that may interact cumulatively with the Amendment are identified in Section 4.0 and Appendix A of the Amendment.

Noise emissions associated with construction of the pipeline and the compressor station are expected to be transient in nature and only occur temporarily for short period. As a result, construction-related residual effects are not expected to act cumulatively with the effects of other past, present, and reasonably foreseeable future projects or physical activities within the RAA. Therefore, an assessment of the potential incremental contribution of construction noise to cumulative effects on the acoustic environment is not warranted. Construction-related residual effects on the acoustic environment will be short-term in duration and ambient sound levels would return at the conclusion of construction in a given area.

For operational activities, the noise assessment evaluated the combined noise effects on the existing acoustic environment and the compressor station during the operation phase. Noise from the normal operation of the compressor station will be continuous for the life of the Project. Because the pipeline system will be buried underground, the noise contribution from the pipeline system will be negligible.



The Application (PRGT 2014a) and the EAO Assessment Report (EAO 2014a) determined that adverse cumulative effects related to the acoustic environment were not anticipated. The contributions of the Amendment to cumulative effects on the acoustic environment are likely to be similar to those associated with the Application (PRGT 2014a).

#### **6.4.5 Risks and Data Uncertainty**

The noise assessment prediction accuracy depends on two factors: 1) the accuracy of the acoustical source data; and 2) the accuracy of the sound propagation model. The sound power level data used in this noise assessment are based on field measurements of similar equipment and manufacturers' data, where applicable. The Cadna/A model predicts outdoor noise in accordance with ISO 9613 standards (ISO 1993, ISO 1996). Propagation calculations under ISO 9613 produce conservative results that are representative of meteorological conditions that enhance sound propagation (e.g., downwind and temperature inversion conditions). These conditions are not persistent, and the model predictions are, therefore, considered to be conservative.

Actual sound levels are generally expected to be lower than predicted by the noise model. The conclusion regarding the prediction of significance of residual effects on the acoustic environment is, therefore, made with a high level of confidence. As the confidence in this prediction is not low, no additional risk analysis has been undertaken.



## 7 Water Quality

Water quality was identified as a VC in the Application Information Requirements (PRGT 2014b) due to Project interactions with the freshwater environment. This Amendment includes an updated description of existing conditions based on publicly available data collected since the original baseline studies were completed and includes expanded spatial boundaries that reflect the proposed Project changes in this Amendment. In the context of water quality in smaller water courses, the definition of the aquatic resources LAA and RAA is the same as presented in the Application (PRGT 2014a), and therefore applied to this Amendment. The LAA for larger watercourses is increased to 1 km downstream to be consistent with the fish and fish habitat LAA. At larger watercourses, assessment will include areas up to 1 km downstream depending on site-specific conditions.

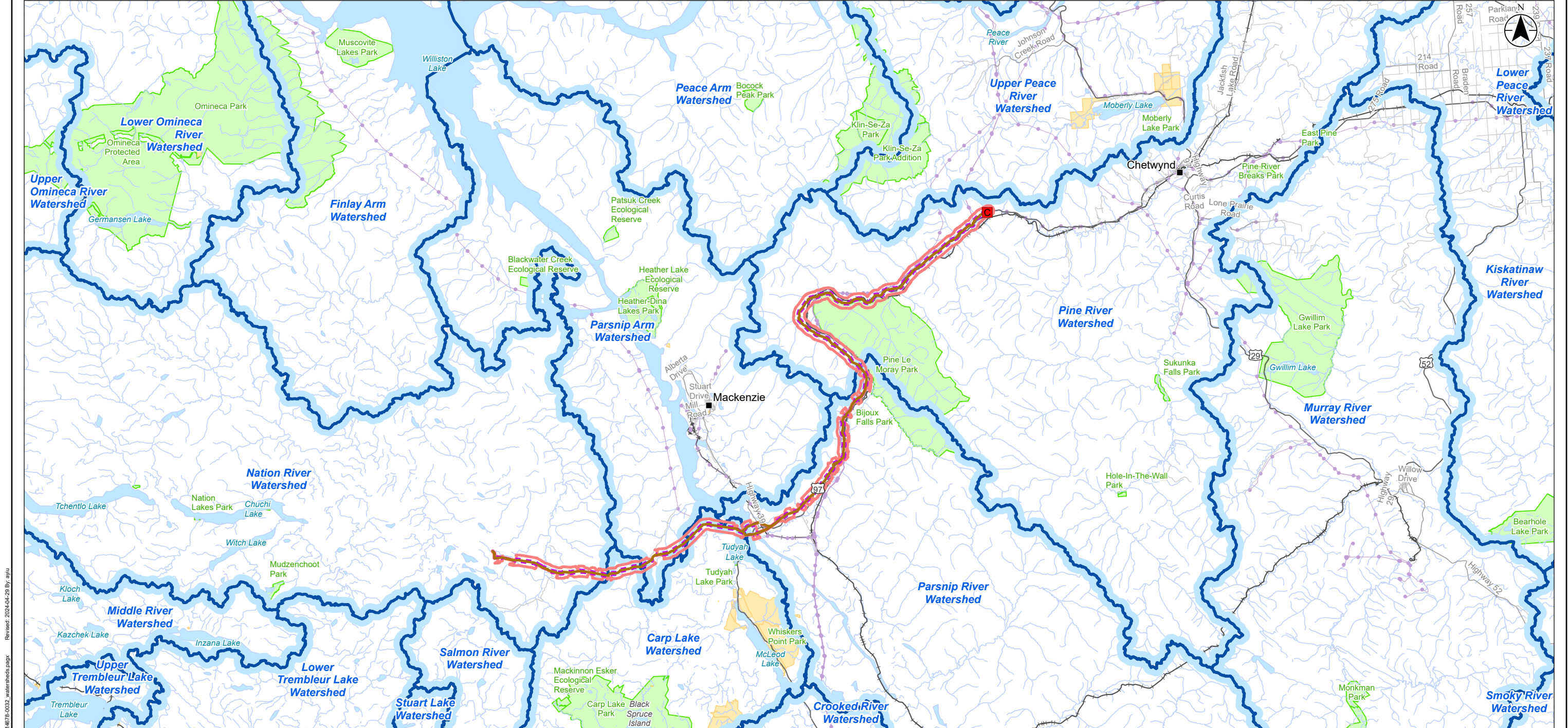
### 7.1 Baseline Conditions

The Eastern Route Alternative consists of 197 mapped watercourse crossings (see Section 9.1.1), passing through the Pine River, Parsnip River, Carp Lake, Parsnip Arm, and Nation River watersheds (Figure 7.1). Baseline conditions have been described from publicly available water quality data including: *Environmental Management Act* (EMA) waste discharge authorization reporting, and provincial water quality monitoring stations (Government of British Columbia 2024a, Government of British Columbia 2024b; Figure 7.2).

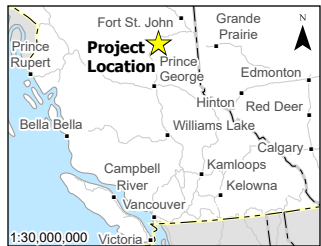
Implementation of the Eastern Route Alternative would eliminate interactions with several potential sources of contaminants which were included in the Application (PRGT 2014a), such as, Williston Reservoir, four waste discharge locations near Mackenzie and Hudson's Hope as they are downstream of the Eastern Route Amendment. One waste discharge location (Westcoast Energy) cancelled their permit in 2019 and is therefore not included in this assessment.

Information for the two EMA waste discharge authorizations which potentially interact with the Eastern Route Alternative was evaluated for locations shown in Table 7.1. Both EMA waste discharge authorization locations were previously evaluated for the approved route but are closer to the Eastern Route Alternative; sediment pond effluent from Willow Creek Mine was previously assessed as greater than 25 km from the approved pipeline but is now located 2 km away from the Eastern Route Alternative, and the First Coal Corp. mine is approximately 8 km from the Eastern Route Alternative.



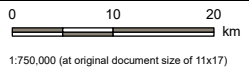


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Revised: 2024-04-29 By: ayiu



**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

- |  |  |  |             |
|--|--|--|-------------|
| ■ City, Town, Village or District Municipality | ■ First Nations Reserve  | ■ Compressor Station                     | ■ Watershed |
| — Highway                                      | ■ Parks, Protected Areas, Ecological Reserves, and Conservancies | ■ Project Footprint                      |             |
| — Road   | ■ Waterbody  | ■ Water Quality Local Assessment Area    |             |
| — Local Street                                 |  | ■ Water Quality Regional Assessment Area |             |
| — Railway                                      |  |  |             |
| — Transmission Line                            |  |  |             |
| — Watercourse                                  |  |  |             |



Project Location  
Project Number 123514678  
Prepared by AYIU on 20240426  
Requested by SNABESS on 20240426  
Reviewed by TQUILICHINI on 20240426  
British Columbia  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Water Quality  
Figure No.  
**7.1**  
Title  
**EASTERN ROUTE ALTERNATIVE  
AMENDMENT WATERSHEDS**

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**Table 7.1 Summary of EMA Waste Discharge Authorizations within the Eastern Route Alternative RAA**

EMA Waste Discharge Authorization Number	Facility Name	Description of Discharge	Monitoring Parameters	Distance to Eastern Route Amendment Footprint
17042	Conuma Resources Ltd., Willow Creek Mine	Sediment pond discharge of coal mine contact water, road runoff and pit water	Turbidity, TSS*, non-metals, ICP-MS** metals, extractable petroleum hydrocarbons	2 km
103961	First Coal Corporation, Goodrich Central South Coal Bulk Sample Project	Bulk sample trench runoff	Turbidity, TSS, non-metals, ICPMS metals	8.2 km

Notes:

\* TSS = Total Suspended Solids

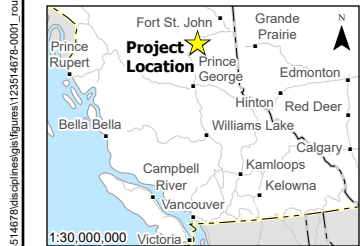
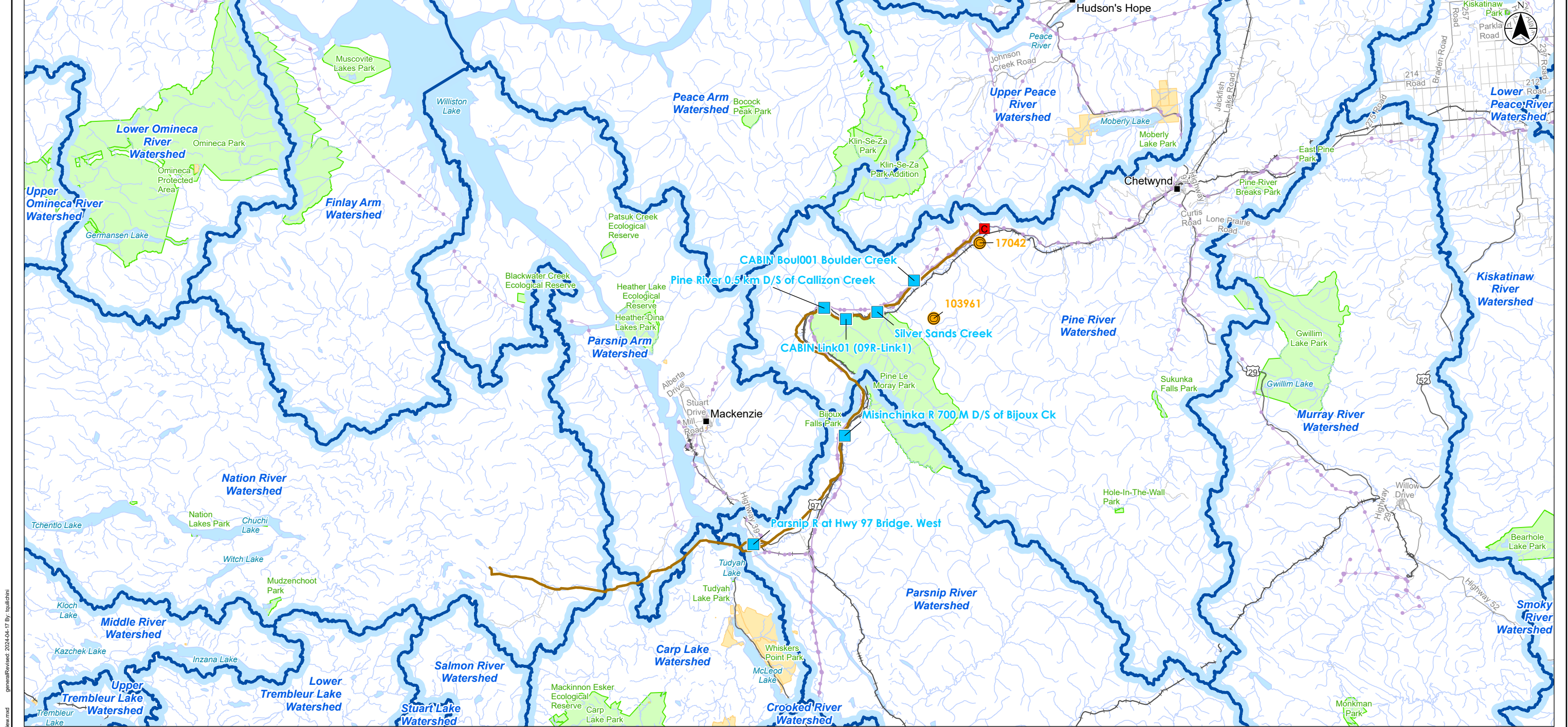
\*\* ICP-MS = Inductively coupled plasma mass spectrometry

Historical water quality data from six provincial water quality monitoring sites, that were not applicable to the approved route, were reviewed as part of the Eastern Route Alternative (Table 7.2; Appendix D). These water quality monitoring sites are located within the RAA of the Eastern Route Alternative in the Pine River (two locations), Big Boulder Creek, Link Creek, Misinchinka River, and Parsnip River (Figure 7.2; Table 7.2).

Water quality guidelines have been updated, since the Application (PRGT 2014a), for both CCME and BC Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (includes British Columbia Water Quality Guidelines – Freshwater Aquatic Life [BC WQG FAL]). Water quality results were screened against the current guidelines for these six water quality monitoring sites (CCME 2024, BC Env 2023; Appendix D). Overall, water quality documented at the monitoring sites along the Eastern Route Alternative is similar to that described in the Application (PRGT 2014a), with results indicating hard water, basic pH, and high conductivity (Appendix D). These sites each had at least one sample exceeding the BC and CCME long term water quality guidelines (Table 7.3) for aluminum (n = 4), cadmium (n = 2), and chromium (n = 2). The BC WQG FAL short-term and CCME long term guidelines for iron were exceeded at three and five sites respectively, and one site had an exceedance of the BC WQG FAL long term guideline for manganese. The frequency and type of exceedances were similar to those described within the Application (PRGT 2014a) for monitoring sites evaluated along the eastern portion of the approved route.







- City, Town, Village or District Municipality

—

Highway

—

Road

—

Local Street

—+—

Railway

—●—

Transmission Line

—

Watercourse
- First Nations Reserve

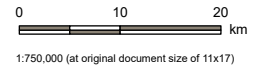
Parks, Protected Areas, Ecological Reserves, and Conservancies

Waterbody
- Compressor Station

Project Footprint
- Effluent Discharge Site

Water Quality Monitoring Station

Watershed



Project Location  
Project Number 123514678  
Prepared by NFORRESTER on 20240402  
Requested by SNABESS on 20240402  
Reviewed by TQUILICHINI on 20240402  
British Columbia  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Water Quality  
Figure No.  
**7.2**  
Title  
**EASTERN ROUTE ALTERNATIVE AMENDMENT  
WATERSHEDS AND WATER QUALITY  
MONITORING LOCATIONS**

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**Table 7.2 Water Quality Monitoring Sites Near the Eastern Route**

<b>Site name</b>	<b>EMS ID</b>	<b>First Sample Date</b>	<b>Most Recent Sample Date</b>	<b>Description</b>	<b>Distance to Eastern Route Amendment Route Footprint</b>
CONUMA WILLOW CREEK MINE (PE17042) PR4	E330812	17 Jan 2023	27 Mar 2024	Pine River downstream of mine at Sheen Property	0.8 km
CONUMA COAL WILLOW CREEK MINE (PE17042) – PR-3	E309361	27 Nov 2018	1 Mar 2024	Pine River u/s of CCR. Background site, Pine River	0.5 km
CABIN BOUL001 BOULDER CREEK (09R-BOUL1)	E277169	31 Aug 2009	30 Aug 2019	Cross Bould Creek on Hwy 97, take 1 <sup>st</sup> L onto bush road, take L at Y, go to end of road, bridge out, walk upstream 500 m. CABIN reference site for Peace model.	0.6 km
CABIN LINK01 (09R-LINK1)	E277180	3 Sep 2009	24 Sep 2020	Link Creek bridge crossing on Hwy 97, access stream via quad trail on East side of Hwy, site 50 m upstream. CABIN reference site	In footprint
MISINCHINKA R 700 M D/S OF BIJOUX CK.	E206756	5 Aug 1986	5 Nov 1987	Approx. 700 m southwest of Bijoux Falls on Hwy 97 north, close to Hwy. Midstream sample	0.7 km
PARSNIP R AT HWY 97 BRIDGE. WEST	0920084	7 May 1985	5 Nov 1987	Parsnip River at John Hart-Peace River Hwy 97. West of Midstream. 30 m downstream of bridge	0.8 km



**Table 7.3 British Columbia and Canadian Council of Ministers of Environment Water Quality Guidelines for the Protection of Aquatic Life**

Parameters	BC WQG FAL <sup>1</sup> (mg/L unless noted otherwise)		CCME <sup>2</sup> (mg/L unless noted otherwise)	
	Short-term acute	Long-term chronic	Short term	Long term
Temperature (°C)	ns	1°C change from optimum for fish species	ns	Maximum weekly temperature not to be exceeded
Dissolved oxygen	5 - 9 minimum (varies with life stage)	8 - 11 minimum (varies with life stage)	ns	5.5 - 9.5 minimum (varies with life stage and cold vs. warm water biota) <sup>3</sup>
pH (pH units)	ns	6.5 - 9.0 (if outside the range, no statistically significant change from background)	ns	6.5 - 9.0
Total Suspended Solids	Change compared to background	Change compared to background	ns	ns
Turbidity (Nephelometric Turbidity unit [NTU])	Change compared to background	Change compared to background	ns	Change compared to background
Total Organic Carbon	ns	Change compared to background	ns	ns
Ammonia	Varies with temperature and pH <sup>4</sup>	Varies with temperature and pH <sup>4</sup>	ns	Varies with temperature and pH <sup>5</sup>
Chloride	600	150	640	120
Nitrate	32.8	3	550	13
Nitrite	0.06 - 0.60 (varies with chloride)	0.02 – 0.20 (varies with chloride)	ns	0.06
Sulphate	ns	128 - 409 Varies with water hardness	ns	ns
Aluminum	ns	Varies with water hardness, pH and dissolved organic carbon <sup>4</sup>	ns	0.005 at pH < 6.5, 0.1 at pH ≥ 6.5
Antimony	0.074	0.250	ns	ns
Arsenic	0.005	ns	ns	0.005
Barium	ns	1	ns	ns
Beryllium	ns	0.00013	ns	ns
Boron	ns	1.2	29	1.5



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Parameters	BC WQG FAL <sup>1</sup> (mg/L unless noted otherwise)		CCME <sup>2</sup> (mg/L unless noted otherwise)	
	Short-term acute	Long-term chronic	Short term	Long term
Cadmium	Varies with water hardness <sup>4</sup>	Varies with water hardness <sup>4</sup>	Varies with water hardness <sup>6</sup>	Varies with water hardness <sup>6</sup>
Chromium	ns	0.001 Cr(VI) 0.0089 Cr(III)	ns	0.001 Cr(VI) 0.0089 Cr(III)
Cobalt	0.110	0.004	ns	ns
Copper	Varies with water hardness, pH and dissolved organic carbon <sup>4</sup>	Varies with water hardness, pH and dissolved organic carbon <sup>4</sup>	ns	Varies with water hardness
Fluoride	Varies with water hardness <sup>4</sup>	ns	ns	ns
Iron	1 (total) 0.35 (dissolved)	ns	ns	0.3
Lead	Varies with water hardness <sup>4</sup>	Varies with water hardness <sup>4</sup>	ns	0.001 - 0.007 Varies with water hardness <sup>7</sup>
Lithium	ns	ns	ns	ns
Manganese	Varies with water hardness <sup>4</sup>	Varies with water hardness <sup>4</sup>	Varies with water hardness <sup>8</sup>	Varies with water hardness, pH and dissolved organic carbon <sup>8</sup>
Mercury	ns	0.00002 for MeHg = 0.5% of THg	ns	0.000026 (Total), 0.000004 (MeHg)
Molybdenum	46	7.6	ns	0.073
Nickel	ns	Varies with water hardness <sup>4</sup>	ns	0.025 - 0.150 Varies with water hardness <sup>9</sup>
Phosphorus	ns	ns	ns	0.0035 to 0.100 (categories of eutrophication) <sup>10</sup>
Potassium	ns	ns	ns	ns
Selenium	ns	0.002	ns	0.001
Silver	Varies with water hardness <sup>4</sup>	Varies with water hardness <sup>4</sup>	ns	0.00025
Thallium	ns	ns	ns	0.0008
Titanium	ns	ns	ns	ns
Uranium	ns	0.0085	0.033	0.015
Vanadium	ns	ns	ns	ns
Zinc	Varies with water hardness and dissolved organic carbon	Varies with water hardness, pH and dissolved organic carbon	Varies with water hardness and dissolved organic carbon <sup>11</sup>	Varies with water hardness, pH and dissolved organic carbon <sup>11</sup>



Notes:

- <sup>1</sup> BC Ministry of Environment and Climate Change Strategy Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (BC MOECCS 2023)
- <sup>2</sup> Canadian Council of Ministers of the Environment Water Quality Guidelines for Protection of Aquatic Life (CCME 2024)
- <sup>3</sup> CCME factsheet for dissolved oxygen ([https://ccme.ca/en/chemical/154#\\_aql\\_fresh\\_concentration](https://ccme.ca/en/chemical/154#_aql_fresh_concentration))
- <sup>4</sup> BC WQG FAL guideline look-up table ([https://bcgov-env.shinyapps.io/bc\\_wqg/](https://bcgov-env.shinyapps.io/bc_wqg/))
- <sup>5</sup> CCME factsheet for ammonia ([https://ccme.ca/en/chemical/5#\\_aql\\_fresh\\_concentration](https://ccme.ca/en/chemical/5#_aql_fresh_concentration))
- <sup>6</sup> CCME factsheet for cadmium ([https://ccme.ca/en/chemical/20#\\_aql\\_fresh\\_ST\\_concentration](https://ccme.ca/en/chemical/20#_aql_fresh_ST_concentration))
- <sup>7</sup> CCME factsheet for lead ([https://ccme.ca/en/chemical/124#\\_aql\\_fresh\\_concentration](https://ccme.ca/en/chemical/124#_aql_fresh_concentration))
- <sup>8</sup> CCME factsheet for manganese ([https://ccme.ca/en/chemical/129#\\_aql\\_fresh\\_concentration](https://ccme.ca/en/chemical/129#_aql_fresh_concentration))
- <sup>9</sup> CCME factsheet for nickel ([https://ccme.ca/en/chemical/139#\\_aql\\_fresh\\_concentration](https://ccme.ca/en/chemical/139#_aql_fresh_concentration))
- <sup>10</sup> CCME factsheet for phosphorus ([https://ccme.ca/en/chemical/167#\\_aql\\_fresh\\_concentration](https://ccme.ca/en/chemical/167#_aql_fresh_concentration))
- <sup>11</sup> CCME factsheet for zinc ([https://ccme.ca/en/chemical/229#\\_aql\\_fresh\\_ST\\_concentration](https://ccme.ca/en/chemical/229#_aql_fresh_ST_concentration))

ns = no standard

Shaded cells = guideline has been updated since 2014

## 7.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application (PRGT 2014a), Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to water quality. This feedback has been considered and summarized in Table 7.4 and has been integrated into the water quality effects assessment.

**Table 7.4 Summary of Engagement Feedback Related to Water Quality**

Comment	Sources	PRGT Response
Doig River First Nation expressed concern that harvested animals show signs of illness and attributed this to contamination of water from chemicals found in industrial areas and herbicides sprayed for clearing areas.	Firelight 2014a	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality and wildlife are assessed in Section 7.3.1 and 12.3.1.</li> <li>Management and mitigation measures related to clearing during construction are addressed in the CEMP within the Chemical and Waste Management Plan and the Erosion and Sediment Control Management Plan. The CEMP restricts the use of herbicides within 30 m of an open body of water.</li> </ul>
McLeod Lake Indian Band expressed concerns of erosion and sediment control, recommending a trenchless option.	January 2024 engagement	<ul style="list-style-type: none"> <li>Management and mitigation measures related to erosion and sediment control are addressed in the Erosion and Sediment Control Management Plan. Trenchless options will be considered for environmentally sensitive areas and areas evaluated to have elevated erosion and sediment control risks.</li> </ul>



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<b>Comment</b>	<b>Sources</b>	<b>PRGT Response</b>
McLeod Lake Indian Band has noted a decline in water quality in its traditional territory due to industrial activity, particularly the mercury contamination within the Williston Reservoir watershed, noting that many McLeod Lake Indian Band members have stopped eating harvested fish.	Firelight 2015	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality and fish health are assessed in Section 7.3.1 and 9.3.1.</li> <li>As noted in Section 7.3.1, the Eastern Route Alternative would avoid trenching through the Williston Reservoir, reducing the potential for mobilization of metals in this area.</li> <li>Management and mitigation measures related to construction are addressed in the CEMP within the Chemical and Waste Management Plan, the Erosion and Sediment Control Management Plan, the Freshwater Water Quality Monitoring Plan, and the Watercourse Crossing Mitigation and Inspection Plan</li> </ul>
Nak'azdli Whut'en members have expressed concerns regarding the health of white sturgeon, salmon, and waterways within close proximity to the Project, and have further expressed concerns about leaks, damaged pipelines, and sedimentation impacting the water quality and fish habitat.	CSTC 2014b	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality and fish health are assessed in Section 7.3.1 and 9.3.1.</li> <li>Risk of sedimentation will be managed through the Erosion and Sediment Control Management Plan.</li> <li>Assessment related to accidents and malfunctions is addressed within Chapter 31 of the Application (PRGT 2014a),</li> </ul>
Saulteau First Nations reported changes to fish and fish spawning due to water contamination, and increased sedimentation noting decreases in fish size and populations. Saulteau First Nations previously expressed concerns about water quality and the health impacts of eating fish affected by industrial contamination.	Olson et al. 2018; Sunderman and Lions Gate 2013	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality are assessed in Section 7.3.1 Amendment-related effects on fish health are assessed in Sections 9.3.1 and 18.3.1.</li> <li>Management and mitigation measures related to construction are addressed in the CEMP within the Chemical and Waste Management Plan, the Erosion and Sediment Control Management Plan, the Freshwater Water Quality Monitoring Plan, and the Watercourse Crossing Mitigation and Inspection Plan.</li> </ul>
Takla Nation has expressed concern about effects on wildlife health, wildlife movement, and wildlife access as a result of Project activities including contaminated water resulting from leaks or spills associated with compression stations.	TLFN and Sharp 2014	<ul style="list-style-type: none"> <li>Assessment related to accidents and malfunctions is addressed within Chapter 31 of the Application (PRGT 2014a)</li> </ul>
Access to fresh water sources is of great importance to West Moberly First Nations and members have expressed concerns regarding water quality in its Traditional Territory.	CGGP 2014; WMFN 2014	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality are assessed in Section 7.3.1.</li> <li>Management and mitigation measures related to water quality are addressed in the CEMP within the Chemical and Waste Management Plan, the Erosion and Sediment Control Management Plan, and the Freshwater Water Quality Monitoring Plan</li> </ul>



## 7.3 Amendment Effects Assessment

This section outlines the changes to the assessment methods, anticipated potential effects, anticipated residual effects, changes to the EAO Assessment Report (EAO 2014a) and Application (PRGT 2014a) effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment for the water quality VC. This assessment is informed by a desktop review of recent water quality information available for the assessment boundaries.

This section evaluates potential effects on measurable water quality parameters consistent with those evaluated in the Application (PRGT 2014a; Table 7.5). Background conditions of these parameters is based on information and conditions described in Section 7.1. Potential Project effects pathways which have the potential to impact these parameters described in Section 7.3.1.

**Table 7.5 Potential Effects and Measurable Parameters for Water Quality**

Potential Effect	Measurable Parameter
Change in freshwater water quality related to toxicity	<ul style="list-style-type: none"> <li>pH in water (pH units)</li> <li>acid rock drainage / metal leaching (ARD/ML) potential identified for rock formations in areas where drilling of crossings is required</li> </ul>
	<ul style="list-style-type: none"> <li>metals in water or sediment</li> <li>organic contaminants (polycyclic aromatic hydrocarbons, polychlorinated biphenyls, dioxin, furan) in sediment</li> <li>measurement unit depends on the contaminant and medium</li> </ul>

### 7.3.1 Potential Effects and Mitigation Measures

The Application (PRGT 2014a) considered two effects on water quality: change in freshwater water quality related to toxicity and change in marine water quality related to toxicity (Table 7.5). As the Eastern Route Alternative does not include interactions with marine resources, changes to marine water quality are not relevant and this amendment includes only the anticipated freshwater water quality changes. Based on the content of the Application (PRGT 2014a) and the information gathered during the Application (PRGT 2014a) review, the EAO Assessment Report (EAO 2014a) considered the potential effects on freshwater water quality within the Water chapter related to:

- surface water quality including assessment of release of sediment into watercourses during construction of roads and watercourse crossings; and,
- the Project's potential to cause ML/ARD due to exposure of high sulphide mineral content rock during construction resulting in increased metals concentrations and decreased pH levels in surface water.

Potential effects to fish habitat and fish health due to release of sediment into watercourses is addressed in Section 9.3 of this Amendment application.



Construction of watercourse crossings has the potential to result in release of sediment into watercourses which may result in changes to water quality. Additionally, construction through areas of rock which has high potential for ML/ARD could increase metal concentrations or reduce pH in surface run off water which may flow into watercourses. The Eastern Route Alternative avoids the need for trenching through Williston Lake which reduces the potential for mobilization of sediments in this area which were reported to contain elevated levels of arsenic, manganese, nickel, dioxins and furans (PRGT 2014a).

Table 7.6 summarizes potential effects and mitigation measures for freshwater water quality. No new Project effects (or effects pathways) were identified for the Eastern Route Alternative components. The Eastern Route Alternative is a shorter length (~60 km shorter) and has fewer watercourse crossings than the approved alignment; however, it also has a greater number of major watercourse crossings. Eastern Route Alternative components are predicted to result in residual effects similar to the Application (PRGT 2014a) based on similar activities and the application of mitigation measures identified in the CEMP. Additional mitigation measures to prevent the introduction of sediment into watercourses outlined in updated and newly issued DFO codes of practice will also be applied. Residual effects on freshwater water quality are predicted to be low for the proposed Eastern Route Alternative.

**Table 7.6 Summary of Potential Effects and Mitigation Measures – Freshwater Water Quality**

<b>Proposed Amendment Component</b>	<b>Project Phase</b>	<b>Change in Proposed Works or Activities</b>	<b>Change in Potential Effects</b>	<b>Change in Mitigation or Enhancement Measures</b>	<b>Change in Mitigation or Enhancement Measures Success Rating</b>
Eastern Route Alternative	Construction	No change	<ul style="list-style-type: none"> <li>Changes in freshwater water quality related to toxicity</li> </ul>	<ul style="list-style-type: none"> <li>Updated or newly issued DFO guidance materials (codes of practice and interim codes of practice)</li> </ul>	No change
	Operations	No change	No change	No change	No change



### **7.3.2 Residual Effects**

Watercourse crossings through other areas of the Eastern Route Alternative are expected to result in similar effects to water quality during trenching based on similar water quality at monitoring sites evaluated for this Amendment with those evaluated in the Application (PRGT 2014a).

Potential residual effects of the Eastern Route Alternative on freshwater water quality are predicted to be similar, or less than the portion of the approved route that the Eastern Route Alternative would replace. Potential residual effects include a change in water quality due to increased TSS, at a similar or slightly lesser extent as the approved alignment because the Eastern Route Alternative is approximately 60 km shorter, avoids trenching within Williston Lake, and the duration of construction is expected to be similar to what was described in the Application (PRGT 2014a).

### **7.3.3 Changes to Characterization of Residual Effects**

Based on information for freshwater water quality available from public sources for the Eastern Route Alternative, the proposed Eastern Route Alternative changes, and existing mitigations as described in the CEMP (PRGT 2016) and approved management plans, no changes to the characterization of residual effects are anticipated.

A comparison of the EAO Assessment Report (EAO 2014a) conclusions and proposed Eastern Route Alternative residual effects is presented below in Table 7.7. With respect to the predicted effects on freshwater water quality for the Eastern Route Alternative, the residual effects conclusions presented in the EAO Assessment Report (EAO 2014a) are anticipated to be unchanged.





**Table 7.7 Changes to EAO Assessment Report Characterization of Residual Effects – Freshwater Water Quality**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	Undisturbed; variable sensitivity	Some variability in the sensitivity and resilience of watercourses to sedimentation is expected, depending upon sensitive receptors to which it is associated, as well as a variety of site- and watershed-specific factors.	No change
Magnitude	Low	Water quality, including TSS, would be monitored regularly during construction. For any rise in TSS levels above background levels that exceeds the guidelines for the protection of aquatic life, the Proponent would undertake measures to remedy the factors producing the exceedances, in consultation with OGC*.	No change
Extent	Local	Substantive impacts beyond the LAA are not anticipated.	No change
Duration	Short-term	Short-term sedimentation may occur during construction trenching activities; however, TSS levels would be monitored regularly during construction, and for any rise in TSS levels above background levels that exceed the guidelines for the protection of aquatic life, the Proponent would undertake measures to remedy the factors producing the exceedances, in consultation with OGC*.	No change
Reversibility	Reversible	Once the cause is addressed, the residual effects are considered reversible.	No change
Frequency	Once	At any one location the effect would primarily be caused by a single event during construction.	No change
Likelihood	The likelihood of residual effects to water quality would vary from low to high, depending on the watercourse, crossing method, and success of mitigation measures.		No change
Significance	Taking into consideration the magnitude of the residual effect, as well as the very short duration and reversibility, EAO concludes that the residual effects of the proposed Project on water are not likely to be significant.		-
Confidence	High Confidence – The significance determination and likelihood rating for residual effects are determined with high confidence. Based on the proposed mitigation measures, industry best management practices, and compliance with the EA Certificate conditions, federal and provincial guidelines and permitting requirements, there is high confidence that the residual effects would not be significant.		No change
* The Oil and Gas Commission is now the BCER			

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Assessment Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



### **7.3.4 Cumulative Effects Assessment**

Cumulative effects for water quality are expected to be similar for the Eastern Route Alternative as for the approved route. While the Eastern Route Alternative does not overlap with the previously included Westcoast Connector Gas Transmission Project (WCGT), it is co-located with the Highway 97 corridor which includes other pipeline and powerline ROW and road and rail corridors. Predicted effects to water quality during construction could interact cumulatively with these activities/projects. However, as none of the other projects or activities in the area are expected to be under construction at the same time (i.e., they are already in existence), interactions between these projects/activities and the Eastern Route Alternative are not expected to result in increased cumulative effects from what was described in the Application (PRGT 2014a). Agricultural activities in the area are not anticipated to change in terms of extent or frequency of effects to water quality. Ongoing forestry activities, road work conducted under provincially issued permits would also use similar standard mitigation measures in place to reduce temporal and spatial effects. Therefore, the Eastern Route Alternative is anticipated to have similar interaction with past, present, and reasonably foreseeable projects and activities as compared to the Application (PRGT 2014a). The cumulative effects on water quality are predicted to be consistent with the EAO Assessment Report (EAO 2014a) and remain valid.

### **7.3.5 Risks and Data Uncertainty**

Baseline data has not been collected for water or sediment quality along the Eastern Route Amendment; therefore, quantitative characterization of water quality is not possible at all crossing locations and the assessment has relied on the limited data that is publicly available in the vicinity of the route. Construction of this section will follow standard methods using well understood, effective mitigation measures which will reduce potential for effects on water quality. Additionally, the Eastern Route Alternative avoids a major trenching location at Williston Lake which has the potential to mobilize sediments with elevated concentrations of some parameters.

The level of uncertainty for predicted effects on water quality, is considered low due to the understanding of potential Project effects, the broad understanding of other past, present, and reasonably foreseeable projects and activities, the current regulatory requirements and guidelines, the use of conservative assumptions, and the use of proven measures and best management practices to avoid and mitigate effects on water quality for the Project and other projects. As the uncertainty in this prediction is not high, no additional risk analysis is necessary.



## 8 Hydrology

Hydrology is a VC due to the potential effects of pipeline construction and operations on surface water flows and drainage patterns. Maintaining water flow and drainage patterns in waterbodies is important to the natural fluvial morphological functions of watercourses, to aquatic and terrestrial life, and to anthropogenic uses of waterbodies. The indicators evaluated for this VC are water flow and drainage patterns. The definition of the hydrology LAA has been changed from the Application (PRGT 2014a) to align with the LAA for Water Quality and Aquatics by extending downstream 1 km for larger watercourses and has been applied to this Amendment (Figure 7.1). The definition of the hydrology RAA is the same as presented in the Application and aligns with the RAA used for Water Quality and Aquatics. Spatial boundaries used in this assessment are outlined in Table 8.1.

**Table 8.1      Assessment Areas (Spatial Boundaries) for Hydrology**

Assessment Area	Definition
Project Footprint	The area that will be directly disturbed by construction and operation activities, including the construction ROW (assumed to be 100 m wide), a metering and compressor station and associated temporary ancillary infrastructure
Local Assessment Area	Areas extending 100 m upstream and 300 m downstream of the project watercourse crossings in freshwater systems. The LAA for larger watercourses is increased to 1 km downstream.
Regional Assessment Area	Areas extending 100 m upstream and 1 km downstream of the project watercourse crossings in freshwater systems

Note:  
The Local Assessment Area and Regional Assessment Area extend to the watershed areas upstream of the watercourse crossings.

### 8.1 Baseline Conditions

#### 8.1.1 Baseline Data Sources

Published hydrometric data were obtained from Water Survey of Canada (WSC 2024) for hydrometric stations located within approximately 230 km of the pipeline route. Stream discharge at each proposed stream crossing was calculated from relationships determined between watershed area and discharge for the hydrologic zones crossed by the Project. Watershed areas were determined for each proposed stream crossing based on the BC Freshwater Atlas Watersheds (Government of British Columbia 2024h). Cumulative water demand information and climate projections were obtained from the BC Water Tool (BC Ministry of Forests and Foundry Spatial 2024).



## **8.1.2 Baseline Overview**

### **8.1.2.1 Regional Context**

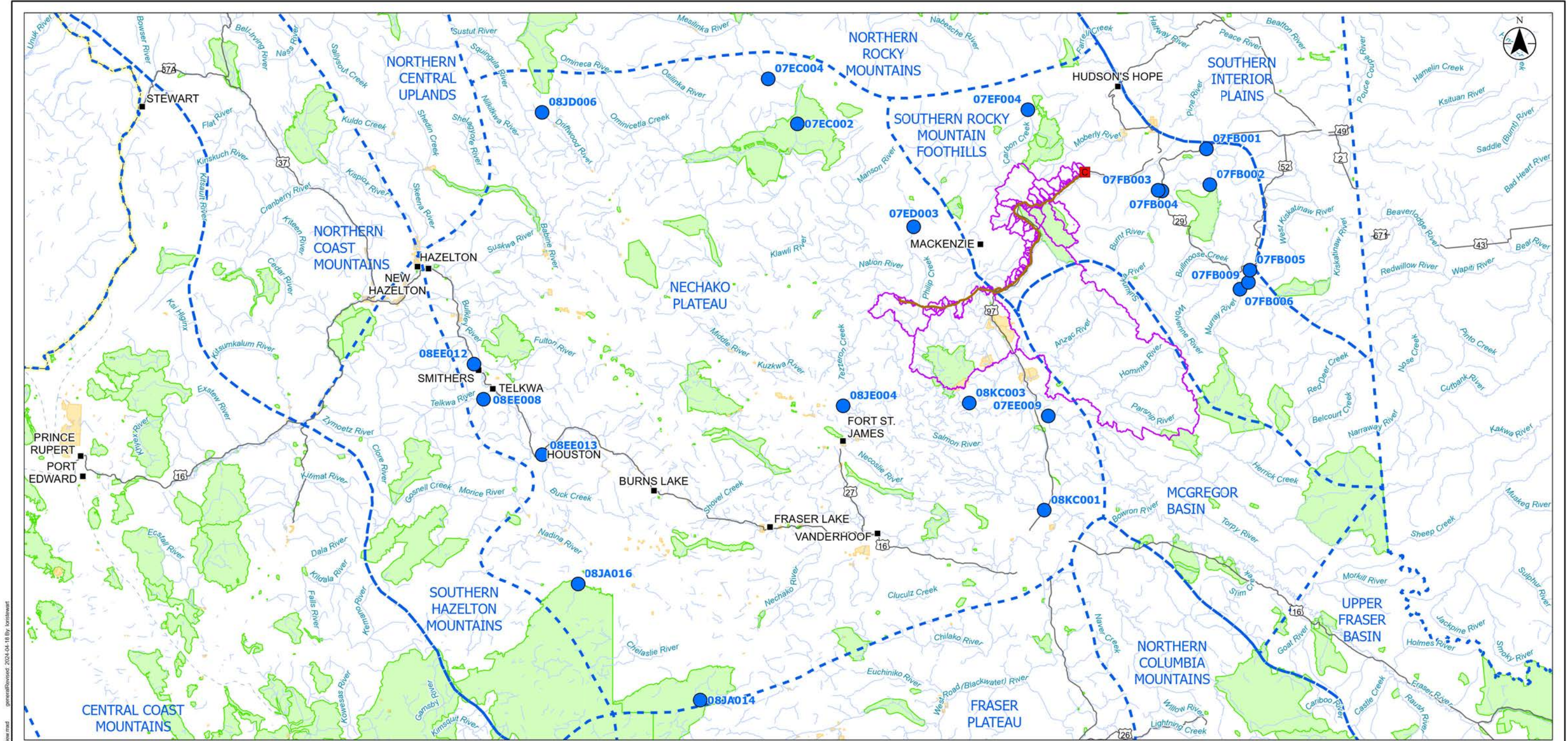
From east to west, the Amendment will cross the Southern Rocky Mountain Foothills and Nechako Plateau hydrologic zones (Figure 8.1). These are zones of relatively homogenous hydrologic and climatic conditions (Obedkoff 2000) and these zones are also crossed by the approved route.

The Southern Rocky Mountain Foothills (SRMF) hydrologic zone physiography is characterized by moderately steep terrain in the west with undulating hills to the east. Annual hydrographs in this zone are typically dominated by snowmelt in the late spring. Freshet peaks generally occur between April and June with freshet occurring earlier in this period for smaller watersheds. Streams in the SRMF hydrologic zone generally experience a steady reduction in flow from July onwards, usually reaching annual low flow rates in February.

The Nechako Plateau hydrologic zone is characterized by flat to gently rolling uplands. Precipitation is relatively moderate throughout the zone. The annual hydrographs for streams in the Nechako Plateau are generally characterized by an annual peak during spring freshet from April to May for smaller to larger streams, respectively. Flows typically decrease gradually from the spring peaks but rebound in conjunction with October rains. Annual low flows are experienced in January and February.







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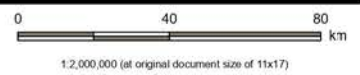
**Notes**  
1. Coordinate System: NAD 1983 BC Environment/Alberta  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- Railway
- Watercourse
- International Boundary

- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies

- Compressor Station
- Project Footprint

- Water Survey of Canada Station
- Hydrologic Zone Boundary
- Watershed Upstream of Watercourse Crossing



Project Location: Prince Rupert  
Project Number: 1235-4678  
Prepared by: LSTEWART on 20240411  
Requested by: JKH/JDS on 20240402  
Reviewed by: TQUILCHER on 20240406  
British Columbia  
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Prince Rupert Gas Transmission Ltd.  
Hydrology  
Figure No.  
**8.1**  
Title  
**WATER SURVEY OF CANADA STATIONS**

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### 8.1.2.2 Assessment Area Context

The Amendment will cross 197 identified watercourses, as tabulated in the hydrology appendix (Appendix E). Watershed areas upstream of the crossing locations range from less than 0.1 square kilometres (km<sup>2</sup>) to 1,048 km<sup>2</sup> in the SRMF hydrologic zone and from less than 0.1 km<sup>2</sup> to 5,544 km<sup>2</sup> in the Nechako Plateau hydrologic zone, which are illustrated in Figure 8.3 to Figure 8.6.

To develop estimates of flow for the watercourse crossings, regional flow relationships were used based on WSC hydrometric data for each of the hydrologic zones crossed by the pipeline. The 21 WSC hydrometric stations considered in this analysis are listed in Table 8.2 and shown in Figure 8.1. These regional relationships between watershed area and flow are then applied to estimate baseline flow statistics for each of the watercourse crossings. Appendix E summarizes the results of this hydrological assessment and includes tables showing baseline estimates of mean monthly flows and peak flow estimates for 2-, 5-, 10-, 20-, 50-, and 100-year return periods for each stream crossing. The crossings are grouped by hydrologic zone in each table.

**Table 8.2 Water Survey of Canada Hydrometric Stations**

Station Number	Station Name	Watershed Area (km <sup>2</sup> )	Operation From (Year)	Operation To (Year)	Years of Operation	Straight-Line Distance from Pipeline (km)
<b>Southern Rocky Mountain Foothills Hydrologic Zone</b>						
07EF004	Carbon Creek near the mouth	741	1998	2024	27	42.9
07FB001	Pine River at East Pine	12,100	1964	2024	61	63.5
07FB002	Murray River near the mouth	5,550	1977	2024	48	64.5
07FB003	Sukunka River near the mouth	2,590	1977	2024	48	38.8
07FB004	Dickebusch Creek near the mouth	82.4	1978	2024	47	40.8
07FB005	Quality Creek near the mouth	29.5	1978	2001	24	99.0
07FB006	Murray River above Wolverine River	2,370	1977	2024	48	100.3
07FB009	Flatbed Creek at Kilometre 110 Heritage Highway	486	1983	2024	42	101.8

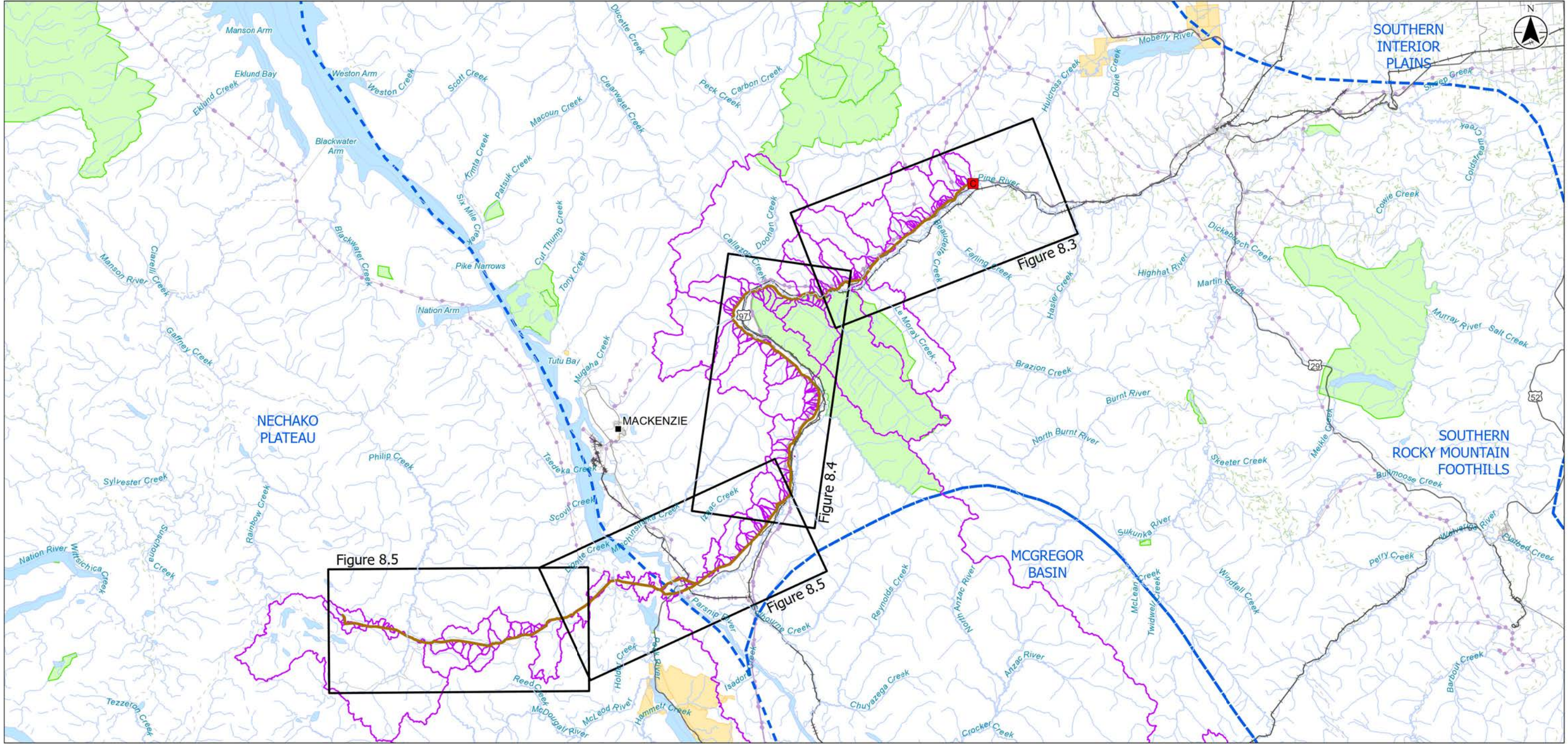


**Prince Rupert Gas Transmission Project:**  
**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 8 Hydrology**  
August 2024

Station Number	Station Name	Watershed Area (km <sup>2</sup> )	Operation From (Year)	Operation To (Year)	Years of Operation	Straight-Line Distance from Pipeline (km)
<b>Nechako Plateau Hydrologic Zone</b>						
07EC002	Omineca River above Osilinka River	5,560	1975	2024	50	104.3
07EC004	Osilinka River near End Lake	1,950	1981	2024	44	131.8
07ED003	Nation River near the mouth	6,790	1981	2024	44	37.8
08EE008	Goathorn Creek Near Telkwa	125	1960	2024	65	220.9
08EE012	Simpson Creek at the mouth	13.2	1974	2024	51	222.3
08EE013	Buck Creek at the mouth	565	1973	2024	52	200.9
08JA014	Van Tine Creek near the mouth	150	1974	2006	33	229.3
08JA016	Macivor Creek near the mouth	53.4	1976	1995	20	220.7
08JD006	Driftwood River Above Kastberg Creek	403	1980	2024	45	208
08JE004	Tsilcoth River near the mouth	431	1975	2024	50	61.2
08KC001	Salmon River near Prince George	4,230	1953	2024	72	114.3
08KC003	Muskeg River north of Joanne Lake	303	1977	1998	22	50.6







**Notes**  
1. Coordinate System: NAD 1983 BC Environment/Alberta  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse line work is from the Freshwater Atlas 1:50K dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- Road
- Local Street
- Railway
- Transmission Line
- Watercourse

- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Mapbook Sheet Extent
- Project Footprint

- Hydrologic Zone Boundary
- Watershed Upstream of Watercourse Crossing

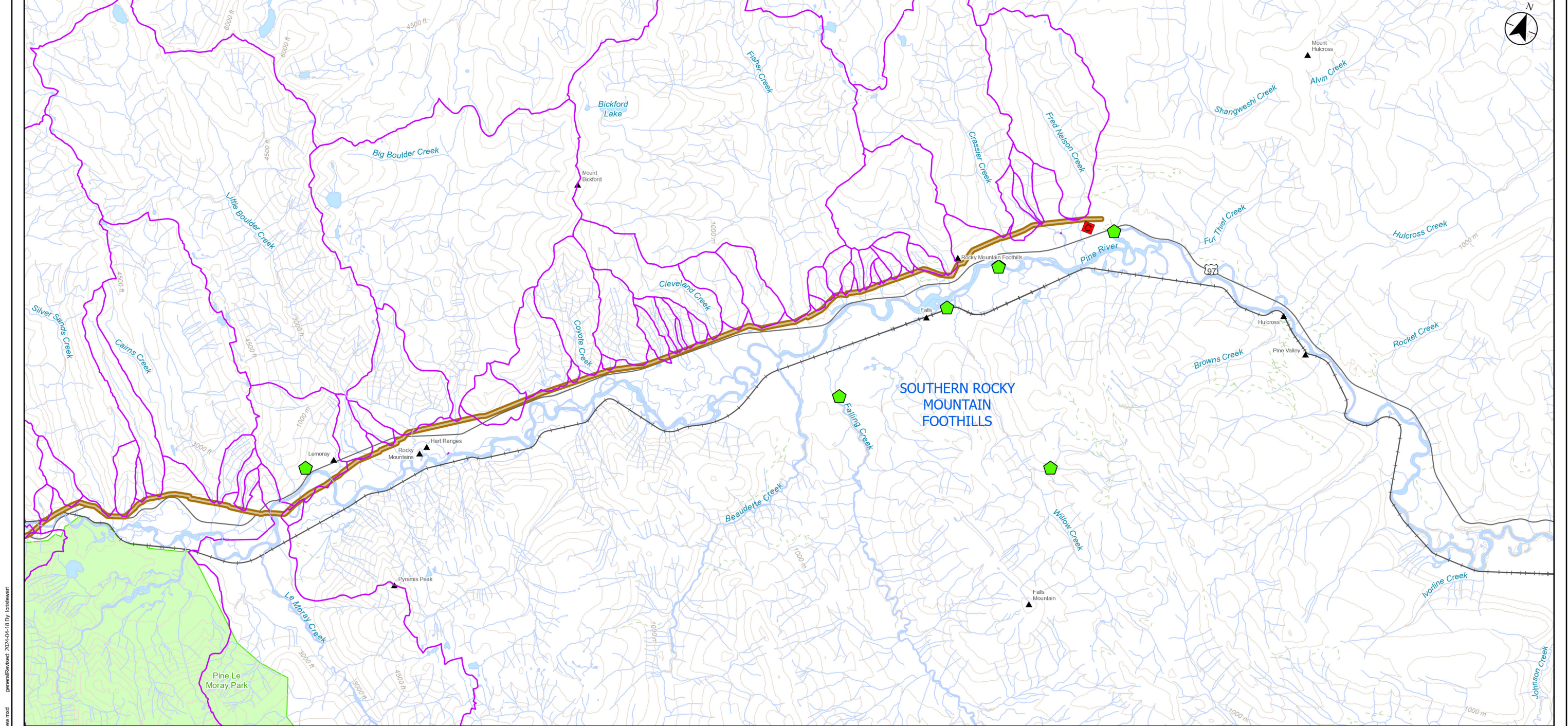
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Project Location: Prince Rupert  
Project Number: 1235-4678  
Prepared by: LSTEWART on 20240411  
Requested by: JKH/JUDSON on 20240402  
Reviewed by: TQUILICHNII on 20240406  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Hydrology  
Figure No.  
**8.2**  
Title  
**HYDROLOGY MAPBOOK - INDEX**

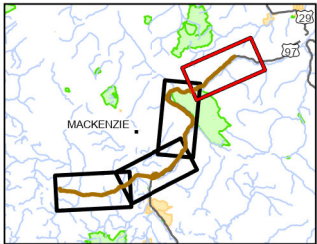




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**Notes**  
1. Coordinate System: NAD 1983 BC Environment/Alberta  
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- City, Town, Village or District Municipality
- Mountain Peak
- Highway
- Road
- Local Street
- Railway
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- BC Water Licence Point of Diversion
- Hydrologic Zone Boundary
- Watershed Upstream of Watercourse Crossing

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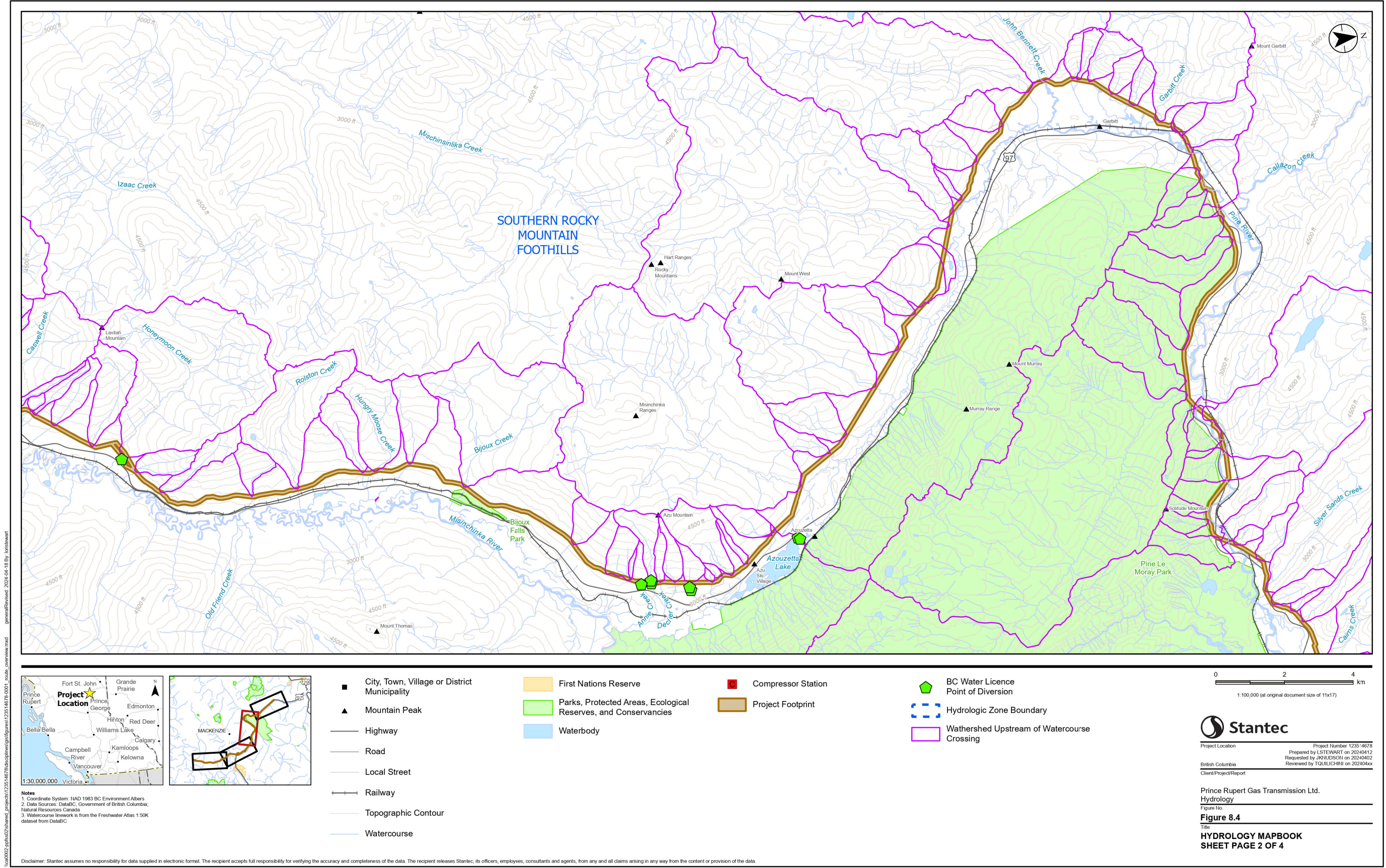


Project Location  
Project Number 123514678  
Prepared by LSTEWART on 20240412  
Requested by JKNUDSON on 20240402  
Reviewed by TQUILICHNII on 202404xx  
British Columbia  
Client/Project/Report

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**Figure 8.3**  
Title  
**HYDROLOGY MAPBOOK**  
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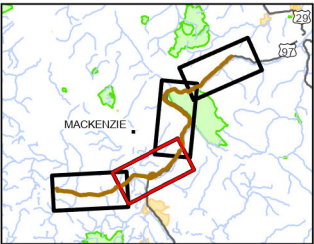
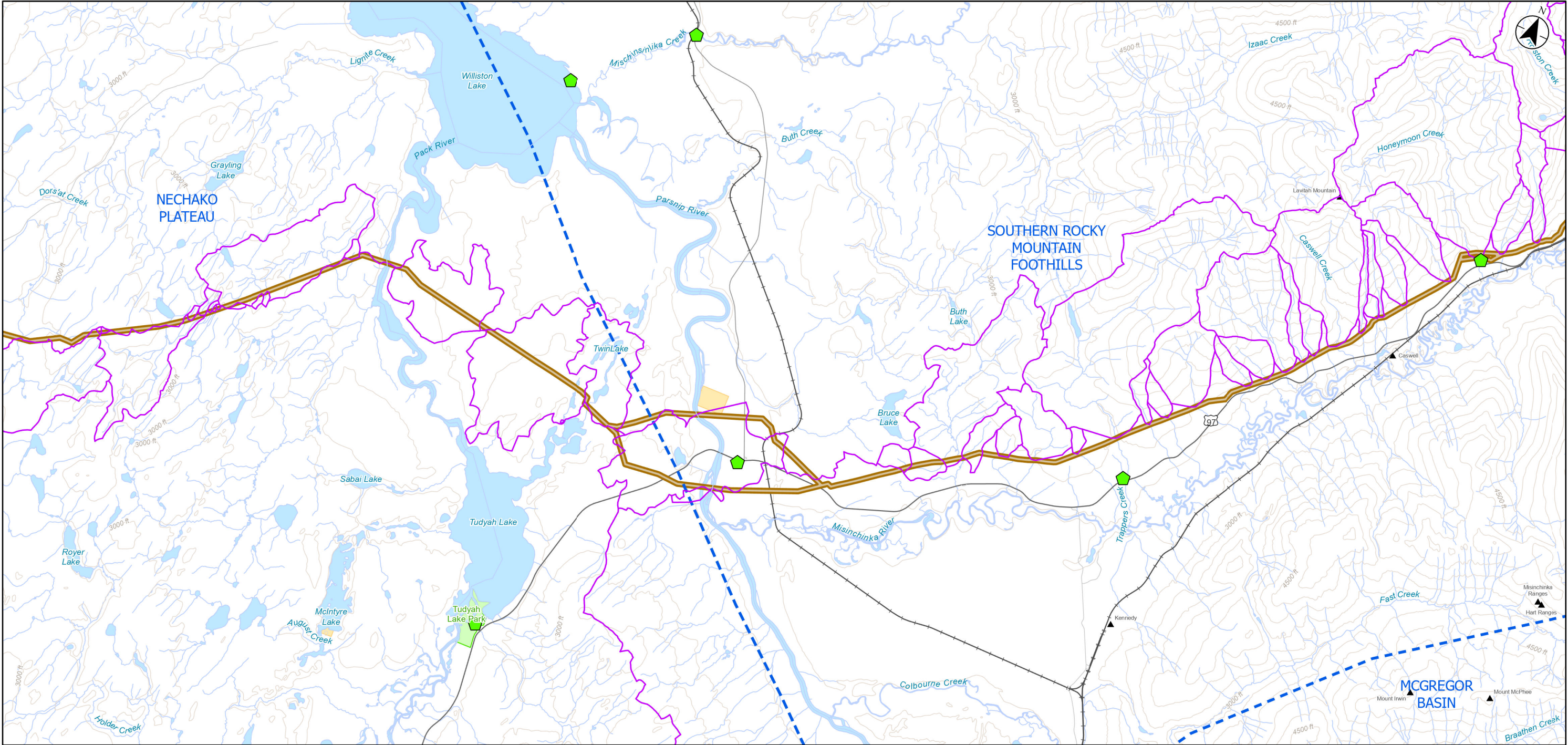
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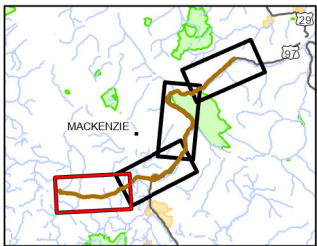
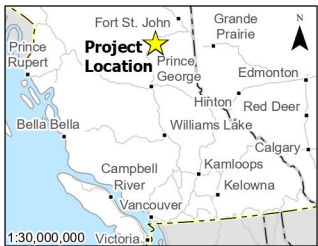
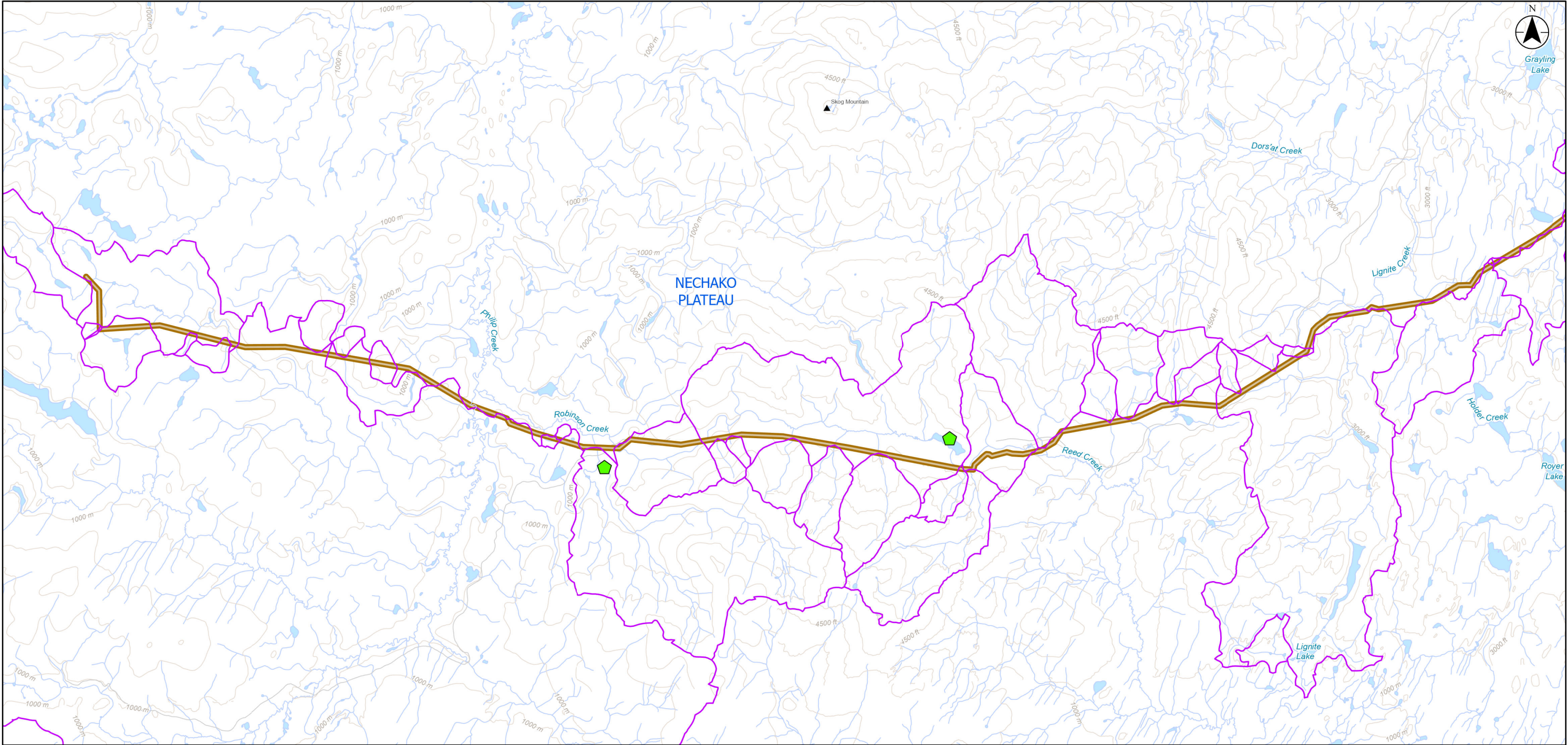
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Prepared by LSTEWART on 20240412  
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Figure No.  
**Figure 8.5**  
Title  
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**Notes**  
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|--|--|----------------------|--|
| ■ City, Town, Village or District Municipality | ■ First Nations Reserve  | ■ Compressor Station | ■ BC Water Licence Point of Diversion        |
| ▲ Mountain Peak                                | ■ Parks, Protected Areas, Ecological Reserves, and Conservancies | ■ Project Footprint  | ■ Hydrologic Zone Boundary                   |
| — Highway                                      | ■ Waterbody  |                      | ■ Watershed Upstream of Watercourse Crossing |
| — Road   |  |                      |  |
| — Local Street                                 |  |                      |  |
| — Railway                                      |  |                      |  |
| — Topographic Contour                          |  |                      |  |
| — Watercourse                                  |  |                      |  |



Project Location  
Project Number 1235/4678  
Prepared by LSTEWART on 20240412  
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British Columbia  
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Hydrology  
Figure No.  
**Figure 8.6**  
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The hydrologic statistics determined for each of the proposed watercourse crossings are provided in Appendix E. A summary of monthly and annual runoff statistics for the proposed watercourse crossings is provided in Table 8.3.

**Table 8.3 Monthly and Annual Runoff Statistics for the Proposed Watercourse Crossings**

Month/ Annual	Runoff Statistics (mm)							
	Southern Rocky Mountain Foothills Hydrologic Zone				Nechako Plateau Hydrologic Zone			
	Mean	Max	90 <sup>th</sup> Percentile	10 <sup>th</sup> Percentile	Mean	Max	90 <sup>th</sup> Percentile	10 <sup>th</sup> Percentile
January	1.1	5.6	2.4	0.3	3.0	7.2	4.0	1.9
February	0.6	3.0	1.2	0.1	2.0	5.8	2.8	1.1
March	1.4	6.1	3.0	0.5	3.7	7.0	4.6	2.7
April	21.0	24.7	23.1	19.7	30.3	34.7	33.4	27.7
May	44.3	115.0	74.4	26.3	107.6	111.2	110.2	105.5
June	30.1	111.6	59.2	13.0	102.0	129.4	121.0	86.4
July	27.7	62.9	43.5	18.1	81.3	146.7	122.4	49.6
August	11.8	26.6	18.5	7.8	38.6	73.5	60.2	22.2
September	8.3	23.1	14.4	4.7	32.2	60.0	49.5	18.9
October	5.3	23.3	11.1	1.9	29.0	43.3	38.5	21.5
November	3.1	15.2	6.7	1.0	15.7	17.5	17.0	14.6
December	1.5	7.2	3.3	0.5	6.1	9.0	7.0	5.1
Annual	156.3	424.4	260.9	94.1	451.6	626.0	562.9	364.8

Future climate variation will have a potential influence on hydrology. The BC Water Tool provides a range of climate change projections for the 2041-2070 time period for a watershed of interest based on gridded climate models and future climate scenarios generally representing hot/dry, warm/very wet, and moderately warm/wet future climates, respectively (BC Ministry of Forests and Foundry Spatial 2024). While the future climate scenario ranges for air temperature are higher than historical averages for each month of the year, future climate scenario ranges for precipitation are more variable and generally projected to increase relative to the historical average during winter months, decrease in early spring, and there is a wide range for precipitation in the projections for summer and fall. Snowfall is generally projected to be lower in fall and spring and remain near normal during mid-winter. With less snow accumulation and higher temperatures, snowmelt-driven freshets are expected to occur earlier under future climate scenarios, and a rapidly melting snowpack may cause snowmelt-driven flooding to increase in magnitude. Summer peak flows may increase in magnitude due to a potential increase in the severity of convective storms. Droughts are expected to become more intense (Engineers and Geoscientists British Columbia [EGBC] 2018), resulting in a further decrease in streamflow during low-flow periods. The increase in drought intensity increases the probability of forest fires, which in turn is expected to lead to a higher probability of flooding in affected watersheds. Given the stationarity of the historical WSC data





used in the flood frequency analysis, a factor of safety of +10% to +20% for peak flow estimates is advised to account for climate change, depending on watershed sensitivity (EGBC 2018).

Water allocation data indicate the existing water demand in the major watersheds crossed by the Project (Table 8.4). Water licence locations are shown in Figure 8.3 to Figure 8.6.

**Table 8.4 Annual Water Demand for the Major Watersheds crossed by the Amendment**

Major Watershed	Mean Annual Discharge (cubic metres per second [m <sup>3</sup> /s])	Cumulative Annual Water Demand (Average, m <sup>3</sup> /s)	Cumulative Annual Water Demand (Average, % of Mean Annual Discharge)
Pack River	46.5	0.010	< 0.1
Parsnip River	168.2	0.012	< 0.1
Philip Creek (Nation River tributary)	4.5	0.256	5.6
Pine River	40.7	0.049	0.1

Note:

Mean annual discharge, as well as annual water demand (includes licenses and short-term use approvals for surface water and groundwater) for the indicated watershed upstream of the Project crossing are from the BC Water Tool (BC Ministry of Forests and Foundry Spatial 2024).

## 8.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to hydrology. This feedback has been considered and summarized in Table 8.5 and has been integrated into the hydrology effects assessment.

**Table 8.5 Summary of Engagement Feedback Related to Hydrology**

Comment	Sources	PRGT Response
Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en expressed concern for impacts to upstream water as a result of the electrification and power draw required for compressor stations.	April 2024 engagement meeting	<ul style="list-style-type: none"> <li>PRGT will continue to engage with Nak'azdli Whut'en in relation to their feedback about potential impacts associated with future power requirements.</li> </ul>
Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en expressed concern about drought.	April 2024 engagement meeting	<ul style="list-style-type: none"> <li>Water use will be proposed and evaluated under the <i>Water Sustainability Act</i> permitting process, as outlined in Section 8.3.1.2.</li> </ul>
Halfway River First Nation previously expressed concerns that the Project and other developments will affect freshwater springs.	Fasken Martineau 2013b	<p>PRGT will implement mitigation for springs and groundwater in the CEMP (PRGT 2016), specifically:</p> <ul style="list-style-type: none"> <li>If springs and ground water are encountered, the Environmental Inspector will review the area and determine the appropriate mitigation and provide guidance to the contractor</li> </ul>



## 8.3 Amendment Effects Assessment

Table 8.6 outlines the potential effects and measurable parameters for Hydrology.

The potential effects of the Project for hydrology have been identified as (1) change in flow, and (2) alteration of drainage patterns. Changes in measurable parameters relative to the Application are: peak flow has been included as a measurable parameter for change in flow as it relates to flooding, and alteration of drainage patterns will be assessed qualitatively as it relates to drainage flow pathways which is a qualitative parameter. Potential Project effects pathways which have the potential to impact these parameters are described in 8.3.1.

**Table 8.6 Potential Effects and Measurable Parameters for Hydrology**

Environmental Effect	Measurable Parameter(s) and Units of Measurement	Notes or Rationale for Selection of the Measurable Parameter
Change in flow	Monthly discharge expressed as mean monthly discharge and peak flow in streams crossed by the pipeline (m <sup>3</sup> /s)	Mean monthly discharge is a method used to quantify water flows, including seasonal variation of flows, within surface water systems
Alteration of drainage patterns	Alteration of drainage patterns will be assessed qualitatively	Maintaining surface water flow paths will support watershed health and drainage basin function

Note:

Changes in measurable parameters relative to the Application are: peak flow has been included as a measurable parameter for change in flow as it relates to flooding, and alteration of drainage patterns will be assessed qualitatively as it relates to drainage flow pathways which is a qualitative parameter.

### 8.3.1 Potential Effects and Mitigation Measures

Project activities have the potential to interact with local hydrology. The effects mechanisms for possible project interactions with hydrology are identified in the project interaction matrix, Table 8.7, which includes a ranking according to the anticipated level of interaction.

**Table 8.7 Potential Project Effects on Hydrology**

Project Activities and Physical Works	Potential Effects	
	Change in Flow	Alteration of Drainage Patterns
<b>Construction</b>		
Site preparation and physical construction of project footprint, temporary ancillary sites, a compressor station including survey, clearing, topsoil salvaging, and grading	1	1
Land based pipe placement, including stringing and welding, trenching, tunneling if required, lowering-in, backfilling, and hydrostatic testing (including water withdrawal and discharge)	1	1
Clean-up and post construction reclamation	1	1



Project Activities and Physical Works	Potential Effects	
	Change in Flow	Alteration of Drainage Patterns
Watercourse crossings – trench, HDD	1	1
Emissions, discharges, and wastes (e.g., construction emissions, noise, materials)	0	0
Employment and expenditure	0	0
<b>Operation</b>		
Presence of physical facilities	1	1
Vegetation management	0	0
Maintenance programs including aerial patrols, in-line inspection, cathodic protection, maintenance of pipeline markers and access roads	0	1
Emissions, discharges, and wastes (e.g., fugitive emissions, noise, materials)	0	0
Employment and expenditure	0	0

**Key:**

0 = No interaction (i.e., no potential for activity to result in the effect).

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting effect is well understood and can be managed to negligible or acceptable levels through standard operating procedures and/or through the application of best management or codified practices. No further assessment is warranted.

2 = Interaction may occur and the resulting effect may exceed negligible or acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

Rank 0 interactions are not assessed further.

Justification for the rankings identified in Table 8.7 and discussions of the potential effects of project activities on surface water flow and drainage patterns are provided in the subsections that follow.

### **8.3.1.1 Justification of Rank 0**

Emissions, discharges and wastes, and employment and expenditure during construction are not expected to have interactions with hydrology. During operations, vegetation management, emissions, discharges and wastes, and employment and expenditure are not expected to have interactions with hydrology.

### **8.3.1.2 Justification of Rank 1**

During the construction phase, site preparation and physical construction, land-based pipe placement (including hydrostatic testing and discharge), clean-up and post-construction reclamation, and watercourse crossing activities are anticipated to have an effect on hydrology. In addition, presence of physical facilities and maintenance programs are expected to have an effect on hydrology during the operation phase.





PRGT's objective is to protect surface flow and drainage of all watercourses and watersheds that will be crossed by the proposed Project. The most effective form of environmental protection is to confirm that Best Management Practices (BMPs) and mitigation measures are in place to avoid and manage the potential for effects. Further analysis of effects is not conducted for interactions that are known to have no, or negligible, adverse effects, or for those effects that are already well regulated through the BC regulatory process or BMPs.

Mitigation measures as identified in the Application (PRGT 2014a) and CEMP (PRGT 2016) are project-wide measures to confirm potential impacts to surface water flows and drainage patterns are managed to negligible or acceptable levels regardless of the location of the drainage being crossed by the proposed Project. Updates to mitigation measures in the Application include the latest version of Canadian Standards Association (CSA) Z662:23 (CSA Group 2023) to be followed as it relates to hydrostatic testing and other activities as required, short-term water use will now be evaluated under the *Water Sustainability Act* (WSA) Section 10 process, BMPs for changes in and about a stream will follow updated guidance (Government of British Columbia 2022), and the design and construction of watercourse crossings will consider the potential increased severity of flooding resulting from climate change (for example, starting with guidance from EGBC 2018), in accordance with applicable standards.

As the mitigation measures identified will be applied to protect all watercourses and drainages crossed by the proposed Project, there are no specific watercourses and/or drainages that require a unique assessment of effects as there are no predicted post-mitigation residual effects to surface water flow or drainage patterns, beyond those managed to an acceptable level through a combination of existing regulatory processes and implementation of mitigation measures.

In summary, while interactions with hydrology may occur, the resulting potential effects are well understood and managed to negligible or acceptable levels under existing regulatory processes and/or readily mitigated using known and effective mitigation measures. This is consistent with the findings of the EAO Assessment Report (EAO 2014a) and the Application (PRGT 2014a).



## 9 Freshwater Aquatic Resources

Freshwater aquatic resources was identified as a VC in the Application Information Requirements for the Application (PRGT 2014a) due to anticipated project interactions with aquatic resources and in recognition of their economic, cultural and ecological significance to Indigenous Nations, and their role in ecosystem health, function and overall biodiversity. This section describes potential residual and cumulative effects of the Amendment for the freshwater aquatic resources VC. Information presented in this section is consistent with the Application (PRGT 2014a) and updated where necessary and relevant. The definition of the aquatic resources LAA and RAA is the same as presented in the Application (PRGT 2014a): 100m upstream for all watercourses and 300 m downstream for smaller watercourses, and includes areas up to 1 km downstream for large watercourses depending on site-specific conditions (i.e., this area may be extended downstream depending on channel width and other watercourse characteristics in order to encompass the potential zone of influence of the project).

### 9.1 Baseline Conditions

Existing conditions for the assessment of effects on freshwater aquatic resources in the Eastern Route Alternative are supported by the desktop methods used in the Application, including the use of third-party and project-specific data and a review of new information that is directly relevant to the proposed Amendment.

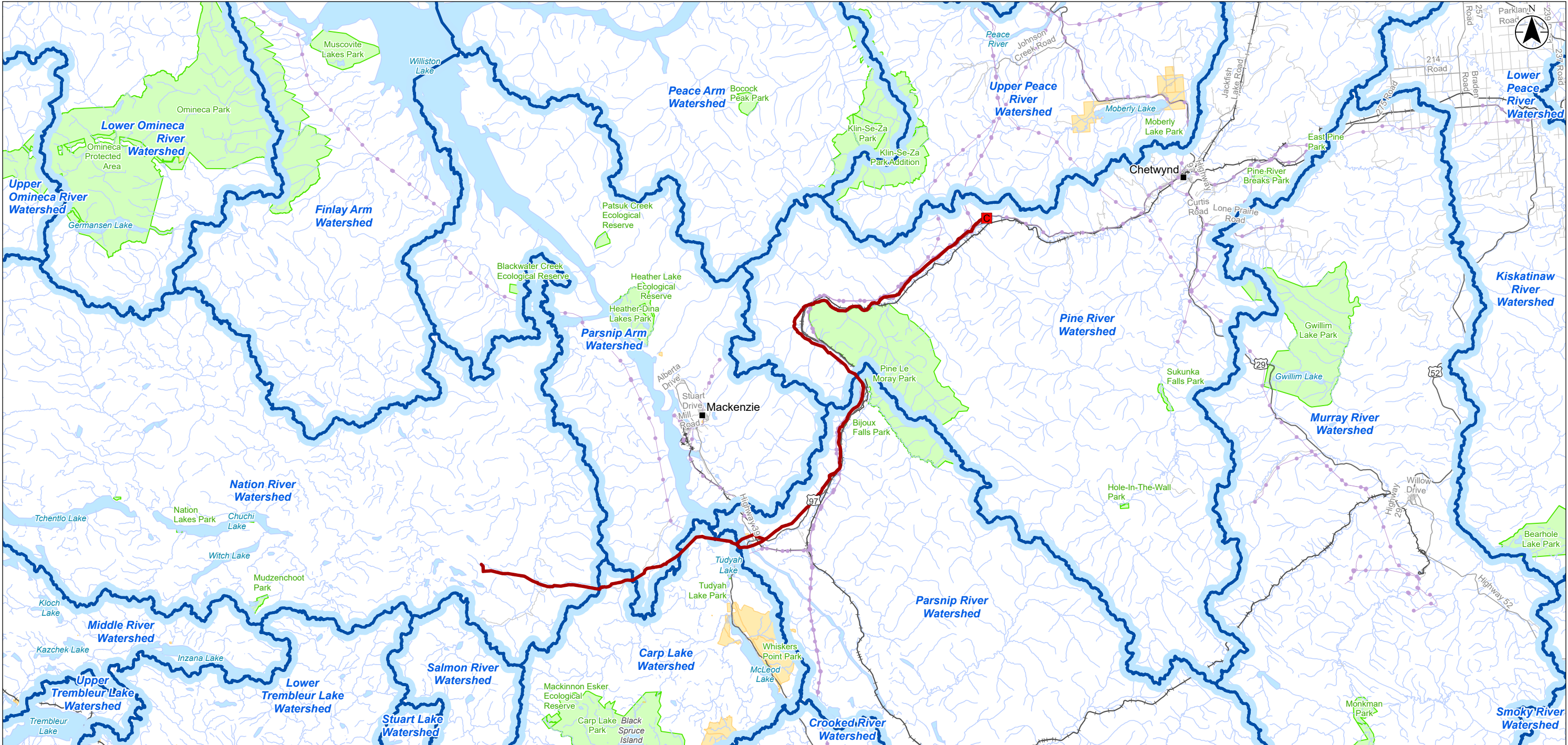
Five watershed groups are crossed by the Eastern Route Alternative including the Pine River, Parsnip River, Carp Lake, Parsnip Arm, and Nation River watersheds (Figure 9.1). These watersheds are in the Peace River drainage. Table 9.1 summarizes the number of mapped watercourse crossings in the Eastern Route Alternative.

There are approximately 403 watercourse crossings<sup>1</sup> in the Peace River drainage along the approved route in the section that would be replaced by the Eastern Route Amendment (including both mapped watercourses and unmapped watercourses identified during field surveys). The Eastern Route Alternative crosses 197 mapped watercourses in the Peace River drainage based on the provincial Freshwater Atlas mapping, including 41 crossing of 27 named watercourses (some watercourses are crossed multiple times) (Appendix F; Appendix G). These watercourses were classified using desktop information, as available. There are 15 crossings of major rivers in the Eastern Route Alternative including multiple crossings of the Pine and Parsnip Rivers and one of the Pack River. If the Eastern Route Alternative is selected, it is anticipated to require fewer watercourse crossings than the approved route but a greater number of major watercourse crossings.

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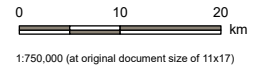
<sup>1</sup> Watercourse crossing totals include fish-bearing and non-fish bearing watercourses as well as crossings classified as non-classified drainages (NCDs) and no visible channel (NVC) in the 2014 EAO Assessment Report.





**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- Road
- Local Street
- Railway
- Transmission Line
- Watercourse
- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody
- Compressor Station
- Project Footprint
- Watershed



Project Location Prince Rupert  
Project Number 123514678  
Prepared by NFORRESTER on 20240402  
Requested by SNABESS on 20240402  
Reviewed by TQUILICHINI on 20240402  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Freshwater Fish  
Figure No.  
**9.1**  
Title  
**EASTERN ROUTE ALTERNATIVE  
AMENDMENT WATERSHEDS**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

**Table 9.1 Watercourse Crossings by Major Watershed and Watershed Group**

Major Drainage	Watershed Group	Number of Crossings - Eastern Route Alternative <sup>1</sup>
Peace	Pine River	98
	Parsnip River	49
	Carp Lake	22
	Parsnip Arm	5
	Nation River	23
<b>Total:</b>		<b>197</b>

Notes:

<sup>1</sup> Includes only mapped watercourses using Freshwater Atlas

### 9.1.1 Fish Habitat

The Project footprint does not overlap any critical habitat polygons for Fisheries and Oceans Canada (DFO) Species at Risk (Government of Canada 2024a), BC Sensitive Fisheries Watersheds (approved or proposed; Government of British Columbia 2024a), or BC Community Watersheds (Government of British Columbia 2024b). The Project corridor overlaps one Wildlife Habitat Area (WHA; [WHA-9-167]), which may potentially apply to fish (the WHA is listed as data sensitive; Government of British Columbia 2024c).

The desktop review of the Project footprint summarized by watershed is presented below.

#### 9.1.1.1 Pine River Watershed

In the Pine River watershed, there are 98 mapped watercourse crossings along the Eastern Route Alternative. Named watercourses include the Pine River (11 crossings), Fred Nelson Creek, Crassier Creek, Fisher Creek, Cleveland Creek, Coyote Creek, Big Boulder Creek, Little Boulder Creek (two crossings), Cairns Creek, Silver Sands Creek, Link Creek, Garbitt Creek, John Bennett Creek, and Steven Creek (Appendix F). These crossings are all within the upper region of the watershed, which extends from the mouth of the Murray River to the headwaters in the Rocky Mountains near Pine Pass. The dominant sportfish species in the upper region of the Pine River watershed are mountain whitefish (*Prosopium williamsoni*), Arctic grayling (*Thymallus arcticus*), bull trout (*Salvelinus confluentes*), and rainbow trout (*Oncorhynchus mykiss*) (Griffith 1992, Triton 1993).

In upper region of the watershed, the Pine River meanders in a well-defined channel at the bottom of a valley and has actively eroding banks (Mainstream Aquatics Ltd. 2012). The Pine River between Callazon Creek and Fur Thief Creek, which covers seven of the 11 crossings of the Pine River, has an average width of approximately 50 m, a low gradient (approximately 0.19%) and little natural cover for adult fish (Griffith 1992). Substrate in this section of the Pine River was characterized as predominately cobble and gravel (Griffith 1992). Fish habitat information for areas upstream of Fur Thief Creek were not found during a literature review of publicly available sources. Anthropogenic developments (e.g., highways, pipelines, railways) in the valley have degraded fish habitat quality in the Pine River through



channelization (Griffith 1992, Triton 1993). Anthropogenic developments have also limited the natural migration of the river within its floodplain (Griffith 1992, Triton 1993).

Streams in the headwaters of the Pine River watershed are typically high-energy in steep, v-shaped valleys, except in the lower reaches of the watercourse near their confluences with the Pine River mainstem, and as such, these headwater streams have “flashy”, fluctuating flows (Hatfield Consultants Ltd. 1998). Crassier Creek was dominated by riffle-pool habitat in the lower reaches of the stream where it is crossed by the Eastern Route Alternative while upper reaches are confined with steep gradients and step-pool habitat (Hatfield Consultants Ltd. 1999). The majority of higher quality salmonid habitat in the Crassier Creek watershed is within the mainstem of the creek, which has a variety of cover and substrate types (Hatfield Consultants Ltd. 1999). Fish habitat information was not found during a literature review of publicly available data sources for other named watercourses in the Pine River watershed.

### **9.1.1.2 Parsnip River Watershed**

In the Parsnip River watershed, there are 49 mapped watercourse crossings along the Eastern Route Alternative. Named watercourses include Parsnip River (two crossings), Declier Creek, Bijoux Creek, Hungry Moose Creek, Rolston Creek, Honeymoon Creek, Caswell Creek, and Trappers Creek (Government of British Columbia 2024d,e). The Parsnip River is approximately 105 m wide where Highway 97 crosses the river with substrates of cobble and gravel (Government of British Columbia 2024e; Appendix F).

Except for the crossings of the mainstem of the Parsnip River and two other crossings (TPWC144 and TPWC145; Appendix F), all the watercourses crossed by the Project flow into the Misinchinka River, which is a tributary of the Parsnip River. Spawning habitat in the Misinchinka River basin is limited with few gravels in the mainstem of the river and although, some tributary streams contain spawning habitat for salmonids, several dry up near their confluence with the Misinchinka River (EDI Environmental Dynamics Inc. and P. Beaudry and Associates Ltd 2001). The Misinchinka River basin is one of the two most important basins in the Parsnip River watershed for bull trout spawning but is not considered to be a primary spawning location for Arctic grayling (Irvine 2020). Good rearing fish habitat can be found in Caswell Creek and Trappers Creek, which are crossed by the Project (EDI Environmental Dynamics Inc. and P. Beaudry and Associates Ltd. 2001; Appendix F).

Watercourse crossings TPWC144 and TPWC145 have been previously assessed within 300 m of the Project footprint (Ecofor 2008). TPWC144 was classified as “no visible channel” (NVC) while TPWC145 was classified as a fisheries sensitive zone with poor spawning and rearing habitat, good rearing habitat, and no overwintering habitat (Ecofor 2008).



### 9.1.1.3 Carp Lake Watershed

In the Carp Lake watershed, there are 22 watercourse crossings along the Eastern Route Alternative including Pack River and Reed Creek (Appendix F). Pack River, in the reach that is crossed by the Eastern Route Alternative, is flooded at high water and provides suitable spawning gravel for fish that prefer that type of substrate (e.g., salmonids; Retzer 1989).

Ten watercourses in the Carp Lake watershed have been previously assessed within approximately 300 m of the Project footprint (Ecofor 2008). Four of these were classified as NVC while the remaining six were classified as watercourses; habitat information for these six watercourse crossings is summarized in Table 9.2.

**Table 9.2 Fish Habitat Information for Watercourses Previously Assessed in the Carp Lake Watershed**

Stantec ID	Stream Name	Riparian Class <sup>a</sup>	Habitat Quality Rating in Proximity to Project Footprint			
			Spawning	Rearing	Overwintering	Migration
TPWC159	Tributary to Unnamed Channel	Fisheries sensitive zone (beaver activity in channel)	Poor (salmonids), fair (forage species)	Good	Poor	Poor
TPWC166	Unnamed Channel	S4	Poor to fair	Fair	Poor	Poor
TPWC167	Unnamed Channel	S4	Fair	Good	Poor	Fair
TPWC168	Unnamed Channel	S4	Good	Poor	Poor	Fair
TPWC169	Unnamed Channel	S4	Fair	Good	Poor	Good
TPWC171	Reed Creek	S3	Good	Fair	Fair	Good

Note:

<sup>a</sup> As per the Environmental Protection and Management Regulation

Source: Ecofor 2008

### 9.1.1.4 Parsnip Arm Watershed

In the Parsnip Arm watershed, there are five watercourse crossings along the Eastern Route Alternative including Lignite Creek, which is the only named watercourse. Of these, four have been previously assessed within approximately 300 m to the Project Footprint (Ecofor 2008). Habitat information for these watercourse crossings is summarized in Table 9.3.



**Table 9.3 Fish Habitat Information for Watercourses Previously Assessed in the Parsnip Arm Watershed**

Stantec ID	Stream Name	Riparian Class <sup>a</sup>	Habitat Quality Rating in Proximity to Project Footprint			
			Spawning	Rearing	Overwintering	Migration
TPWC161	Unnamed Channel	S3	Good	Good	Poor to fair	Good
TPWC162	Lignite Creek	S2	Good	Excellent	Fair	Good
TPWC164	Tributary to Unnamed Channel	S4	Fair	Fair	Poor	Fair
TPWC165	Tributary to Unnamed Channel	S6	Poor	Poor	Poor	Poor

Note:

<sup>a</sup> As per the Environmental Protection and Management Regulation

Source: Ecofor 2008

#### 9.1.1.5 Nation River Watershed

In the Nation River watershed, there are 23 watercourse crossings including Robinson Creek (two crossings) and Philip Creek. Philip Creek has several reaches with excellent rearing habitat for fish with abundant cover while spawning habitat is generally lower in quality for fish species that utilize gravels (e.g., salmonids; Retzer 1989). One reach of Philip Creek has good spawning habitat with suitable gravels (Retzer 1989); however, it is unclear if this is the reach that interacts with the Eastern Route Alternative.

Seventeen (17) watercourse crossings in the Nation River watershed have been previously assessed within approximately 300 m of the Project footprint (Ecofor 2008). Two of these were classified as NVC or NCD while the remaining 15 were watercourses. Habitat information for the 15 previously assessed watercourse crossings is summarized in Table 9.4.

**Table 9.4 Fish Habitat Information for Watercourses Previously Assessed in the Nation River Watershed**

Stantec ID	Stream Name	Riparian Class <sup>a</sup>	Habitat Quality Rating in Proximity to Project Footprint			
			Spawning	Rearing	Overwintering	Migration
TPWC173	Tributary to Robinson Creek	S4	Poor	Fair	Poor	Poor
TPWC175	Tributary to Robinson Creek	S4	Poor	Fair	Poor	Fair
TPWC176	Unnamed Channel	S4	Poor	Poor	Poor	Fair
TPWC177	Tributary to Robinson Creek	S6	Poor	Poor	Poor	Poor
TPWC179	Robinson Creek	S3	Fair	Good	Fair	Good
TPWC180	Robinson Creek	S3	Good	Good	Good	Good
TPWC181	Unnamed Channel	S3	Fair	Good	Fair	Good





Stantec ID	Stream Name	Riparian Class <sup>a</sup>	Habitat Quality Rating in Proximity to Project Footprint			
			Spawning	Rearing	Overwintering	Migration
TPWC184	Philip Creek	S2	Fair	Good	Good	Good
TPWC185	Unnamed Channel	S4	Fair	Fair	Poor	Fair
TPWC189	Unnamed Channel	S3	Good	Poor to fair	Fair	Fair
TPWC190	Tributary to Unnamed Channel	fisheries sensitive zone (beaver dam complex)	Fair	Poor	Fair	Poor
TPWC191	Tributary to Unnamed Channel	S4/NVC	Fair	Fair	Poor	Fair
TPWC192	Unnamed Channel	S3	Fair to good	Fair to good	None to poor	Fair to good
TPWC193	Unnamed Channel	S4	Poor	Poor	None	Poor
TPWC194	Unnamed Channel	S4	Poor	Poor	None	Poor

Note:

<sup>a</sup> As per the Environmental Protection and Management Regulation

Source: Ecofor 2008

#### 9.1.1.6 Fish Habitat Sensitivity Ratings

Though fish habitat sensitivity for each watercourse crossing was assessed in the Application, crossing-specific fish habitat data is not currently available for the crossings, and a qualitative assessment has been done. Broadly speaking, river crossings (i.e., of the Pine River, Parsnip River, and Pack River) and named watercourses are more likely to provide higher quality habitat to a variety of fish species than unnamed watercourses, as the former are more likely to be permanent watercourses with higher flows and wider channels that provide a greater area of fish habitat and habitat complexity. River crossings are more prevalent in the Eastern Route Alternative (15 crossings) than along the approved route (three crossings) in the Peace River drainage due to multiple crossings of the same river (e.g., the Pine River, which is crossed at 11 locations), though the total number of watercourses crossings is anticipated to be less along the Eastern Route Alternative. With respect to lake crossings, the approved route crosses one lake at two locations (Williston Lake and Williston Bay). There are no lakes crossed by the Eastern Route Alternative.

Overall, the Application indicated that the Peace River drainage had the highest proportion of low sensitivity watercourse crossings (42%; characterized by a general lack of high-quality fish habitat and an absence of salmonids or species of conservation concern) than other major watersheds crossed by the Project (15% to 25% other watersheds). It is expected that the proportion of low sensitivity watercourses in the Peace River drainage will remain higher than other watersheds crossed by the pipeline with the addition of the Eastern Route Amendment.





### **9.1.2 Fish Presence**

Thirty-six (36) fish species have been previously documented (Government of BC 2024d) in watersheds crossed by the Project Footprint including:

- Twenty-eight (28) fish species in the Pine River watershed
- Twenty-five (25) fish species in the Parsnip River watershed
- Eighteen (18) fish species in the Carp Lake watershed
- Twenty-two (22) fish species in the Parsnip Arm watershed
- Twenty-three (23) fish species in the Nation River watershed

These species, their conservation status, and the watersheds where they have been documented are summarized in Table 9.5.

In addition, Table 9.6 summarizes the watercourses crossed by the Project where fish species have been previously documented (i.e., 31 watercourses, associated with 44 proposed watercourse crossings).



Table 9.5 Fish Species of Previously Documented in Watersheds Crossed by the Eastern Route Amendment

Species Information			Legislated Protection		Scientific Review of Recommendation		Watershed				
Family	Common Name	Scientific Name	SARA <sup>a</sup> (Federal)	EPMR <sup>b</sup> (Provincial)	COSEWIC <sup>a</sup> (Federal)	BC Status <sup>c</sup>	Pine River	Parsnip River	Carp Lake	Parsnip Arm	Nation River
Catostomidae	largescale sucker	<i>Catostomus macrocheilus</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	longnose sucker	<i>Catostomus catostomus</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	white sucker	<i>Catostomus commersonii</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
Cottidae	coastrange sculpin	<i>Cottus aleuticus</i>	No status	Not listed	Not assessed	Yellow	-	X	-	-	-
	mottled sculpin	<i>Cottus bairdii</i>	No status	Not listed	Not assessed	No status	-	X	-	-	X
	prickly sculpin	<i>Cottus asper</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	slimy sculpin	<i>Cottus cognatus</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	spoonhead sculpin	<i>Cottus ricei</i>	No status	Not listed	Not at risk	Yellow	X	-	-	X	-
Cyprinidae	brassy minnow – western Arctic group	<i>Hybognathus hankinsoni</i>	No status	Not listed	Special concern	Blue	X	-	X	X	X
	finescale dace	<i>Chrosomus neogaeus</i>	No status	Not listed	Not assessed	Yellow	X	-	-	-	-
	flathead chub	<i>Platygobio gracilis</i>	No status	Not listed	Not assessed	Yellow	X	-	-	-	-
	lake chub	<i>Couesius plumbeus</i>	No status	Not listed	Data deficient	Yellow	X	X	X	X	X
	leopard dace	<i>Rhinichthys falcatus</i>	No status	Not listed	Not at risk	Yellow	X	-	-	-	-
	longnose dace	<i>Rhinichthys cataractae</i>	No status	Not listed	Not assessed	Yellow	X	X	-	-	X
	northern pearl dace	<i>Margariscus margarita</i>	No status	Not listed	Not assessed	Yellow	X	-	-	-	-
	northern pikeminnow	<i>Ptychocheilus oregonensis</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	northern redbelly dace x finescale dace	<i>Chrosomus eos x Chrosomus neogaeus</i>	No status	Not listed	Not Assessed	Red	X	-	-	-	-
	peamouth chub	<i>Mylocheilus caurinus</i>	No status	Not listed	Not assessed	Yellow	-	X	X	X	X
	redside shiner	<i>Richardsonius balteatus</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
Esocidae	northern pike	<i>Esox lucius</i>	No status	Not listed	Not assessed	Yellow	X	-	-	-	-
Gadidae	burbot	<i>Lota lota</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
Osmeridae	rainbow smelt	<i>Osmerus dentex</i>	No status	Not listed	Not assessed	Unknown	-	X	-	-	X
Percidae	walleye	<i>Sander vitreus</i>	No status	Not listed	Not assessed	Yellow	X	-	-	-	-
Percopsidae	trout-perch	<i>Percopsis omiscomaycus</i>	No status	Not listed	Not assessed	Yellow	X	-	-	-	-
Salmonidae	Arctic grayling – Southern Beringean lineage	<i>Thymallus arcticus</i>	No status	Not listed	Not assessed	Yellow <sup>d</sup>	X	X	X	X	X
	brook trout	<i>Salvelinus fontinalis</i>	No status	Not listed	Not assessed	Exotic	X	X	-	X	-
	bull trout – western Arctic populations	<i>Salvelinus confluentus</i>	Schedule 1, Special concern	HPW	Special concern	Blue	X	X	X	X	X
	Dolly Varden	<i>Salvelinus malma</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	kokanee	<i>Oncorhynchus nerka</i>	No status	Not listed	Not assessed	No status	-	X	-	X	X
	lake trout	<i>Salvelinus namaycush</i>	No status	Not listed	Not assessed	Yellow	-	X	X	X	X
	lake whitefish	<i>Coregonus clupeaformis</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X



Species Information			Legislated Protection		Scientific Review of Recommendation		Watershed				
Family	Common Name	Scientific Name	SARA <sup>a</sup> (Federal)	EPMR <sup>b</sup> (Provincial)	COSEWIC <sup>a</sup> (Federal)	BC Status <sup>c</sup>	Pine River	Parsnip River	Carp Lake	Parsnip Arm	Nation River
Salmonidae continued	mountain whitefish	<i>Prosopium williamsoni</i>	No status	Not listed	Not assessed	Yellow	X	X	X	X	X
	pygmy whitefish	<i>Prosopium coulterii</i>	No status	Not listed	Not at risk	Yellow	-	X	-	X	X
	rainbow trout	<i>Oncorhynchus mykiss</i>	No status	Not listed	Not Assessed	Yellow	X	X	X	X	X
	round whitefish	<i>Prosopium cylindraceum</i>	No status	Not listed	Not Assessed	Yellow	-	X	-	-	-
	splake	<i>Salvelinus namaycush</i> x <i>Salvelinus fontinalis</i>	No status	Not listed	Not Assessed	No status	X	-	-	-	-

Notes:

SARA = *Species at Risk Act*; EPMR = Environmental Protection and Management Regulation; COSEWIC = Committee on the Status of Endangered Wildlife in Canada; HPW = High Priority Wildlife

“X” Species is present; “-” Species has not been documented (Government of British Columbia 2024d,e)

<sup>a</sup> Species at Risk Public Registry (Government of Canada 2024b)

<sup>b</sup> Environmental Protection and Management Guideline (EPMR; BC Energy Regulator [BCER] 2023)

<sup>c</sup> British Columbia Conservation Data Centre (BC CDC) Status Listing (BC CDC 2024); Blue = any species that is of special concern; Red = any species that is at risk of being lost (extirpated, endangered or threatened)

<sup>d</sup> Though Arctic Grayling - Williston watershed population were categorized as red-listed in the Application, as of 2012, they were no longer considered to be a distinct form of the species and are as of 2012 were considered part of the Southern Beringean lineage of the species (BC CDC 2024).



**Table 9.6 Summary of Watercourse Crossings with Previously Documented Fish Observations**

Watercourse Name	Crossing Numbers	Watershed	Fish Species Previously Documented
Crassier Creek	TPWC6	Pine River	Bull trout, rainbow trout
Unnamed Channel	TPWC7	Pine River	Bull trout, mountain whitefish, rainbow trout
Fisher Creek	TPWC19	Pine River	Bull trout, mountain whitefish, rainbow trout, slimy sculpin
Big Boulder Creek	TPWC35	Pine River	Bull trout, rainbow trout, Dolly Varden
Pine River	TPWC40, TPWC43, TPWC54, TPWC59, TPWC60, TPWC61, TPWC62, TPWC69, TPWC70, TPWC73, TPWC97	Pine River	Arctic grayling, bull trout, burbot, Dolly Varden, finescale dace, flathead chub, lake chub, lake whitefish, largescale sucker, longnose dace, longnose sucker, mountain whitefish, northern pike, northern pikeminnow, rainbow trout, redbside shiner, slimy sculpin, splake, trout-perch, walleye, white sucker
Silver Sands Creek	TPWC51	Pine River	Bull trout, Dolly Varden, mountain whitefish, rainbow trout, slimy sculpin
Link Creek	TPWC64	Pine River	Bull trout, mountain whitefish, slimy sculpin
Unnamed Channel	TPWC67	Pine River	Bull trout
John Bennett Creek	TPWC83	Pine River	Bull trout, Dolly Varden, mountain whitefish, rainbow trout, slimy sculpin
Declier Creek	TPWC107	Parsnip River	Bull trout
Bijoux Creek	TPWC111	Parsnip River	Bull trout
Rolston Creek	TPWC115	Parsnip River	Bull trout
Caswell Creek	TPWC125	Parsnip River	Bull trout, rainbow trout
Parsnip River	TPWC142, TPWC142-A, TPWC143	Parsnip River	Arctic grayling, bull trout, burbot, Dolly Varden, kokanee, lake chub, lake whitefish, largescale sucker, longnose sucker, longnose dace, mountain whitefish, northern pikeminnow, peamouth chub, prickly sculpin, rainbow trout, redbside shiner, slimy sculpin, white sucker
Pack River	TPWC147	Carp Lake	Arctic grayling, Dolly Varden, lake chub, lake whitefish, largescale sucker, longnose sucker, mountain whitefish, northern pikeminnow, peamouth chub, rainbow trout, redbside shiner
Unnamed Channel	TPWC158	Carp Lake	Rainbow trout
Unnamed Channel	TPWC159	Carp Lake	Lake chub
Unnamed Channel	TPWC161	Parsnip Arm	Rainbow trout



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Watercourse Name	Crossing Numbers	Watershed	Fish Species Previously Documented
Lignite Creek	TPWC162	Parsnip Arm	Rainbow trout
Unnamed Channel	TPWC167	Carp Lake	Rainbow trout
Unnamed Channel	TPWC168	Carp Lake	Rainbow trout
Unnamed Channel	TPWC170	Carp Lake	Rainbow trout
Reed Creek	TPWC171	Carp Lake	Rainbow trout, slimy sculpin
Unnamed Channel	TPWC172	Carp Lake	Rainbow trout, slimy sculpin
Robinson Creek	TPWC179, TPWC180	Nation River	Rainbow trout
Unnamed Channel	TPWC181	Nation River	Rainbow trout
Philip Creek	TPWC184	Nation River	Arctic grayling, bull trout, burbot, Dolly Varden, kokanee, lake whitefish, largescale sucker, longnose sucker, mountain whitefish, northern pikeminnow, peamouth chub, prickly sculpin, rainbow trout, redbside shiner, slimy sculpin, longnose dace
Unnamed Channel	TPWC185	Nation River	Rainbow trout
Unnamed Channel	TPWC189	Nation River	Rainbow trout, slimy sculpin
Unnamed Channel	TPWC192	Nation River	Rainbow trout
Unnamed Channel	TPWC195	Nation River	Rainbow trout, slimy sculpin

Source: Government of BC 2024d,e



### 9.1.3 Species of Conservation Concern

There are three listed species of conservation concern within watersheds that are crossed by the Project footprint: bull trout – western Arctic populations (*Salvelinus confluentus*), brassy minnow – western Arctic group (*Hybognathus hankinsoni*), and northern redbelly dace x finescale dace (*Chrosomus eos* x *Chrosomus neogaeus*). Bull trout have been previously documented within the RAA<sup>2</sup> (Government of British Columbia 2024d,e) while Brassy minnow and northern redbelly dace x finescale dace are unlikely to be encountered by the Project (Government of British Columbia 2024d,e).

Western Arctic populations of bull trout are listed as special concern under Schedule 1 of the *Species at Risk Act* and by COSEWIC, listed as high-priority wildlife under the Environmental Protection and Management Regulation, and are provincially blue-listed (Government of Canada 2024b, BCER 2023, BC CDC 2024). There is evidence that this population is in decline in some areas in terms of both numbers and distribution and it is considered vulnerable to habitat degradation and fragmentation as well as other factors (COSEWIC 2012).

Bull trout have been previously documented in 15 watercourses associated with 27 crossings including the Pine River (11 crossings), Parsnip River (two crossings), and several smaller creeks and unnamed watercourses (Table 9.6; Government of BC 2024d,e). Within the RAA, previous bull trout observations are primarily associated within or near the mainstem of the Pine River in the Pine River watershed with fewer associated in or near the mainstem of the Misinchinka River (Government of British Columbia 2024e). Though the Misinchinka River is not crossed by the Project, several of its tributaries cross the Project less than 1 km from the mainstem of the river. There have been no bull trout observations within the RAA in the Carp Lake, Parsnip Arm, or Nation River watersheds (Government of British Columbia 2024d,e).

Bull trout distribution in British Columbia downstream of the Peace Canyon (including the Pine River watershed) is associated with mountainous areas and rarely extends beyond the mainstems of larger rivers (Decker and Hagen 2011). In areas upstream of the Peace Canyon (including the Parsnip River, Carp Lake, Parsnip Arm, and Nation River watersheds), bull trout are relatively widespread, including in Parsnip Reach, which includes tributaries associated with the Project such as Misinchinka River (which has tributaries crossed by the Project), Pack River, Phillip Creek (Decker and Hagen 2011). In the Misinchinka River basin, critical bull trout spawning habitat and juvenile habitat has been identified in the mainstem of the river as well as one unnamed tributary, but not in any of the watercourses crossed by the Project (Hagen and Weber 2019). In the Pack River basin, there are records of adult and subadult bull trout; however, no juveniles have been recorded, indicating they are unlikely to spawn there (Hagen and Weber 2019). In Philip Creek within the Nation River watershed, bull trout are present but sampling to date has been inadequate for delineating the distribution within the basin (Hagen and Weber 2019).

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<sup>2</sup> The RAA includes the LAA and relevant fish habitats in the sub-basin upstream of disturbed instream or riparian fish habitat and extending a minimum of 1 km downstream from disturbed instream or riparian fish habitat.



There are limited observations of brassy minnow - western Arctic group of subpopulations in watersheds that intersect the Project (five in the Pine River watershed, three in the Carp Lake watershed, and two in the Nation River watershed), all of the observations are >15 km from the Project (Government of British Columbia 2024d,e). In the Parsnip Arm watershed, the distribution of the brassy minnow is limited to Rocky Marsh and Mugaha Marsh, which are >15 km from the Project; they have not been previously documented in any of the watercourses crossed by the Project COSEWIC 2022, Government of Canada 2024c, Government of British Columbia 2024d,e).

There is only one documented observation of redbelly dace x finescale dace in watersheds associated with the Project. It is in Graveyard Creek in the Pine River watershed, which is not crossed by the Project (Government of British Columbia 2024e). This observation is >60 km from the Project, so it is unlikely that this species will be encountered in the Project watercourse crossings.

Although Arctic grayling – Williston watershed population (*Thymallus arcticus*) are not provincially or federally listed as species at risk currently (they were red-listed prior to 2010 and now considered part of the yellow-listed Southern Beringean lineage), they have also been included as a species of conservation concern in this assessment because populations upstream of the W.A.C. Bennett Dam have significantly declined since the dam's construction in 1967 and they are valued by Indigenous Nations in the Williston watershed (BC CDC 2010, 2024; Hagen and Stamford 2023).

Arctic grayling populations in the Williston watershed (which includes the Parsnip River, Carp Lake, Parsnip Arm, and Nation River watersheds) are isolated from the remainder of the Peace River drainage by the W.A.C Bennett dam (Ministry of Water, Land and Air Protection 2002). Their population declined in the 1980s, particularly in small and medium-sized streams, and by 1988, only populations in the larger river systems remained (Ministry of Water, Land and Air Protection 2002). The Parsnip River watershed is one of the few remaining places where populations of Arctic grayling are present upstream of the W.A.C Bennett dam (Hagen and Stamford 2023). Recent studies in the Parsnip watershed indicated that the estimated population abundance of Arctic grayling in the Misinchinka River basin (where the majority of the watercourse crossings are located in the watershed) is the lowest of the eight basins studied and that they are present at barely detectible levels within the basin (Hagen and Stamford 2023).

Arctic grayling have been previously documented in three watercourses associated with five crossings in the Williston watershed: the Parsnip River (three crossings), Pack River, and Phillip Creek (Table 9.6, Government of British Columbia 2024d,e). They have been documented within the LAA<sup>3</sup> at the Parsnip River crossings. For Pack River and Phillip Creek, they have been documented >3 km and >26 km downstream of the crossings, respectively, near the mouths of these watercourses (Government of British Columbia 2024e).

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<sup>3</sup> Defined as an area extending 100 m upstream of disturbed instream or riparian habitat and a minimum of 300 m downstream of disturbed instream or riparian habitat. At larger, more sensitive watercourses, assessment will include areas up to 1 km downstream depending on site-specific conditions.



## 9.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to freshwater aquatic resources. Doig River First Nation, Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Saulteau First Nations, Takla Nation, and West Moberly First Nations each identified an interest in harvesting fish (Firelight 2014a, 2014b, 2015; DMCS and HRFN 2014; CSTC 2014b; TLFN and Sharp 2014; WMFN 2015). This feedback has been considered and summarized in Table 9.7 and has been integrated into the freshwater aquatic resources effects assessment.

**Table 9.7 Summary of Engagement Feedback Related to Freshwater Aquatic Resources**

Comment	Sources	PRGT Response
Doig River First Nation has expressed concerns about potential effects on fish, fish habitat, fish migration, and species composition within the various waterways of the Peace River Valley as well as contamination of fish, further noting that the quality of water and fish in the region has declined, to the point where they often do not feel safe using these resources.  Doig River First Nation identified important harvesting habitat in the Pine River and John Hart Highway areas (which are intersected and paralleled by the Eastern Route Alternative), Callazon Creek (crossed by the Eastern Route Alternative), and Tudyah Lake and Windy Point Lake (within the Indigenous Interests LAA).	Fasken Martineau 2013a; Firelight 2014a; NGTL 2015a, 2015b; AiM 2021a; DRFN 2023b	<ul style="list-style-type: none"> <li>• Potential interactions of the Project amendment with fish habitat are addressed in Section 9.1.</li> <li>• Amendment-related effects on water quality and fish are assessed in Sections 7.3 and 9.3.</li> <li>• PRGT acknowledges that Doig River First Nation has identified important harvesting habitat in these areas and will continue to engage with Doig River First Nation around how these areas will be managed during construction planning.</li> </ul>
Halfway River First Nation previously expressed concern about the effects of past industrial and other developments on the composition, migration, and spawning behaviour of culturally important and harvested fish species, and expressed concern regarding changes to fish habitats, watercourses, water quality and wetlands in its territory (e.g., through chemical or other contamination; sedimentation; introduction of construction debris or refuse abandonment).	PRGT 2014a; Fasken Martineau 2013b; TERA 2013, 2014a, 2014b, 2014c	<ul style="list-style-type: none"> <li>• Amendment-related effects on water quality and fish and fish habitat are assessed in Sections 7.3 and 9.3.</li> </ul>





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Comment	Sources	PRGT Response
McLeod Lake Indian Band has noted a decline in fishing in its traditional territory due to industrial activity, particularly the mercury contamination within the Williston Reservoir watershed, noting that many McLeod Lake Indian Band members have stopped eating harvested fish.	Firelight 2015	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality and fish are assessed in Sections 7.3 and 9.3.</li> <li>As noted in Section 7.3.1, the Eastern Route Alternative would avoid trenching through the Williston Reservoir, reducing the potential for mobilization of metals in this area.</li> </ul>
Nak'azdli Whut'en raised concerns around gaps in the spawning habitat assessment.	April 2024 engagement	<ul style="list-style-type: none"> <li>Data gathered from future field-based fish and fish habitat assessments, including spawning habitat assessment, will be incorporated into construction planning to mitigate potential adverse effects to fish and fish habitat.</li> </ul>
<p>Nak'azdli Whut'en members have expressed concerns regarding the health of white sturgeon, salmon, and waterways within close proximity to the Project, and have further expressed concerns about leaks, damaged pipelines, and sedimentation impacting the water quality and fish habitat.</p> <p>Nak'azdli Whut'en previously identified harvesting areas in the Phillip Creek area, which is intersected by the Eastern Route Alternative.</p>	CSTC 2014b	<ul style="list-style-type: none"> <li>White sturgeon and salmon are not found within watercourses crossed by the Amendment.</li> <li>Amendment-related effects on water quality and fish are assessed in Sections 7.3 and 9.3.</li> <li>Potential interactions of the Project with accidents and malfunctions are addressed in Section 31 of the Application.</li> <li>Potential interactions of the Project amendment with fish habitat are addressed in Section 9.1.</li> <li>PRGT acknowledges that Nak'azdli has identified these harvesting areas and will continue to engage with Doig River First Nation around how these areas will be managed during construction planning.</li> </ul>
Saulteau First Nations reported changes to fish and fish spawning due to water contamination, and increased sedimentation noting decreases in fish size and populations. Saulteau First Nations previously expressed concerns about water quality and the health impacts of eating fish affected by industrial contamination and about the potential effects of water crossings on spawning habitat.	Olson et al. 2018; Sunderman and Lions Gate 2013	<ul style="list-style-type: none"> <li>Amendment-related effects on water quality and fish and fish and fish habitat are assessed in Sections 7.3 and 9.3.</li> </ul>



Comment	Sources	PRGT Response
Takla Nation expressed concerns about the effects of overharvesting, and declining health of aquatic ecosystems on important fish species, in particular salmon and sturgeon. Takla Nation has also expressed additional concerns about potential Project effects on aquatic ecosystems, in particular, stream diversions, streambed disturbance, contamination, and long-term effects of vibrations.	TLFN and Sharp 2014	<ul style="list-style-type: none"> <li>• Amendment-related effects on fish and fish habitat are assessed in Section and 9.3.</li> <li>• Sturgeon and salmon are not found within watercourses crossed by Amendment.</li> </ul>
West Moberly First Nations previously reported a decrease in the population and size of fish and, specifically, lake trout is becoming increasingly rare. West Moberly First Nations also reported that there are concerns of pollutants in the water and there has been a decrease of fish consumption due to health concerns.	T8FNCAT 2012; CTQ 2014; WMFN 2014	<ul style="list-style-type: none"> <li>• Amendment-related effects on water quality and fish and fish and fish habitat are assessed in Sections 7.3 and 9.3.</li> </ul>

## 9.3 Amendment Effects Assessment

This amendment is not anticipated to interact with freshwater aquatic resources differently than previously assessed; however, the Eastern Route Alternative is outside the original LAA and crosses watersheds and watercourses not evaluated in the previous assessment.

Temporal, Administrative and Technical Boundaries established in the Application will be applied to this Amendment. There have been no changes to the assessment area definitions from those assessed in the Application.

Updates to the *Fisheries Act* have occurred since the Application was filed in 2014. From 2012 to 2019, the *Fisheries Act* included provisions to prevent “serious harm to commercial, recreational and aboriginal (CRA) fisheries”; this terminology is reflected in the potential effect “harm to fish, marine mammals, or species at risk” specified for assessment in the Application Information Requirements (EAO 2014c). In 2019 these provisions were repealed and the current *Fisheries Act* now uses the terminology “harmful alteration, disruption or destruction” of fish or fish habitat. Where the term ‘fish’ is used within this Amendment it refers to ‘fish’ as defined in the *Fisheries Act*. The assessment of potential effects to freshwater aquatic resources in the Amendment uses the current terminology but does not change the overall assessment.

This amendment will evaluate potential effects on measurable freshwater aquatic resources parameters, as outlined in Table 9.8. Background conditions of these parameters is based on the information and conditions described in Section 9.1. Potential Project effects pathways which have the potential to impact these parameters are described in Section 9.3.1.



**Table 9.8 Potential Effects and Measurable Parameters for Freshwater Aquatic Resources**

Potential Effect	Measurable Parameter
Change in fish habitat	<ul style="list-style-type: none"> <li>Change in habitat will be assessed qualitatively based on the number and location of watercourse crossings and construction methods and timing.</li> </ul>
Change in fish health or mortality risk	<ul style="list-style-type: none"> <li>Qualitative estimate of number of dead and moribund fish.</li> </ul>
Change in water quality	<ul style="list-style-type: none"> <li>Qualitative assessment of estimated change in temperature (°C) and TSS concentrations (mg/L): <ul style="list-style-type: none"> <li>to quantify change in total suspended sediment concentrations <ul style="list-style-type: none"> <li>Changes in turbidity (in NTUs)</li> </ul> </li> <li>to quantify change in temperature <ul style="list-style-type: none"> <li>Changes in water temperature (°C).</li> </ul> </li> </ul> </li> </ul>

### 9.3.1 Potential Effects and Mitigation Measures

The Application considered three effects on freshwater aquatic resources: change in fish habitat, change in fish health or mortality risk, and change in water quality (Table 9.8). Based on the content of the Application and the information gathered during the Application review, the EAO Assessment Report (2014a) considered the potential effects on freshwater aquatic resources both within the Freshwater Fish and Fish Habitat chapter (change in fish habitat and change in fish health or mortality risk) and Water chapter (change in water quality).

The Freshwater Fish and Fish Habitat chapter in the EAO Assessment Report (2014a) considered change in fish habitat through alteration of substrate and bank contours, and loss of riparian vegetation and instream habitat associated with pipeline construction and permanent loss of riparian vegetation and bank recontouring associated with vehicle crossings.

The Freshwater Fish and Fish Habitat chapter in the EAO Assessment Report (2014a) considered change in fish health or mortality risk through change in sediment concentrations, displacement or stranding of fish, potential mortality of fish-egg-ova from equipment, change in water temperatures, lethal or sub-lethal effects on fish, and incidental entrainment, impingement or mortality of resident fish species.

The Water chapter in the EAO Assessment Report (2014a) considered the potential effects on freshwater water quality with respect to change in TSS and temperature which may impact fish and fish habitat. It indicated that potential effects to water quality downstream of the crossings during the construction phase may result from:

- An increase in suspended sediment caused by site preparation, as well as road and pipeline construction



- A change in water temperature due to clearing of riparian vegetation at watercourses
- Table 9.9 summarizes potential effects and mitigation measures for freshwater aquatic resources. No new Project effects (or effects pathways) were identified for the Eastern Route Alternative. The Eastern Route Alternative is predicted to result in residual effects consistent with those described in the Application based on the same type of projects effects, effects pathways, and the application of mitigation measures identified in the CEMP (PRGT 2016). Mitigation measures to prevent the introduction of sediment into watercourses and limit changes to fish habitat will be updated within the CEMP to reflect DFO's updates to guidance materials since the Application including DFO's measures to protect fish and fish habitat outlined in the Fish and Fish Habitat Protection Policy Statement (DFO 2019a; DFO 2019b) and codes of practice and interim codes of practice (DFO 2024).

**Table 9.9 Summary of Potential Effects and Mitigation Measures – Freshwater Aquatic Resources**

<b>Proposed Amendment Component</b>	<b>Project Phase</b>	<b>Change in Proposed Works or Activities</b>	<b>Change in Potential Effects</b>	<b>Change in Mitigation or Enhancement Measures</b>	<b>Change in Mitigation or Enhancement Measures Success Rating</b>
Eastern Route Alternative	Construction	No change	No change	No change	No change
	Operations	No change	No change	No change	No change

### 9.3.2 Residual Effects

Potential residual effects of this Amendment on freshwater aquatic resources are predicted to be similar to the portion of the approved alignment that the Eastern Route Alternative would replace. Potential residual effects include:

- Alteration and loss of instream and riparian habitat
- Increased fish mortality and injury
- Change in water quality due to increased TSS

These residual effects are expected to have a similar magnitude as noted in the Application. The Eastern Route Alternative is a shorter length (~60 km shorter) and has fewer watercourse crossings than the approved alignment; however, it also has a greater number of major watercourse crossings. The detailed magnitude (e.g., aerial extent) of the impacts to instream and riparian habitat cannot be quantified until information on watercourse crossing methods and stream characteristics (e.g., channel width) and classifications are determined as part of pre-construction surveys and construction planning.



### 9.3.3 Changes to Characterization of Residual Effects

Changes to the definition for magnitude of effects, as written in the Application, are required due to regulatory changes (i.e., updated *Fisheries Act*) as well as due to the more qualitative nature of this assessment. Specifically, the magnitude definitions are modified to evaluate change to habitat and change to fish mortality for all fish species, rather than just CRA fish species. The characterization of residual effects to freshwater aquatic resources in the Amendment uses the current terminology but use of this updated terminology does not change the overall assessment results of the Application or the Amendment.

Predicted effects on freshwater aquatic resources, the residual effects conclusions presented in the EAO Assessment Report (EAO 2014a) are unchanged as a result of the Eastern Route Alternative. A detailed comparison of the EAO Assessment Report conclusions and Eastern Route Alternative residual effects is presented below in Table 9.10.



**Table 9.10 Changes to the EAO Assessment Report Characterization of Residual Effects – Freshwater Aquatic Resources**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<b>Habitat, Mortality, and water quality:</b> <i>Undisturbed; variable sensitivity</i>	<p><b>Habitat:</b> <i>Habitat sensitivity is considered in the risk rankings of watercourses. Critical habitat (e.g., spawning habitat) for fish species of conservation concern has a higher sensitivity to disturbance.</i></p> <p><b>Mortality:</b> <i>Fish species of conservation concern have a higher sensitivity and lower resilience to disturbance.</i></p> <p><b>Water Quality:</b> <i>Some variability in the sensitivity and resilience of watercourses to sedimentation is expected, depending upon sensitive receptors to which it is associated, as well as a variety of site- and watershed-specific factors.</i></p>	No change
Magnitude	<p><b>Habitat and Mortality:</b> <i>Low to Moderate</i></p> <p><b>Water Quality:</b> <i>Low</i></p>	<p><b>Habitat:</b> <i>The total area of instream and riparian habitat impacted by proposed Project is relatively small on a watershed scale. However, within some watercourses there is the possibility that the Project may impact moderate or high sensitivity fish and fish habitat which may result in “serious harm” to fish, requiring authorization under the Fisheries Act, and habitat offsetting. With effective construction mitigation and post-construction habitat restoration, temporary residual effects from instream and riparian habitat alteration would be limited at each watercourse crossing.</i></p> <p><b>Mortality:</b> <i>The proposed Project has the potential to result in injury and mortality to fish during construction of isolated trenched watercourse crossings, but would not affect local population levels.</i></p> <p><b>Water Quality:</b> <i>Water quality, including TSS, would be monitored regularly during construction. For any rise in TSS levels above background levels that exceeds the guidelines for the protection of aquatic life, the Proponent would undertake measures to remedy the factors producing the exceedances, in consultation with OGC*.</i></p>	<p>No change</p> <p><i>Fisheries Act updated in 2019 to repeal ‘serious harm’ provisions. Amendment assessed fish and fish habitat as defined and required in current Fisheries Act. There are no changes to the rating for magnitude of residual effects based on revised magnitude definitions.</i></p>
Extent	<b>Habitat, Mortality, and Water Quality:</b> <i>Local</i>	<p><b>Habitat and Mortality:</b> <i>Potential residual effect to fish habitat and fish mortality risk would be within the LAA (primarily 100 m upstream and 300 m downstream, but potentially further downstream on site specific or larger watercourses).</i></p> <p><b>Water Quality:</b> <i>Substantive impacts beyond the LAA are not anticipated.</i></p>	No change

<sup>4</sup> The text in italics was copied from the Environmental Assessment Office Assessment Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Duration	<b>Habitat:</b> Medium-term to Long-Term <b>Mortality and Water Quality:</b> Short-term	<p><b>Habitat:</b> The duration of the effects depend on the instream habitat characteristics, timing and extent of disturbance, effectiveness of mitigation, post-construction reclamation, habitat restoration (and offsetting, if required), and natural stream channel and riparian restoration. However, considering the existing regulatory regime and past practice, the measureable effect is anticipated beyond construction, but material effects would generally not be present beyond a few years.</p> <p>The duration of effects to riparian habitat would depend on the re-establishment of riparian vegetation following construction. Early stages of riparian revegetation (e.g., small shrubs) would take approximately 3-5 years to provide bank stabilization and restore some riparian function. Restoration of full riparian function in some area could take up to 10 years, and at some watercourses may extend for the duration of the proposed Project due to lack of large trees and mature riparian function (e.g., stream cover, shade) along the ROW.</p> <p><b>Mortality:</b> Potential for fish mortality or injury would be limited to the duration of instream construction activities at each watercourse crossing.</p> <p><b>Water Quality:</b> Short-term sedimentation may occur during construction trenching activities; however, TSS levels would be monitored regularly during construction, and for any rise in TSS levels above background levels that exceed the guidelines for the protection of aquatic life, the Proponent would undertake measures to remedy the factors producing the exceedances, in consultation with OGC*.</p>	No change.
Reversibility	<b>Habitat, Mortality, and Water Quality:</b> Reversible	<p><b>Habitat and Mortality:</b> The residual effects on fish habitat and mortality are expected to be reversible with reclamation, and in some cases offsetting.</p> <p><b>Water Quality:</b> Once the cause is addressed, the residual effects are considered reversible.</p>	No change
Frequency	<b>Habitat, Mortality, and Water Quality:</b> Once	<p><b>Habitat and Mortality:</b> Frequency of fish mortality and habitat disturbance would occur one time, during instream construction activities.</p> <p><b>Water Quality:</b> At any one location the effect would primarily be caused by a single event during construction.</p>	No change



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Likelihood	<p><b>Habitat:</b> The likelihood of residual effects to instream and riparian habitat would vary from low to high, depending on the watercourse and crossing method. The likelihood of impacts to riparian habitat would generally be higher (with the exception of some trenchless crossings).</p> <p><b>Mortality:</b> The likelihood of residual effects to fish mortality would generally be low to moderate, but would somewhat depend on watercourse crossing method and fish presence at time of construction. Predicted numbers of dead or moribund fish at watercourse crossings as a result of project activities are very low, such that there would be no measurable effects to species at a population level.</p> <p><b>Water Quality:</b> The likelihood of residual effects to water quality would vary from low to high, depending on the watercourse, crossing method, and success of mitigation measures.</p>		No change
Significance	<p><b>Habitat and Mortality:</b> Taking into consideration the magnitude of the potential effects, as well as their short duration and reversibility, EAO concludes that the residual effects of the proposed Project on fish and fish habitat are not likely to be significant.</p> <p><b>Water Quality:</b> Taking into consideration the magnitude of the residual effect, as well as the very short duration and reversibility, EAO concludes that the residual effects of the proposed Project on water are not likely to be significant.</p>		-
Confidence	<p><b>Habitat and Mortality:</b> The significance determination and likelihood rating for residual effects are determined with high confidence, based on the proposed mitigation measures, particularly existing federal and provincial regulatory requirements, as well as well-developed industry best management practices and compliance with the proposed EA Certificate conditions.</p> <p><b>Water Quality:</b> High Confidence – The significance determination and likelihood rating for residual effects are determined with high confidence. Based on the proposed mitigation measures, industry best management practices, and compliance with the EA Certificate conditions, federal and provincial guidelines and permitting requirements, there is high confidence that the residual effects would not be significant.</p>		No change

Source: EAO 2014a

Note regulator is now BCER, not OGC





### **9.3.4 Cumulative Effects Assessment**

Cumulative effects for freshwater aquatic resources are expected to be similar to the approved Project for the Eastern Route Amendment. While this route does not overlap with the previously included Westcoast Connector Gas Transmission Project, it is co-located with the Highway 97 corridor which includes other pipeline and powerline ROW and road and rail corridors. The Frontier Project is also within the RAA for the Eastern Route Amendment.

Predicted effects to freshwater aquatic resources during construction could interact cumulatively with these activities/projects; however, as none of the other projects or activities in the area are expected to be under construction at the same time, interactions between these projects/activities and the Eastern Route Amendment are not expected to result in increased cumulative effects from what was described in the Application. Therefore, the Eastern Route Amendment is anticipated to have similar interaction with past, present, and reasonably foreseeable projects and activities as discussed in the Application. The cumulative effects on freshwater aquatic resources are predicted to be consistent with the EAO Assessment Report and remain valid.

### **9.3.5 Risks and Data Uncertainty**

Baseline data has not been collected for fish or fish habitat along the Eastern Route Amendment; therefore, quantitative characterization of freshwater aquatic resources is not possible at all crossing locations and this Amendment has relied on data that is publicly available in the vicinity of the route. Assumptions based on the number of mapped watercourse crossings has been used to compare effects with this Amendment and the approved route. Construction of the Eastern Route Amendment will follow standard methods using well understood, effective mitigation measures that can reduce potential for residual effects on freshwater aquatic resources.

The level of uncertainty for predicted effects on freshwater aquatic resources is considered moderate. The following items support data certainty for the Amendment: the understanding of Project effects, the broad understanding of other past, present, and reasonably foreseeable projects and activities, the current regulatory requirements and guidelines, the use of conservative assumptions, and the use of proven measures and best management practices to avoid and mitigate effects on water quality for the Project and other projects. However, unknown details related to timing of construction, crossing method to be used at each watercourse crossing, and fish habitat quality at watercourse crossing are the driving factors resulting in the uncertainty ranking as moderate. For example, the Eastern Route Amendment avoids crossing several high sensitivity watercourses (i.e., those used by fish species of conservation concern or species that are considered sensitive to changes in surface water quality or flow, or habitats that have characteristics that indicate a low resiliency to change; generally larger watercourse crossings) that are crossed by the approved route including Williston Lake, Moberly River, Mugaha Creek, Callazon Creek, Lynx Creek, as well as others unnamed watercourses. However, Eastern Route Amendment includes 15 crossings of major river as well as numerous other watercourses that have the potential to have high sensitivity, so the Eastern Route Amendment may have a higher proportion of sensitive watercourses crossings than the approved. Field-based data from along the Eastern Route Amendment



is required to refine the level of uncertainty for specific watercourse crossings. As the uncertainty in this prediction is not high, no additional risk analysis is necessary.



## 10 Soil

Soils are identified as a VC in the Application Information Requirements (PRGT 2014b) for the Application (PRGT 2014a) based on their importance in the environment, including their influence on above-ground productivity of natural vegetation, habitats, and water movement. Soils have potential to be directly or indirectly affected by the proposed Project. Project activities that include soil disturbance have the potential to affect baseline chemical and physical soil characteristics, such as fertility, tilth, texture, drainage, and coarse fragment content, which may alter soil productivity and, in turn, could affect other VCs such as Vegetation and Wetland Resources and Wildlife and Wildlife Habitat. Soils are the interface between non-living and living components of ecosystems and play a vital role in successful reclamation of disturbed lands. This section assesses Project effects on soils, particularly effects on forest soils. The Eastern Route Alternative avoids the Agricultural Land Reserves (ALR), and the remainder of the Project route it connects to does not intersect ALR. ALR soils will not be impacted by Project activities and thus are not included in this Amendment. The definition of the soil LAA and RAA are the same as presented in the Application (PRGT 2014a), and also applied to this Amendment. The LAA and RAA include the project footprint plus a band 50 m to either side in which indirect effects may occur.

### 10.1 Baseline Conditions

A review of available soils desktop data sources and literature was conducted to assess baseline forest soils along the Amendment route:

- The Soil Landscapes of British Columbia (Valentine et al. 1978)
- Canadian System of Soil Classification (Soil Classification Working Group 1998)
- Digital Bedrock Geology Map of British Columbia (Massey et al. 2005)
- Agriculture and Agri-Food Canada's Land Use categories (Agriculture and Agri-Food Canada 2020)
- Agriculture and Agri-Food Canada's Soil Landscapes of Canada digital map and database version 3.2. (Soil Landscapes of Canada Working Group [SLCWG] 2010)

#### Desktop Soils Overview

Table 10.1 summarizes the extent of soils along the approximately 172 km Amendment route, based on a desktop assessment. The assessment identified a wide range of soil types with varying coverage areas along the route. Well drained Brunisols (Eluviated Dystric Brunisols and Eluviated Eutric Brunisols) developed predominantly on coarse to medium textured colluvium with minor inclusions of glaciofluvial parent materials, and till parent materials are identified as the dominant soil, occupying approximately 36.5% (62.7 km) of the Project route. Moderately well to rapidly drained Podzols (Orthic Humo-Ferric) and Luvisols (Brunisolic Gray Luvisols) developed on coarse to medium textured colluvium, glaciofluvial, or till parent materials occupy approximately 27.9% (48.0 km) and 17.6% (30.2 km) of the Project route, respectively. There are minor inclusions of well to imperfectly drained Regosols (Cumulic Regosols, Gleyed Regosols, and Gleyed Cumulic Regosols) occupying approximately 13.4% (23.1 km) of the



Project route. Very poorly drained Typic Mesisols developed on organic parent material occur sparsely in depressional landscapes along the Project route, occupying approximately 1.8% (3.2 km). Approximately 2.7% (4.7 km) of the Project footprint is anticipated to be occupied by rock outcrop.

**Table 10.1 Soil Types along the Amendment Route**

Soil Classification – Great Group	Soil Classification – Subgroup	Parent Material	Length (km)	Length (%)
Brunisol	Eluviated Dystric Brunisol	Colluvium, Glaciofluvial, Till	62.7	36.5
	Eluviated Eutric Brunisol	Glaciofluvial		
Podzol	Orthic Humo-Ferric Podzol	Colluvium, Glaciofluvial, Till	48.0	27.9
Luvisol	Brunisolic Gray Luvisol	Till	30.2	17.6
Regosol	Cumulic Regosol	Fluvial	23.1	13.4
	Gleyed Regosol	Fluvial		
	Gleyed Cumulic Regosol	Fluvial		
Rock Outcrop	N/A	N/A	4.7	2.7
Mesisol	Typic Mesisol	Organic	3.2	1.8
<b>TOTAL</b>			<b>172</b>	<b>100</b>

Source: Valentine et al. 1978 and SLCWG 2010

Land use along the Amendment route is predominantly forested (83.2%; 142.8 km). Anthropogenic, wetland, unmanaged grassland, surface water, and other land make up the remainder of land uses (Table 10.2) (Agriculture and Agri-Food Canada 2020). No ALR lands will be impacted by the Amendment.

**Table 10.2 Land Use along the Amendment Route**

Land Use	Length (km)	Length (%)
Forested	142.8	83.2
Settlement	19.8	11.2
Wetland	5.5	3.2
Unmanaged Grassland	3.1	1.8
Water	0.6	0.3
Other Land (Rock, beaches, ice, barren land)	0.5	0.3
<b>TOTAL</b>	<b>172</b>	<b>100</b>

Note:

Totals may not sum due to rounding

Source: Agriculture and Agri-Food Canada 2020



Parent surficial material types found along the Amendment route are summarized in Table 10.3. Data from the Soil Landscapes of British Columbia (Valentine et al. 1978) and Agriculture and Agri-Food Canada's Soil Landscapes of Canada digital map and database version 3.2. (SLCWG 2010) was used to characterize surficial materials for this report. Terrestrial ecosystem mapping will be used to characterize surficial materials when updating the CEMP (PRGT 2016) prior to construction. Colluvium is the most common parent material occupying approximately 37.9% (65.1 km) along the route. Till, glaciofluvial, and fluvial parent materials occupy approximately 27.0% (46.5 km), 17.0% (29.3 km), and 13.4% (23.1 km) of the Amendment route, respectively. The Amendment route also encounters a small proportion of rock outcrops and organic parent materials, occupying approximately 2.7% (4.7 km) and 1.8% (46.4 hectares [ha]), respectively.

**Table 10.3      Surficial Materials in the Amendment Route**

<b>Surficial Material</b>	<b>Length (km)</b>	<b>Length (%)</b>
Colluvium	65.1	37.9
Till	46.5	27.0
Glaciofluvial	29.3	17.0
Fluvial	23.1	13.4
Rock Outcrop	4.7	2.7
Organic	3.2	1.8
<b>TOTAL</b>	<b>172</b>	<b>100</b>

Note:

Totals may not sum due to rounding

Source: Valentine et al. 1978 and SLCWG 2010

### **Reclamation Suitability**

According to criteria outlined in the Soil Quality Criteria Relative to Disturbance and Reclamation (Soil Quality Working Group 2004) for the foothills region, soils were generally rated poor and poor-to-fair for reclamation suitability of the material in the root zone. Some topsoils and subsoils have an unsuitable reclamation suitability largely due to their high coarse fragment content.

### **Water and Wind Erosion Risk**

Water erosion was estimated using revised universal soil loss equations (Wall et al. 2002). Water risk ratings assume bare soil conditions, which occur during site clearing, soil stripping and topsoil storage and in the initial phase of reclamation prior to revegetation when soils are most vulnerable to erosion. Most soils have a moderate to severe water erosion risk, as a result of the moderate to steep slope gradients found in the footprint.

Soil wind erosion risk was assessed based on models developed by Coote and Pettapiece (1989). Soil texture, surface roughness, and climatic factors are the key variables in the model. Most soils have a negligible to moderate soil wind erosion risk.



Organic soils were not assessed for water and soil wind erosion risk. These risk ratings were used to qualitatively assess erosion potential prior to the application of mitigation.

**Compaction and Rutting Risk**

Soil compaction and rutting can occur during construction and operation due to equipment and vehicle traffic operating in wet conditions. Soil compaction and rutting risk was estimated using BC Ministry of Forests Hazard Assessment Keys for Evaluating Site Sensitivity to Soil Degrading Processes Guidebook (BC Ministry of Forests, 1999). Most soils along the route have a low to moderate compaction risk and low to moderate rutting risk. Organic soils were not assessed for compaction and rutting risk.

**10.2 Influence of Engagement and Consultation**

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies, related to soil. This feedback has been considered and summarized in Table 10.4 and has been integrated into the soil effects assessment.

**Table 10.4 Summary of Engagement Feedback Related to Soils**

Comment	Sources	PRGT Response
Takla Nation has expressed concern about effects on wildlife health, wildlife movement, and wildlife access as a result of Project activities including contaminated soil resulting from leaks or spills associated with compression stations.	TLFN and Sharp 2014	<ul style="list-style-type: none"><li>• If contaminated soil is encountered during construction activities, measures will be implemented as per the Spill Contingency Plan (PRGT 2016).</li></ul>

**10.3 Amendment Effects Assessment**

This section outlines the anticipated potential effects, additional mitigation measures (to the 2014 EAC), anticipated residual effects, changes to the EAO Assessment Report (EAO 2014a) and Application (PRGT 2014a) effect characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessments.

The Amendment will include the same indicators as the Application (PRGT 2014a), excluding agricultural land capability as ALR lands do not intersect the Amendment area.



### 10.3.1 Potential Effects and Mitigation Measures

The Application considered two potential effects on soil resources: change in soil quality as a result of admixing, compaction, contamination, and soil fertility changes; and change in soil quantity as a result of wind and water erosion relocating topsoil and loss of topsoil depth during replacement (Table 10.5). Based on the content of the Application (PRGT 2014a) and the information gathered during the Application review, the EAO Assessment Report (EAO 2014a) considered these potential effects within the CPC.

Project activities with potential to affect soils that are anticipated to be undertaken for the Amendment are unchanged from those presented in the Application (PRGT 2014a) and will include site preparation of the pipeline footprint, including clearing, topsoil salvaging, soil handling and storage, and grading.

**Table 10.5 Potential Effects and Measurable Parameters for Soils**

Potential Effect	Measurable Parameter(s)
Change in Soil Quality	<ul style="list-style-type: none"> <li>Reclamation suitability of soils (based on soil texture, pH, electrical conductivity, coarse fragment content) for forested lands.</li> </ul>
Change in Soil Quantity	<ul style="list-style-type: none"> <li>Depth of soil salvage/replacement.</li> <li>Erosion risk.</li> </ul>

#### 10.3.1.1 Changes to Soil Quality

Changes in soil quality (i.e. reclamation suitability) are assessed by the following parameters:

- **Admixing**—reduction of soil quality due to the mixing or dilution of topsoil with poorer quality subsoil or spoil. Soil admixing affects soil reclamation suitability through possible changes in soil texture or chemical parameters.
- **Compaction**—condensing soil particles by mechanical means, affecting water movement and oxygen content in soil required for plant growth. Compaction is carried forward in the assessment to highlight site-specific mitigation.
- **Contamination**—introduction of deleterious substances resulting from chemical spills, waste mismanagement, and fugitive dust. The effects of contamination affect soil reclamation suitability through possible changes in soil texture or chemical parameters.

Mitigation measures for soil quality in the Application (PRGT 2014a) will also apply to the Amendment and are presented in the CEMP (PRGT 2016) and relevant associated contingency plans:

- Soil Handling Contingency Plan
- Spill Contingency Plan
- Wet Soils Contingency Plan
- Adverse Weather Contingency Plan



### 10.3.1.2 Changes to Soil Quantity

Insufficient soil salvage and replacement operations and water/wind erosion are potential causes of soil loss and hence changes in soil quantity.

#### Soil Salvage and Replacement

Soil salvage, soil handling and storage can alter soil during Project activities. Some soils are more sensitive to impact than others and optimal soil handling procedures, based on soil type, land use and construction season weather conditions can be necessary.

Mitigation measures for soil salvage and replacement provided in the Application (PRGT 2014a), CEMP (PRGT 2016), and relevant associated contingency plans will also apply to the Amendment.

#### Water and Wind Erosion

Soils are at risk of water erosion when they are exposed to the kinetic energy of raindrops and on long and/or steep slope gradients where displaced soil can be entrained in flowing water leading to splash, sheet, rill, and gully erosion.

Soils are at risk of wind erosion when they are exposed after vegetation has been cleared to facilitate construction, after salvaged soils are stored in windrows during trenching, and prior to revegetation on the backfilled trench.

Mitigation measures for soil erosion in the CEMP (PRGT 2016) will also apply to the Amendment and are presented in the following contingency plans (EAO 2014a):

- Adverse Weather Contingency Plan
- Soil Erosion Contingency Plan.

Table 10.6 summarizes changes to potential effects and mitigation measures for soil based on proposed changes associated with the Amendment.

**Table 10.6 Summary of Potential Effects and Mitigation Measures – Soil Quality and Quantity**

Proposed Amendment Component	Project Phase	Change in Proposed Works or Activities	Change in Potential Effects	Change in Mitigation or Enhancement Measures	Change in Mitigation or Enhancement Measures Success Rating
Eastern Route Alternative	Construction	No	No	No change	No change
	Backfilling/Reclamation	No	No	No change	No change
	Operations	No	No	No change	No change





## 10.3.2 Residual Effects

Residual effects associated with the Eastern Route Alternative are anticipated to be similar to those assessed in the Application (PRGT 2014a). As per the Assessment Report (EAO 2014a), residual effects of the Project on soil were characterized as localized in extent, low in magnitude, and short term to medium term in duration. The frequency of residual effects will consist of a single event, and when work on the Project is completed, residual effects on soil quality can be reversed. No changes to this characterization of residual effects on soil quality are anticipated as a result of this Amendment.

## 10.3.3 Changes to Characterization of Residual Effects

**Table 10.7 Changes to EAO Assessment Report Characterization of Residual Effects – Soil Resources**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<i>Low to high sensitivity</i>	<i>Through ALR lands, the water erosion risk is generally rated high, and the wind erosion risk is considered moderate. Where slopes are steeper, the erosion risk rating is greater, especially on valley sides of watercourses.</i>  <i>Poor drainage conditions of some soils may result in a high susceptibility to soil compaction and rutting. The susceptibility of soils to degradation from soil mixing varies depend on the textures and depths of the soils involved.</i>  <i>In non-ALR lands, the topography, drainage conditions and soil types are highly-variable. Forested soils with high coarse fragment content are considered to have a low sensitivity and high resilience to disturbance. Conversely, poorly drained silty or clayey soils have a high sensitivity to disturbance.</i>	No change
Magnitude	<i>Low</i>	<i>The effects would be expected to be well within environmental variability and resilience, after the proposed mitigation.</i>	No change
Extent	<i>Localized</i>	<i>Effects would be confined primarily to the Project footprint.</i>	No change
Duration	<i>Short to medium-term</i>	<i>With appropriate site restoration, it would generally take less than one year following final cleanup and reclamation to establish stable vegetation cover to prevent wind and water erosion, and to reverse adverse effects from compaction or rutting (short-term). Residual adverse effects from topsoil loss or degradation during handling could take several years to reverse (medium-term).</i>	No change
Reversibility	<i>Reversible</i>	<i>The residual adverse effects are considered to be reversible.</i>	No change

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Frequency	Once and occasional	Potential adverse effects would be largely confined to the construction phase with some occasional, localized occurrences possible throughout operations and maintenance.	No change
Likelihood	There is a high likelihood of residual effects to soil quality and quantity.		No change
Significance	In consideration of the low magnitude, short to medium-term duration and reversibility of the anticipated residual effects, and the Proponent's proposed mitigation measures, EAO concludes that the proposed Project would not likely result in significant adverse effects on soils.		-
Confidence	High confidence – The significance determination and likelihood rating for residual effects are determined with high confidence.		No change

#### 10.3.4 Cumulative Effects Assessment

Potential residual adverse effects of the amended Project are expected to be minor and limited primarily to the Project footprint. The Assessment Report (EAO 2014a) concluded that potential residual adverse effects of the Project are not likely to interact cumulatively with residual effects of other past, present, or future projects and activities that affect soil capability. No change is anticipated to this conclusion as a result of the Amendment, given its shorter overall route length, avoidance of ALR lands, and implementation of mitigation measures. Given these factors, a detailed cumulative effects assessment is not warranted.

#### 10.3.5 Risks and Data Uncertainty

The level of uncertainty for predicted effects on soils is considered moderate due to the lack of supporting field surveys in the amended route; however, this will be managed by implementing pre-construction field surveys.

The understanding of Project effects, the broad understanding of other past, present, and reasonably foreseeable projects and activities, the current and future application of statutory requirements and management objectives, the use of conservative assumptions, and the use of proven measures and best management practices will help to avoid and mitigate effects on soils. Mitigation strategies and measures have demonstrated to be effective in the past.



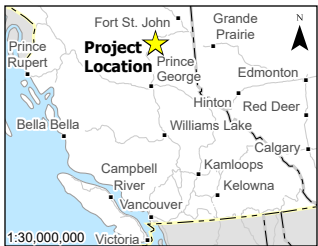
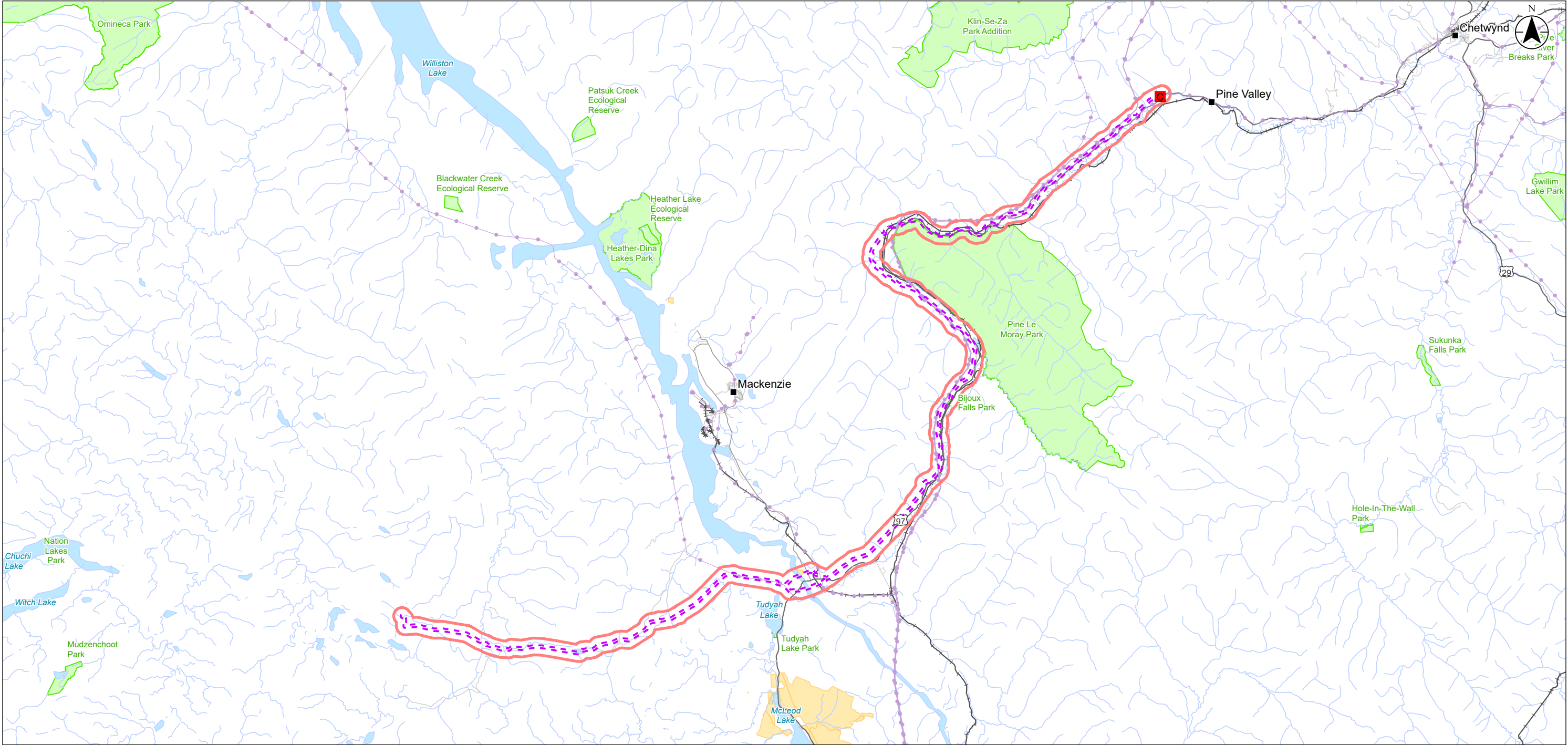
## **11 Vegetation and Wetland Resources**

Vegetation and wetland resources were identified as a VC in the Application Information Requirements (PRGT 2014b) for the Application (PRGT 2014a) due to anticipated Project interactions with vegetation and wetlands and in recognition of their economic, cultural, and ecological significance to local Indigenous communities, their role to ecosystem health, function, and their overall contribution to biodiversity. This Amendment includes an updated description of existing conditions based on data collected since the original baseline studies were completed and includes spatial boundaries that reflect the spatial extent of the proposed Project changes. Spatial parameters of the vegetation and wetland resources LAA and RAA are the same as presented in the Application (PRGT 2014a). In the context of vegetation and wetland resources, the LAA encompasses the area in which project-related effects can best be predicted or measured, and wherein there is a reasonable expectation that those effects could be of concern (PRGT 2014a). For the vegetation and wetlands resources VC, this encompasses the area 120 m on either side of the centreline of the Project footprint. The RAA is defined as a 2 km band that fully encompasses the Project footprint and is used to assess regional and potential cumulative effects. The extent of the Project footprint, LAA and RAA for the Amendment are shown in Figure 11.1.



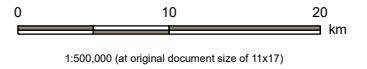
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**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia;  
Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K  
dataset from DataBC

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| ■ City, Town, Village or District Municipality | ■ First Nations Reserve  | ■ Compressor Station                               |
| — Highway                                      | ■ Parks, Protected Areas, Ecological Reserves, and Conservancies | --- Vegetation and Wetlands Local Assessment Area  |
| — Road   | ■ Waterbody  | — Vegetation and Wetlands Regional Assessment Area |
| — Local Street                                 |  |  |
| — Railway                                      |  |  |
| — Transmission Line                            |  |  |
| — Watercourse                                  |  |  |



Project Location Prince Rupert  
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Client/Project/Report  
Project Number 123514388  
Prepared by TQULICHINI on 20240403  
Requested by CLION on 20240403  
Reviewed by NFORRESTER on 20240403

Prince Rupert Gas Transmission Ltd.  
Vegetation and Wetlands  
Figure No.  
**11.1**  
Title  
**VEGETATION AND WETLANDS ASSESSMENT AREAS**

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## 11.1 Baseline Conditions

Existing conditions for vegetation and wetland resources in the Amendment were evaluated using the vegetation and wetlands baseline data compiled as part of the Application (PRGT 2014a), and review of existing data and Project-specific ecosystem mapping prepared for the Amendment.

The Eastern Route Amendment is within an area that has been previously disturbed by linear developments such as Enbridge T-South, BC Hydro transmission line, Highway 97, a railway, and other development such as recreational areas, forestry and agriculture have occurred. Approximately 45% of the Eastern Route Amendment footprint has been disturbed by these developments.

The Project footprint is within three biogeoclimatic zones: Boreal White and Black Spruce (BWBS), Engelmann Spruce-Subalpine Fir (ESSF), and Sub-boreal Spruce (SBS).

A desktop review was completed and ecosystem mapping of the Amendment was completed using LiDAR and aerial imagery which were collected from late September to November 2023. The presence of wetlands and provincially red- and blue-listed ecological communities was evaluated through Project-specific mapping, federal and provincial listed plant species, and potential supporting habitat intersected by the proposed Amendment were also evaluated. Project-specific mapping followed similar methods to those used in the Application, however, only red- and blue-listed ecological communities, wetlands and floodplains were mapped. The HabitatWizard map tool was used to evaluate existing and historical occurrences of red- and blue-listed ecological communities (BC ENV 2024). The CDC was queried to identify at-risk ecological communities and provincially or federally listed plant species occurring in the intersected biogeoclimatic subzones and variants<sup>1</sup> and the Natural Resource Districts that the Project intersects (BC CDC 2024a).

### 11.1.1 Plant Species of Interest

Twenty-six (26) blue or red-listed vascular and non-vascular plant and lichen species with the potential to occur in the vicinity of the Amendment were identified during the desktop review, of which two are also listed on Schedule 1 of SARA (Table 11.1). Field surveys will be undertaken prior to construction to evaluate the presence of rare plants and ecological communities.

There are no known historic occurrences of red-, blue-, or SARA-listed plant species within the LAA. There is a historical occurrence of crumpled tarpaper (*Collema coniophilum*) lichen within the RAA (Figure 11.2). This species is provincially red-listed, and considered Threatened by COSEWIC and is listed as Threatened on Schedule 1 of SARA.

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<sup>1</sup> Moist Warm BWBS (BWBSmw1), Mossvale Moist Cool SBS (SBSmk1), Finlay-Peace Wet Cool SBS (SBSwk2), Omineca Moist Very Cold ESSF (ESSFmv3) and Misinchinka Wet Cool ESSF (ESSFwk2).



**Table 11.1 Listed Vascular and Non-vascular Plants and Lichens with the Potential to Occur in the Local Assessment Area**

Species Form	Scientific Name	English Name	BC List <sup>1</sup>	SARA Status <sup>2</sup>
Lichen	<i>Phaeophyscia ciliata</i>	greater eye shadow	Blue	–
	<i>Nephroma isidiosum</i>	pebbled paw	Blue	–
	<i>Lobaria retigera</i>	smoker's lung	Blue	Schedule 1 - Threatened
Vascular Plant	<i>Acorus americanus</i>	American sweet-flag	Blue	–
	<i>Sarracenia purpurea</i> ssp. <i>purpurea</i>	common pitcher-plant	Red	–
	<i>Lomatium foeniculaceum</i> var. <i>foeniculaceum</i>	fennel-leaved desert-parsley	Blue	–
	<i>Atriplex gardneri</i> var. <i>gardneri</i>	Gardner's sagebrush	Red	–
	<i>Ranunculus cardiophyllus</i>	heart-leaved buttercup	Red	–
	<i>Tephrosieris palustris</i>	marsh fleabane	Blue	–
	<i>Utricularia ochroleuca</i>	ochroleucous bladderwort	Blue	–
	<i>Silene repens</i>	pink campion	Blue	–
	<i>Ranunculus rhomboideus</i>	prairie buttercup	Blue	–
	<i>Nabalus racemosus</i>	purple rattlesnake-root	Red	–
	<i>Nymphaea tetragona</i>	pygmy waterlily	Blue	–
	<i>Selaginella rupestris</i>	rock selaginella	Red	–
	<i>Polygala senega</i>	Seneca-snakeroot	Red	–
	<i>Taraxia breviflora</i>	short-flowered evening-primrose	Red	–
	<i>Penstemon gracilis</i>	slender penstemon	Blue	–
	<i>Nymphaea leibergii</i>	small white waterlily	Red	–
	<i>Potentilla biflora</i>	two-flowered cinquefoil	Blue	–
	<i>Piptatheropsis canadensis</i>	Canada ricegrass	Red	–
	<i>Carex xerantica</i>	dry-land sedge	Blue	–
	<i>Carex torreyi</i>	Torrey's sedge	Blue	–
	<i>Rosa arkansana</i>	Arkansas rose	Blue	–
	<i>Salix petiolaris</i>	meadow willow	Blue	–
	<i>Pinus albicaulis</i>	whitebark pine	Blue	Schedule 1- Endangered

Notes:

<sup>1</sup> BC Species and Ecosystems Explorer (BC CDC 2024a): Red List – includes species that are extirpated, endangered, or threatened in British Columbia, or are candidates for such designation; Blue List – considered to be of special concern (formerly vulnerable) in British Columbia because of characteristics that make them particularly sensitive to human activities or natural events

<sup>2</sup> Species at Risk Public Registry (SRPR 2024): Endangered – a species that is facing imminent extirpation or extinction; Threatened – a species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction

Source: BC CDC 2024a

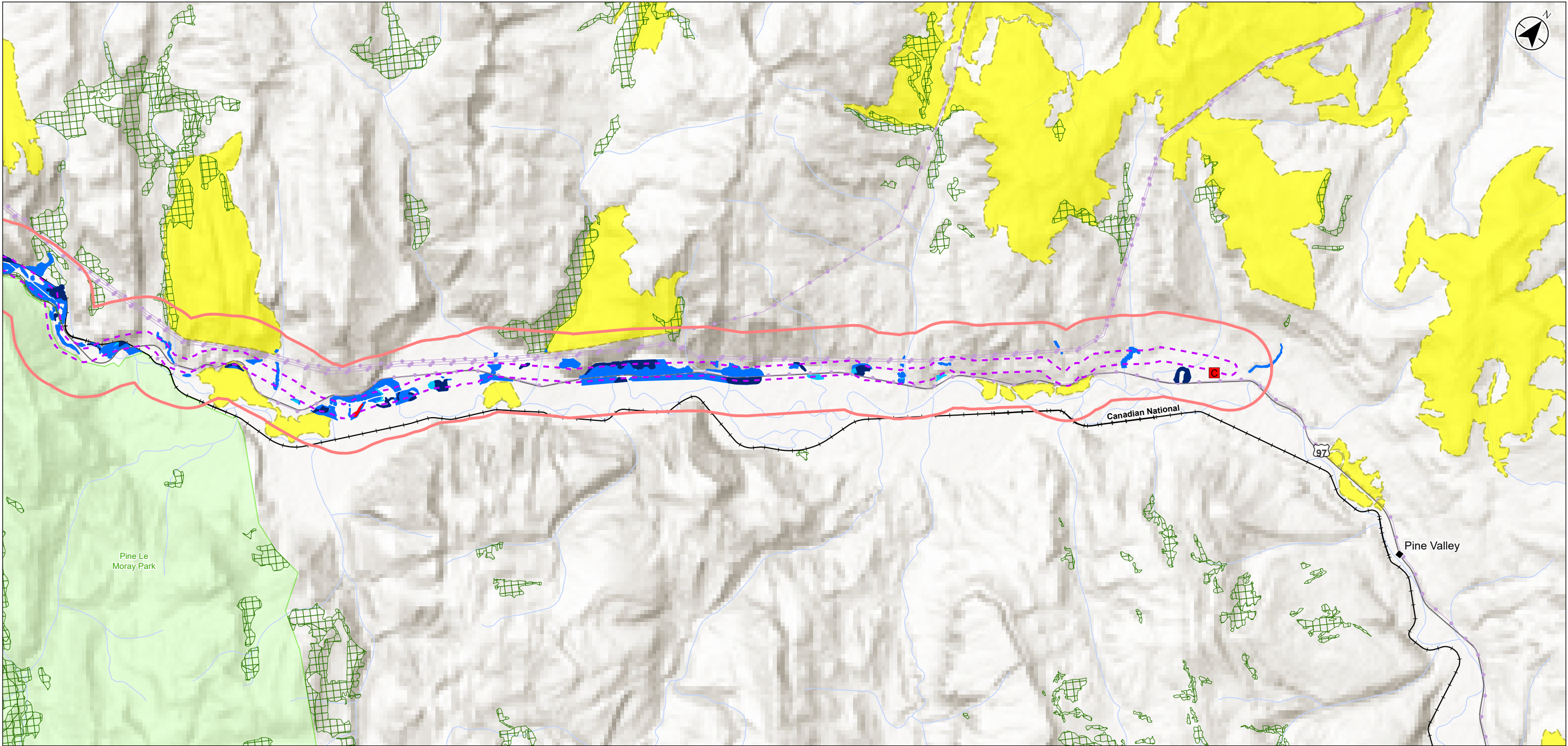
Search terms: Searches were completed through the BC CDC Species and Ecosystems Explorer tool by biogeoclimatic zone (BC CDC 2024b).





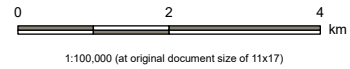
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**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
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|--|--|--|------------------------------------|
| ■ City, Town, Village or District Municipality | ■ First Nations Reserve  | ■ Compressor Station                               | ■ Blue-listed Ecological Community |
| — Highway                                      | ■ Old Growth Priority Deferral Area                              | ■ Vegetation and Wetlands Local Assessment Area    | ■ Red-listed Ecological Community  |
| — Local Street                                 | ■ Old Growth Management Area (Legal)                             | ■ Vegetation and Wetlands Regional Assessment Area | ■ Blue-listed Wetland              |
| — Railway                                      | ■ Parks, Protected Areas, Ecological Reserves, and Conservancies |  | ■ Non Listed Wetland               |
| — Transmission Line                            | ■ Waterbody  |  |                                    |
| — Watercourse                                  |  |  |                                    |



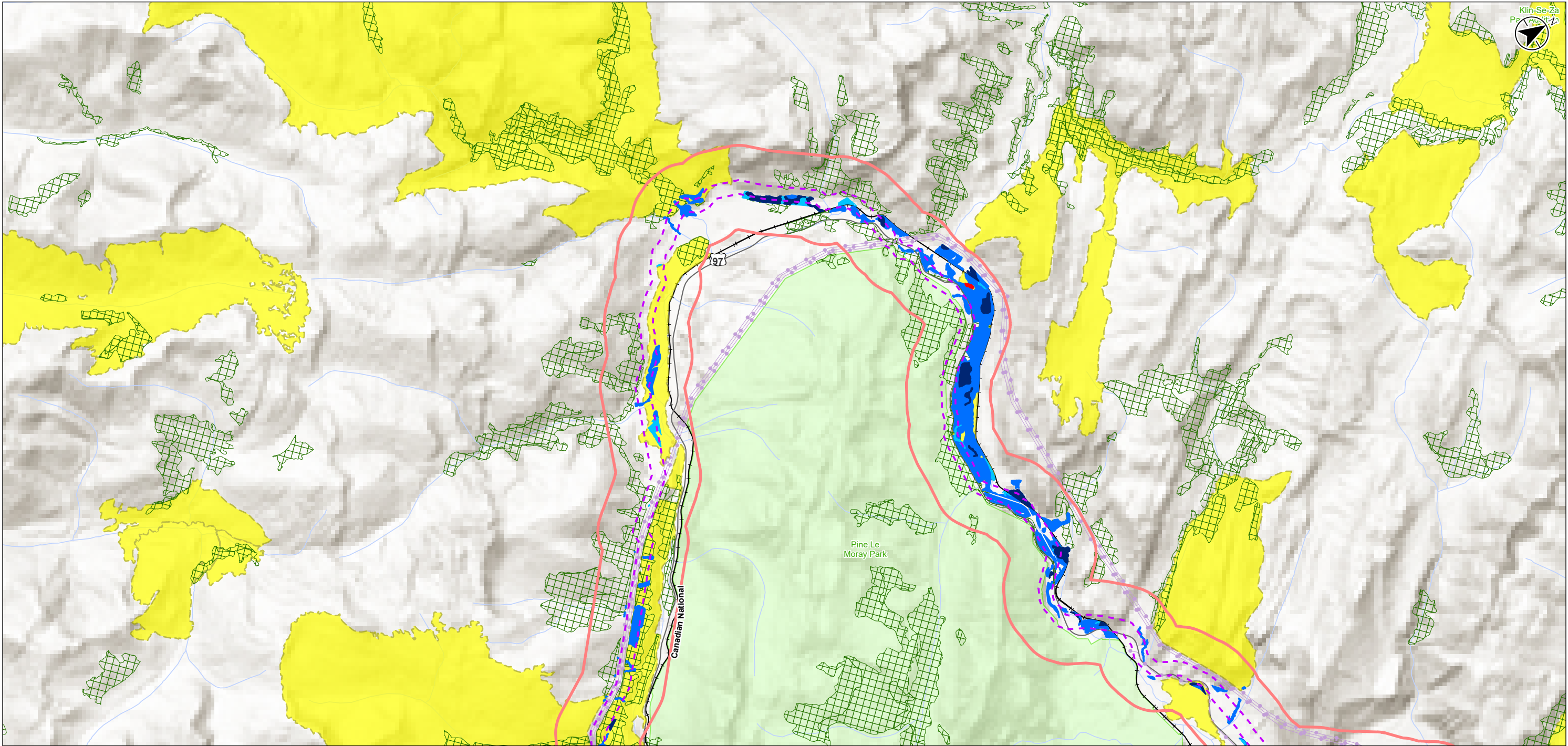
Project Location  
British Columbia  
Client/Project/Report  
Project Number 123514388  
Prepared by TQUILICHINI on 20240522  
Requested by CLION on 202404515  
Reviewed by NFORRESTER on 20240522

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Vegetation and Wetlands  
Figure No.  
**11.2**  
Title  
**RED- AND BLUE-LISTED ECOLOGICAL COMMUNITIES AND WETLANDS IN THE EAST AMENDMENT ROUTE**

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- City, Town, Village or District Municipality
- Highway
- Railway
- Transmission Line
- Watercourse

- First Nations Reserve
- Old Growth Priority Deferral Area
- Old Growth Management Area (Legal)
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Vegetation and Wetlands Local Assessment Area
- Vegetation and Wetlands Regional Assessment Area

- Blue-listed Ecological Community
- Red-listed Ecological Community
- Blue-listed Wetland
- Non Listed Wetland

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Project Location: Prince Rupert, British Columbia  
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Prepared by: TQUILICHINI on 20240522  
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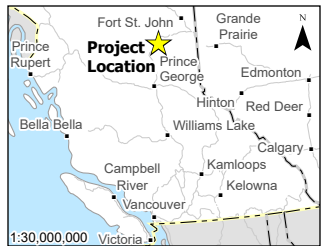
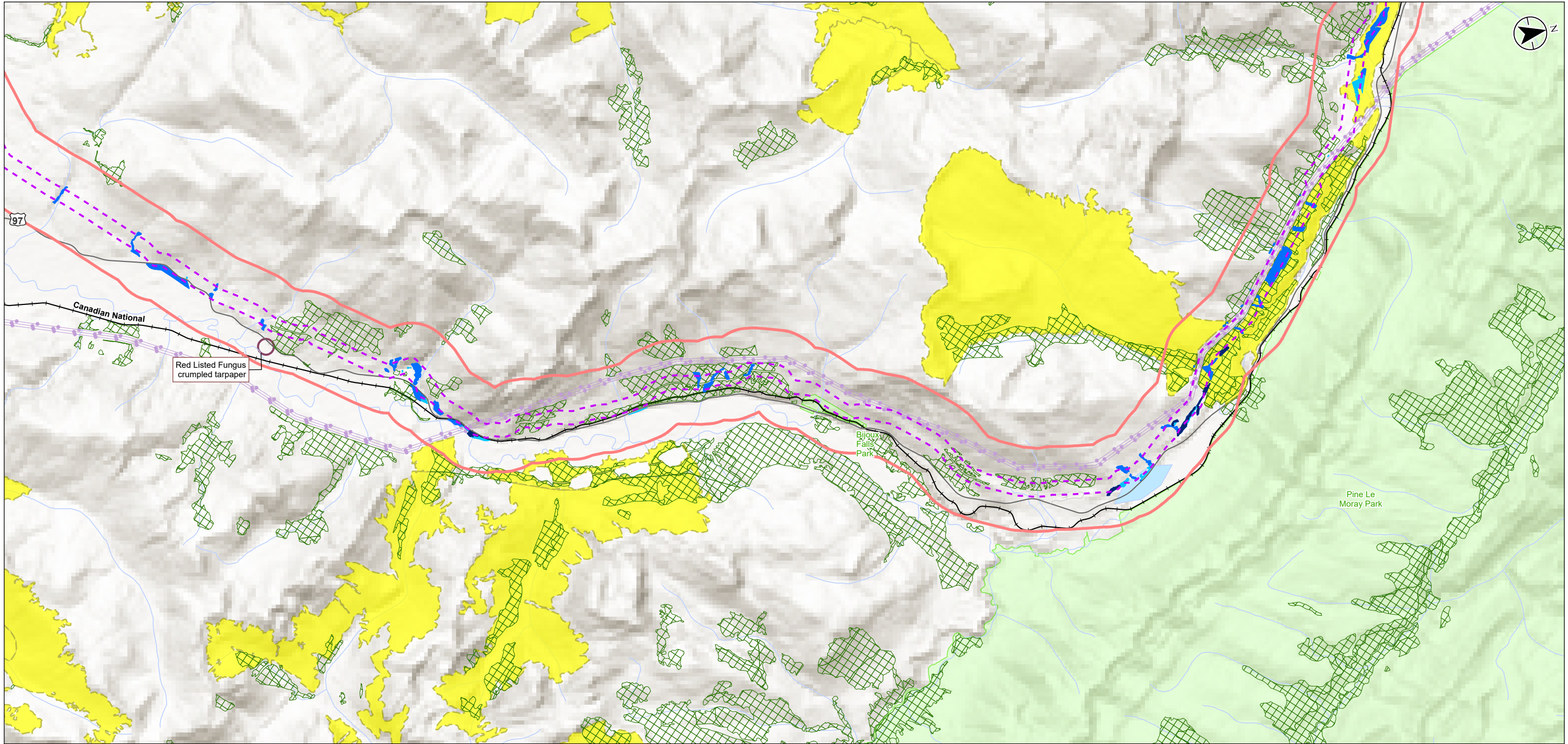
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Figure No. 11.2  
Title  
**RED- AND BLUE-LISTED ECOLOGICAL COMMUNITIES AND WETLANDS IN THE EAST AMENDMENT ROUTE**

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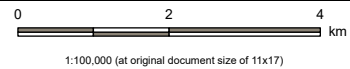
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- City, Town, Village or District Municipality
- Highway
- Local Street
- Railway
- Transmission Line
- Watercourse

- Endangered Species Occurrence (CDC)
- First Nations Reserve
- Old Growth Priority Deferral Area
- Old Growth Management Area (Legal)
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Vegetation and Wetlands Local Assessment Area
- Vegetation and Wetlands Regional Assessment Area

- Blue-listed Ecological Community
- Red-listed Ecological Community
- Blue-listed Wetland
- Non Listed Wetland



Project Location: Prince Rupert, British Columbia  
Project Number: 123514388  
Prepared by: TQUILICHINI on 20240522  
Requested by: CLION on 202404515  
Reviewed by: NFORRESTER on 20240522  
Client/Project/Report

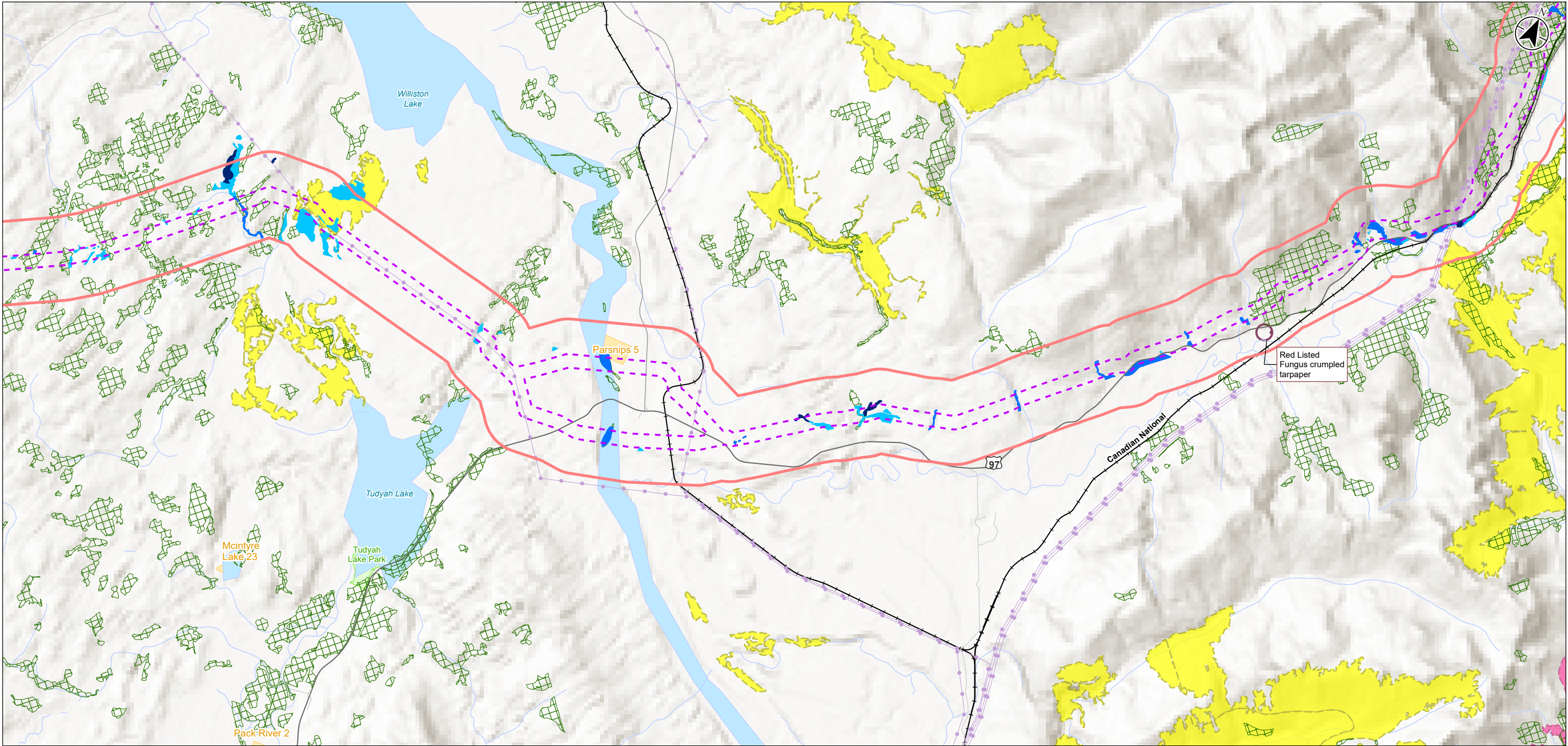
Prince Rupert Gas Transmission Ltd.  
Vegetation and Wetlands  
Figure No.  
**11.2**  
Title  
**RED- AND BLUE-LISTED ECOLOGICAL COMMUNITIES AND WETLANDS IN THE EAST AMENDMENT ROUTE**

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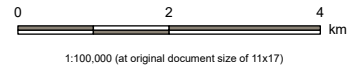


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**Stantec**

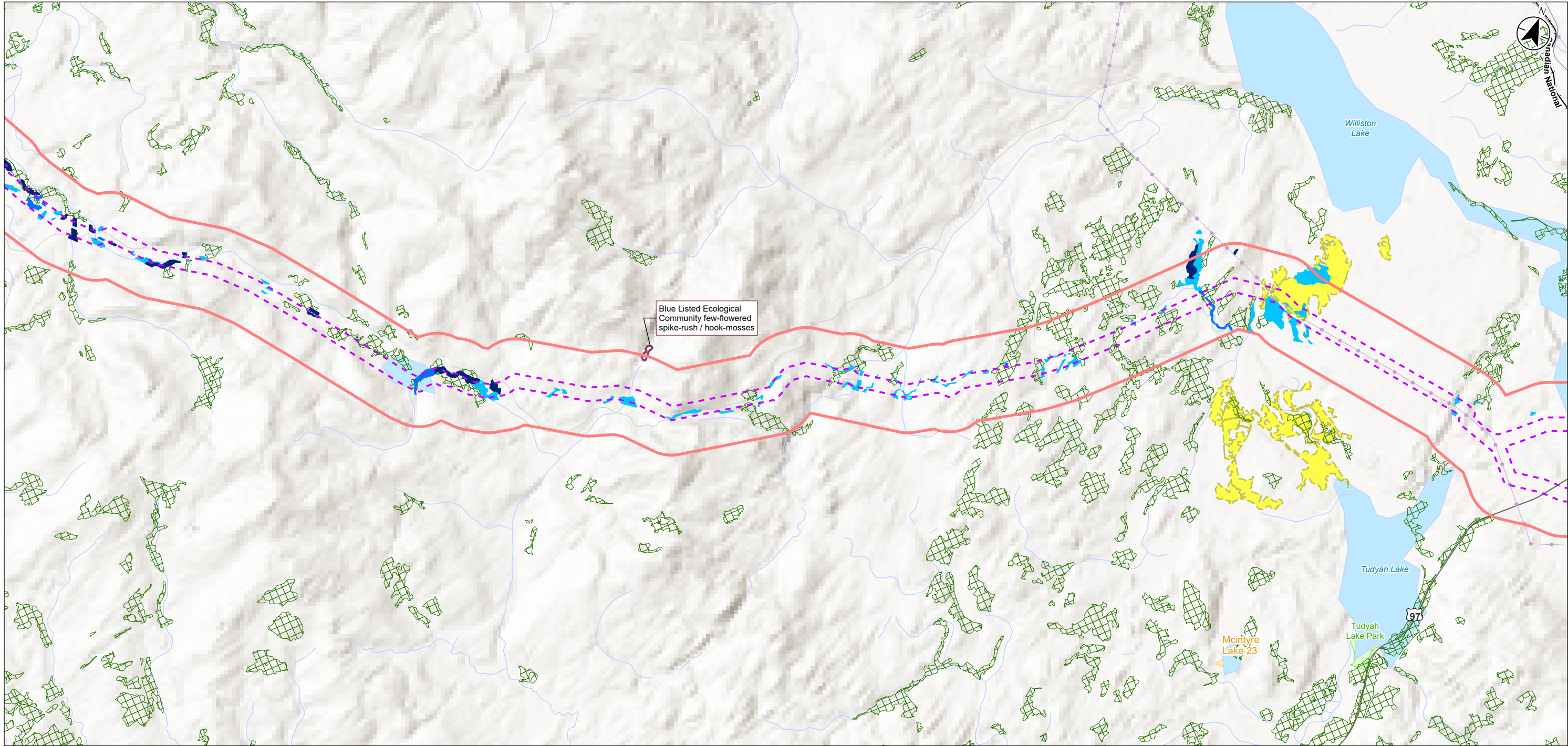
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Figure No. **11.2**  
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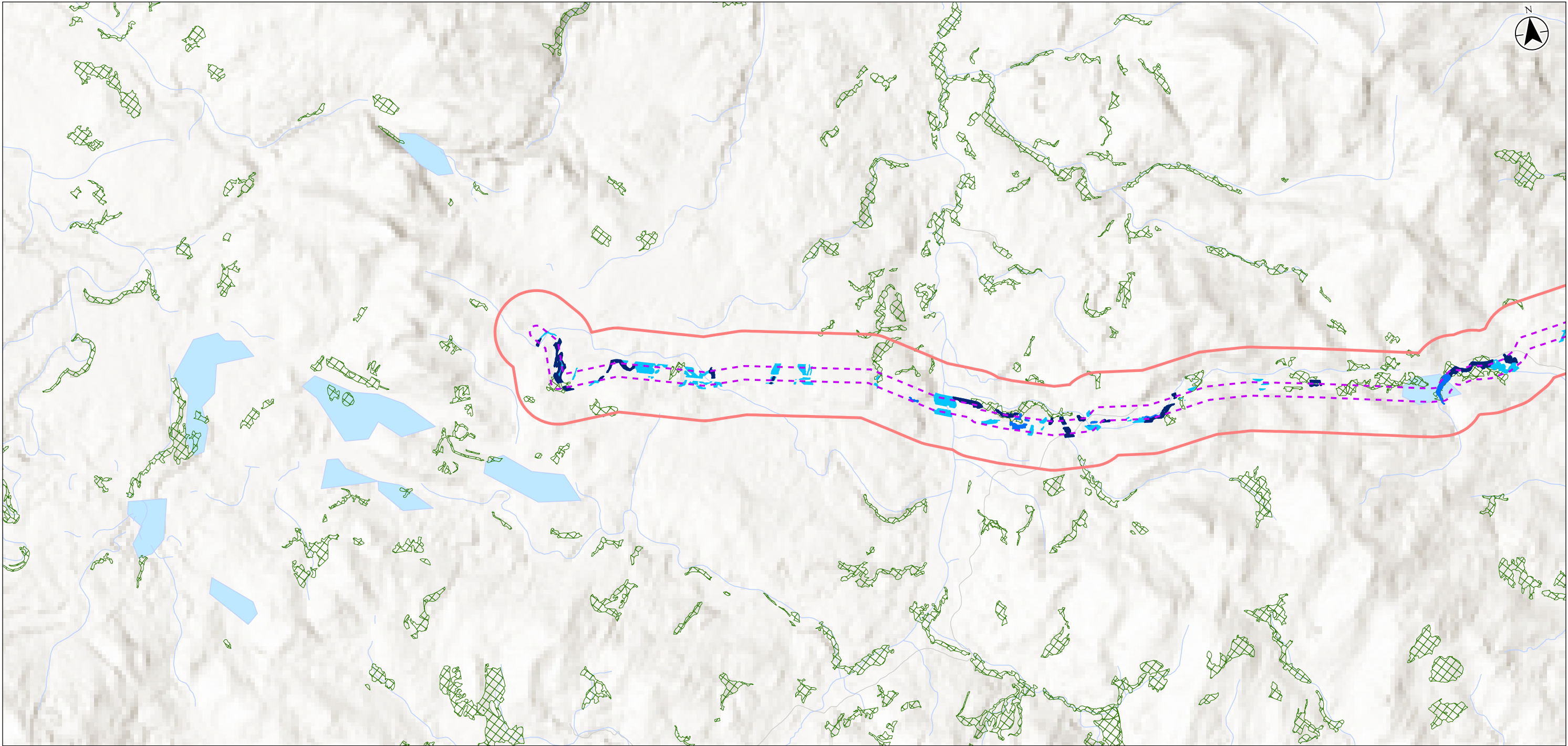
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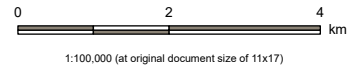
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Six species of cultural importance were described in the Application (PRGT 2014a). Pine mushroom (*Tricholoma magnivelare*) and large western redcedar (*Thuja plicata*) are not present within the Amendment RAA, based on the biogeoclimatic subzones described for each species in Appendix O of the Application (PRGT 2014a). The remaining species of cultural importance (black huckleberry [*Vaccinium membranaceum*], devil's club [*Oplopanax horridus*], labrador tea [*Rhododendron groenlandicum*] and soopolallie [*Shepherdia canadensis*]) are likely to be present across the RAA in suitable habitat.

Terrestrial ecosystem mapping was unavailable to complete habitat modelling for traditional use plant species, as was completed for the Application (PRGT 2014a). Instead, the percent of each biogeoclimatic subzone or variant where each species occurs (generally following the methods outlined in Appendix O; PRGT 2014a) is used as an estimate of potentially suitable habitat. This is a highly conservative approach as not all ecological communities within each biogeoclimatic subzone or variant will contain suitable habitat for the species. Black huckleberry, devil's club and Labrador tea have potential to be present in most (95 to 100%) of the LAA and RAA, within suitable habitat. As soopolallie is typically present in drier locations, it has potential to be present in only approximately 38% of the LAA and RAA where there is suitable habitat.

According to InvasivesBC (BC MOF 2024), there are 307 occurrences of 31 invasive plant species in the LAA (Table 11.2). There are 788 occurrences of invasive plant species in the RAA.

**Table 11.2 Invasive Plant Species in the Local Assessment Area**

Scientific Name	English Name	Weed Control Act Status	PRRD Status <sup>4</sup>	NWIPC - Prince George IPMA Status <sup>5</sup>	Occurrences in the LAA
<i>Sonchus oleraceus</i>	annual sow thistle	Provincial	Education and Awareness	-	2
<i>Silene vulgaris</i>	bladder campion	-	Education and Awareness	Low Priority	2
<i>Cirsium vulgare</i>	bull thistle	-	Education and Awareness	Low Priority	11
<i>Arctium</i> spp	burdock species	Regional <sup>1</sup>	Category A	Low Priority	1
<i>Rumex crispus</i>	curled dock	-	Education and Awareness	-	1
<i>Ranunculus repens</i>	creeping buttercup	-	-	-	2
<i>Cirsium arvense</i>	Canada thistle	Provincial	Category B	Low Priority	46
<i>Cichorium intybus</i>	chicory	-	Regional EDRR	High Priority	1
<i>Senecio vulgaris</i>	groundsel	-	Education and Awareness	-	6
<i>Crepis tectorum</i>	annual hawksbeard	-	Education and Awareness	-	13
<i>Hieracium</i> spp	yellow hawkweed species	-	Category A	Low Priority	17



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Scientific Name	English Name	Weed Control Act Status	PRRD Status <sup>4</sup>	NWIPC - Prince George IPMA Status <sup>5</sup>	Occurrences in the LAA
<i>Ranunculus acris</i>	meadow buttercup	-	Category B	-	4
<i>Hieracium pilosella</i>	mouse ear hawkweed	-	-	Regional EDRR	1
<i>Tragopogon pratensis</i>	meadow goats-beard	-	Regional EDRR	High Priority	4
<i>Hieracium caespitosum</i>	meadow hawkweed		-	-	1
<i>Verbascum thapsus</i>	mullein	-	Education and Awareness	-	4
<i>Silene noctiflora</i>	night-flowering catchfly	Regional <sup>2</sup>	Category B	-	3
<i>Leucanthemum vulgare</i>	oxeye daisy	Regional <sup>2</sup>	Category B	Low Priority	75
<i>Pilosella aurantiaca</i>	orange-red king devil	-	Category A	Low Priority	15
<i>Sonchus arvensis</i>	perennial sow thistle	Provincial	Education and Awareness	-	1
<i>Matricaria perforata</i>	scentless chamomile	Provincial	Category B	Low Priority	19
<i>Hypericum perforatum</i>	St. John's wort/Saint John's wort/ goatweed	-	Regional EDRR	High Priority	1
<i>Sonchus species</i>	sow thistle species	Provincial <sup>3</sup>	Education and Awareness	-	3
<i>Hieracium maculatum</i>	spotted hawkweed	-	-	High Priority	1
<i>Centaurea biebersteinii</i>	spotted knapweed	Provincial <sup>3</sup>	Category A	High Priority	2
<i>Tanacetum vulgare</i>	common tansy	-	Category A	High Priority	18
<i>Hieracium piloselloides</i>	tall hawkweed	-	-	-	12
<i>Tragopogon dubius</i>	western goat's-beard	-	-	-	2
<i>Hieracium glomeratum</i>	yellow devil hawkweed	-	-	-	5
<i>Hieracium pratense</i>	yellow hawkweed	-	Category A	Low Priority	33
<i>Linaria vulgaris</i>	yellow/common toadflax	Provincial	Category B	Low Priority	1

Notes

<sup>1</sup> Considered noxious in Fraser-Fort George Regional District and Peace River Regional District

<sup>2</sup> Considered noxious in Peace River Regional District



- <sup>3</sup> While these records are not identified to species, both perennial sow thistle (*Sonchus arvensis*) and annual sow thistle (*Sonchus oleraceus*) are considered provincially noxious.
- <sup>4</sup> Peace River Regional District status (PRRD 2022):
- Category A: high priority for eradication and containment; plants are competitive and pose a “significant” threat
  - Category B: medium priority for eradication and containment; plants spread quickly but are less aggressive than Category A
  - Education and Awareness; plants spread easily but containment requirements are site-specific
  - Regional early detection and rapid response (EDRR): new to the area and pose a significant threat
- <sup>5</sup> Northwest Invasive Plant Council (NWIPC) Prince George Invasive Plant Management Area (IPMA) status (NWIPC 2020):
- High Priority: limited populations but high potential to spread
  - Low Priority: may be widespread, or of concern in specific areas
  - Regional EDRR: new to the area and pose a significant threat

## 11.1.2 Ecological Communities of Interest

Thirteen red- or blue-listed ecological communities with potential to occur in the vicinity of the Amendment were identified during the desktop review, including two red-listed and 11 (eleven) blue-listed upland forest, grassland, flood, and wetland communities (Table 11.3).

**Table 11.3 Listed Ecological Communities that may occur in the Amendment**

Ecosystem Group	Scientific Name	English Name	BC List <sup>1</sup>	Biogeoclimatic Unit
Wetland	<i>Carex lasiocarpa</i> / <i>Drepanocladus aduncus</i>	slender sedge / common hook-moss	Blue	SBSmk1/Wf05
	<i>Carex limosa</i> - <i>Menyanthes trifoliata</i> / <i>Sphagnum</i> spp.	shore sedge - buckbean / peat-mosses	Blue	SBSmk1/Wb13
	<i>Eriophorum angustifolium</i> - <i>Carex limosa</i>	narrow-leaved cotton-grass-shore sedge	Blue	SBSwk2/Wf13
	<i>Picea glauca</i> - <i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> / <i>Aulacomnium palustre</i>	white spruce - black spruce / Labrador-tea / glow moss	Blue	BWBSmw/Ws13
	<i>Schoenoplectus acutus</i> Deep Marsh	hard-stemmed bulrush Deep Marsh	Blue	BWBSmw/Wm06
	<i>Typha latifolia</i> Marsh	common cattail marsh	Blue	BWBSmw/Wm05
Terrestrial - Flood	<i>Populus balsamifera</i> - <i>Picea glauca</i> / <i>Alnus incana</i> - <i>Cornus sericea</i>	balsam poplar - white spruce / mountain alder - red-osier dogwood	Blue	BWBSmw/112
	<i>Salix exigua</i> Shrubland	narrow-leaf willow Shrubland	Red	BWBSmw/FI06





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Ecosystem Group	Scientific Name	English Name	BC List <sup>1</sup>	Biogeoclimatic Unit
Terrestrial - Forest	<i>Picea glauca</i> / <i>Gymnocarpium dryopteris</i> - <i>Aralia nudicaulis</i>	white spruce / oak fern - wild sarsaparilla	Blue	BWBSmw/110
	<i>Picea glauca</i> / <i>Ribes triste</i> / <i>Equisetum</i> spp.	white spruce / red swamp currant / horsetails	Blue	BWBSmw/111
	<i>Pinus contorta</i> / <i>Vaccinium membranaceum</i> / <i>Cladina</i> spp.	lodgepole pine / black huckleberry / reindeer lichens	Blue	SBSwk2/02
	<i>Pseudotsuga menziesii</i> - <i>Picea engelmannii</i> x <i>glauca</i> / <i>Ptilium crista-castrensis</i>	Douglas-fir - hybrid white spruce / knight's plume	Blue	SBSmk1/04
Terrestrial - Grassland	<i>Juncus arcticus</i> - <i>Puccinellia nuttalliana</i> - <i>Suaeda calceoliformis</i>	arctic rush - Nuttall's alkaligrass - seablite	Red	BWBSmw/00

Notes:

<sup>1</sup> BC Species and Ecosystems Explorer (BC CDC 2024b): Red List – includes species that are extirpated, endangered, or threatened in British Columbia, or are candidates for such designation; Blue List – considered to be of special concern (formerly vulnerable) in British Columbia because of characteristics that make them particularly sensitive to human activities or natural events.

Source: BC CDC 2024a

Search Parameters: The BC CDC Species and Ecosystems Explorer was queried with filters of Natural Resource District and biogeoclimatic subzone, and variant when applicable.

There are no known historical occurrences of red- or blue-listed ecological communities within the LAA (BC CDC 2024a). There is one known occurrence of blue-listed few-flowered spike-rush / hook-mosses fen (*Eleocharis quinqueflora* / *Drepanocladus* spp. fen) within the RAA (BC CDC 2024a).

Project-specific mapping delineated 15 blue-listed ecological communities and one red-listed ecological community within the LAA (Table 11.4).

**Table 11.4 Listed Ecological Communities Mapped in the Local Assessment Area**

Biogeoclimatic Variant	Site Series	Scientific Name	English Name	BC List <sup>1</sup>
<b>Upland Forest</b>				
SBSwk2	02	<i>Pinus contorta</i> / <i>Vaccinium membranaceum</i> / <i>Cladonia</i> spp.	Lodgepole pine - Huckleberry - Cladina	Blue
SBSmk1	04	<i>Picea engelmannii</i> x <i>glauca</i> – <i>Pseudotsuga menziesii</i> – <i>Ptilium crista-castrensis</i>	Engelmann x white spruce Douglas fir - Knight's plume	Blue
SBSwk2	06	<i>Picea engelmannii</i> x <i>glauca</i> – <i>Equisetum</i> spp.	Engelmann x white spruce - Horsetail	Blue
SBSmk1	09a	<i>Picea engelmannii</i> x <i>glauca</i> – <i>Equisetum</i> spp. fluvial phase	Engelmann x white spruce - Horsetail, fluvial phase	Blue
BWBSmw	111	<i>Picea glauca</i> / <i>Ribes triste</i> / <i>Equisetum</i> spp.	White spruce - Currant - Horsetail	Blue



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Biogeoclimatic Variant	Site Series	Scientific Name	English Name	BC List <sup>1</sup>
BWBSmw	112	<i>Populus balsamifera</i> - <i>Picea glauca</i> / <i>Alnus incana</i> - <i>Cornus sericea</i>	Balsam poplar - white spruce - mountain alder - dogwood	Blue
<b>Floodplain</b>				
BWBSmw, SBSmk1, SBSwk2	FI01	<i>Alnus incana</i> / <i>Equisetum arvense</i>	Mountain alder - common horsetail	Blue
SBSwk2	FI05	<i>Salix drummondiana</i> / <i>Calamagrostis canadensis</i>	Drummond's willow - Bluejoint	Blue
SBSwk2	FI06	<i>Salix exigua</i> Shrubland	Narrow-leaf willow shrubland	Red
SBSwk2	Fm02	<i>Populus trichocarpa</i> - <i>Picea engelmannii</i> x <i>glauca</i> / <i>Cornus sericea</i>	Cottonwood - Spruce - Red-osier dogwood	Blue
<b>Wetland - Bog</b>				
SBSmk1	Wb01	<i>Picea mariana</i> / <i>Gaultheria hispida</i> / <i>Sphagnum</i> spp.	Black spruce - creeping-snowberry - peat -moss	Blue
<b>Wetland - Marsh</b>				
SBSwk2	Wm02	<i>Equisetum fluviatile</i> - <i>Carex utriculata</i>	Swamp horsetail - beaked sedge	Blue
<b>Wetland - Swamp</b>				
SBSmk1, SBSwk2	Ws03	<i>Salix bebbiana</i> / <i>Calamagrostis canadensis</i>	Bebb's willow - bluejoint	Blue
SBSwk2	Ws06	<i>Salix sitchensis</i> / <i>Carex sitchensis</i>	Sitka willow - Sitka sedge	Blue
SBSwk2	Ws07	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	Engelmann x white spruce - horsetail - leafy moss	Blue
SBSmk1	09a	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. organic phase	Engelmann x white spruce - horsetail, organic phase	Blue

Notes:

<sup>1</sup> BC Species and Ecosystems Explorer (BC CDC 2024a): Red List – includes species that are extirpated, endangered, or threatened in British Columbia, or are candidates for such designation; Blue List – considered to be of special concern (formerly vulnerable) in British Columbia because of characteristics that make them particularly sensitive to human activities or natural events

The BC List status in this table considers structural stage and follows Blue- and Red- determination procedures used in the Application (PRGT 2014a).

According to the BC Freshwater Atlas, there are approximately 100 ha of wetlands in the LAA and approximately 1,020 ha of wetlands in the RAA (British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development [BC MFLNRORD] 2018).



Project-specific mapping identified 23 wetland associations across five wetland classes (Table 11.5).

**Table 11.5 Wetland Ecological Communities Mapped in the Local Assessment Area**

Biogeoclimatic Variant	Wetland Association / Site Series	Scientific Name	English Name
<b>Wetland – Bog</b>			
SBSmk1	Wb01	<i>Picea mariana</i> / <i>Gaultheria hispidula</i> / <i>Sphagnum</i> spp.	black spruce - creeping-snowberry – peat-moss
SBSmk1, SBSwk2	10/ Wb05	<i>Picea mariana</i> / <i>Carex aquatilis</i> / <i>Sphagnum</i> spp.	black spruce - water sedge - peat moss
SBSmk1 SBSwk2	Wb08	<i>Picea mariana</i> / <i>Carex disperma</i> / <i>Sphagnum</i> spp.	black spruce - soft-leaved sedge - sphagnum
SBSwk2	Wb09	<i>Picea mariana</i> / <i>Equisetum arvense</i> / <i>Sphagnum</i> spp.	black spruce - common horsetail - peat-moss
SBSmk1	Wb	N/A	undifferentiated bog
<b>Wetland – Fen</b>			
ESSFmv2, SSmk1, SBSwk2	Wf01	<i>Carex aquatilis</i> – <i>Carex utriculata</i>	water sedge - beaked sedge
SBSmk1 SBSwk2	Wf02	<i>Betula nana</i> / <i>Carex aquatilis</i>	scrub birch - water sedge
SBSwk2	Wf03	<i>Carex aquatilis</i> / <i>Sphagnum</i> spp.	water sedge - peat moss
SSmk1, SBSwk2	Wf04	<i>Salix barclayi</i> / <i>Carex aquatilis</i> / <i>Aulacomnium palustre</i>	Barclay's willow - water sedge - glow moss
SBSmk1	Wf07	<i>Betula nana</i> / <i>Menyanthes trifoliata</i> - <i>Carex limosa</i>	scrub birch - buckbean - shore sedge
SBSmk1	Wf	N/A	undifferentiated fen
<b>Wetland – Marsh</b>			
SBSmk1 SBSwk2	Wm01	<i>Carex utriculata</i> – <i>Carex aquatilis</i>	beaked sedge - water sedge
SBSwk2	Wm02	<i>Equisetum fluviatile</i> - <i>Carex utriculata</i>	swamp horsetail - beaked sedge
BWBSmw, SBSmk1 SBSwk2	Wm	N/A	undifferentiated marsh
<b>Wetland – Swamp</b>			
SBSmk2, SBSwk2	Ws03	<i>Salix bebbiana</i> / <i>Calamagrostis canadensis</i>	Bebb's willow – bluejoint reedgrass
SBSmk2, SBSwk2	Ws04	<i>Salix drummondiana</i> / <i>Carex rostrata</i>	Drummonds willow – beaked sedge
SBSwk2	Ws06	<i>Salix sitchensis</i> / <i>Carex sitchensis</i>	Sitka willow - Sitka sedge
SBSwk2	Ws07	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	Engelmann x white spruce - Horsetail - Leafy Moss



Biogeoclimatic Variant	Wetland Association / Site Series	Scientific Name	English Name
SBSmk1	09b / Ws07	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. organic phase	Engelmann x white spruce - Horsetail, organic phase
ESSFmv3	Ws08	<i>Abies lasiocarpa</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	subalpine fir / horsetails / leafy mosses
ESSFmv3, SBSmk1, SBSwk2	Ws	N/A	undifferentiated swamp
<b>Wetland – Shallow Open Water</b>			
SBSmk1, SBSwk2	Ww	N/A	shallow open water
<b>Wetland – Disturbed</b>			
BWBSmw, SBSwk2	Wd	N/A	disturbed wetland

Note:

This table includes all wetlands, including red-, blue- and yellow-listed wetlands.

There are approximately 287 ha of old growth management areas (OGMAs) in the LAA, and 2,267 ha in the RAA (Figure 11.2). There are no non-legal OGMAs in the Project footprint, LAA, or RAA. Legal OGMAs are declared in an old-growth order, whereas non-legal OGMAs are not declared in an old-growth order (Forest Practices Board [FPB] 2012).

There are 75 old growth deferral areas (OGDAs) totalling approximately 203 ha in the LAA. There are approximately 751 ha of OGDAs in the LAA and 3,286 ha in the RAA (Figure 11.2). Old growth deferral areas were identified through a provincial panel and include big-treed old growth, ancient forest, and remnant old growth (Old Growth Technical Advisory Panel [OG TAP] 2021).

## 11.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to vegetation and wetland resources. Doig River First Nation, Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Saulteau First Nations, Takla Nation, and West Moberly First Nations each identified an interest in harvesting plants (Firelight 2014a, 2014b, 2015; DMCS and Halfway River First Nation 2014; CSTC 2014b; TLFN and Sharp 2014; WMFN 2015). This feedback has been considered and summarized in Table 11.6 and has been integrated into the vegetation and wetland resources effects assessment.



**Table 11.6 Summary of Engagement Feedback Related to Vegetation and Wetland Resources**

<b>Comment</b>	<b>Sources</b>	<b>PRGT Response</b>
<p>Doig River First Nation expressed concern that harvested animals show signs of illness and attributed this to contamination of plants from chemicals found in industrial areas and herbicides sprayed for clearing areas.</p> <p>Doig River First Nation has previously expressed concerns regarding the effects of industry and development on traditionally important plants, including contamination, habitat loss and invasive species.</p> <p>Doig River First Nation identified important harvesting habitat in the Pine River and John Hart Highway areas (which are intersected and paralleled by the Eastern Route Alternative), Callazon Creek (crossed by the Eastern Route Alternative), and Tudyah Lake and Windy Point Lake (within the Indigenous Interests LAA).</p>	<p>Firelight 2014a; Fasken Martineau 2013a; Doig River First Nation 2023b; CER 2020; AiM 2021a, 2021b; NGTL 2015a, 2015b</p>	<ul style="list-style-type: none"> <li>• The Application (PRGT 2014a) included the following mitigation measure related to herbicide use, which will be applied to the Amendment: <ul style="list-style-type: none"> <li>- Restrict the general application of herbicide near identified traditional-use species and rare plant communities. Spot spraying, wicking, mowing or hand-picking are acceptable measures for weed control in these areas (PRGT 2016).</li> </ul> </li> </ul> <p>Change in traditional use plants are considered in Section 11.3.1.1 the Amendment.</p> <p>PRGT acknowledges that Doig River First Nation has identified important harvesting habitat in these areas and will continue to engage with Doig River First Nation around how these areas will be managed during construction planning.</p>
<p>The protection of wetlands is a priority for Halfway River First Nation, and Nation members previously expressed concerns regarding development-driven effects on wetlands. Halfway River First Nation also previously expressed concern around large forestry cut blocks (as well as other developments) that have contributed to the introduction of invasive species in its territory, as these invasive species are perceived to degrade the environment and overall habitat function for plant species of cultural importance.</p>	<p>PRGT 2014a; TERA 2014c; Spectra Energy 2019; Stantec 2021</p>	<ul style="list-style-type: none"> <li>• The Application (PRGT 2014a) included mitigation measures related to wetlands, which will be applied to the Amendment. Potential effects of the Amendment on wetlands have been described in this Amendment.</li> <li>• Mitigation measures from the Application (PRGT 2014a) and CEMP (such as the Invasive Plant Species and Vegetation Management Plan) applicable to invasive species will be implemented.</li> <li>• Change in wetlands is included in Section 11.3.1.2 of the Amendment.</li> </ul>
<p>McLeod Lake Indian Band requested access controls to be implemented, with revegetation to occur following the completion of construction.</p>	<p>January 2024 engagement</p>	<ul style="list-style-type: none"> <li>• The Application (PRGT 2014a) and CEMP included mitigation measures related to access management, such as the Access Management Plan and the Reclamation Program, which will be applicable to the Amendment. In addition, the effectiveness of reclamation and access control measures during post-construction monitoring will be monitored by PRGT.</li> </ul>



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Comment	Sources	PRGT Response
<p>McLeod Lake Indian Band expressed concerns regarding the chemical contamination of berries.</p>	<p>NGTL 2015c; Firelight 2015</p>	<ul style="list-style-type: none"> <li>• The Application (PRGT 2014a) included the following mitigation measure related to herbicide use, which will be applied to the Amendment: <ul style="list-style-type: none"> <li>- Restrict the general application of herbicide near identified traditional-use species and rare plant communities. Spot spraying, wicking, mowing or hand-picking are acceptable measures for weed control in these areas (BC MOE 2012).</li> </ul> </li> <li>• Traditional use plants are considered in Section 11.3.1.1 the Amendment.</li> </ul>
<p>Nak'azdli Whut'en previously raised concerns about potential effects to gathering practices including changes in habitat, effects to culturally critical plant species, real or perceived contamination of medicinal plants, reduced plant diversity and increased invasive species.</p> <p>Nak'azdli Whut'en previously identified harvesting areas in the Phillip Creek area, which is intersected by the Eastern Route Alternative.</p>	<p>EAO 2014a</p>	<ul style="list-style-type: none"> <li>• The Application (PRGT 2014a) included the following mitigation measure related to herbicide use, which will be applied to the Amendment: <ul style="list-style-type: none"> <li>- Restrict the general application of herbicide near identified traditional-use species and rare plant communities. Spot spraying, wicking, mowing or hand-picking are acceptable measures for weed control in these areas (BC MOE 2012).</li> </ul> </li> <li>• Traditional use plants are considered in Section 11.3.1.1 the Amendment.</li> <li>• PRGT acknowledges that Nak'azdli Whut'en has identified important harvesting habitat in this area and will continue to engage with Nak'azdli Whut'en around how this area will be managed during construction planning.</li> </ul>
<p>Saulteau First Nations noted that traditionally important plants have been affected by industrial developments, increased traffic and road networks due to dust (PRGT 2014a). It was also reported that the herbicides sprayed on the cleared spaces and roads have caused harvesters to avoid these areas due to fears of contamination. Pine River was previously identified as a harvesting areas, which is intersected and paralleled by the Eastern Route Alternative.</p>	<p>Firelight 2014b</p>	<ul style="list-style-type: none"> <li>• The Application (PRGT 2014a) included the following mitigation measure related to herbicide use, which will be applied to the Amendment: <ul style="list-style-type: none"> <li>- Restrict the general application of herbicide near identified traditional-use species and rare plant communities. Spot spraying, wicking, mowing or hand-picking are acceptable measures for weed control in these areas (BC MOE 2012).</li> </ul> </li> <li>• Traditional use plants are considered in Section 11.3.1.1 the Amendment.</li> <li>• PRGT acknowledges that Saulteau First Nations has identified important harvesting habitat in these areas and will continue to engage with Saulteau First Nations around how these areas will be managed during construction planning.</li> </ul>



Comment	Sources	PRGT Response
Contamination is a concern for West Moberly First Nation; the Nations has previously stated that there are no clean areas left in which to harvest plants. Pesticides, chemicals, industrial activities, and dust from roads are ongoing issues faced by West Moberly First Nations, and that medicinal plants are especially sensitive to industrial developments.	CTQ 2014; WMFN 2014; NGTL 2015c	<ul style="list-style-type: none"> <li>The Application (PRGT 2014b) included the following mitigation measure related to herbicide use, which will be applied to the Amendment: <ul style="list-style-type: none"> <li>Restrict the general application of herbicide near identified traditional-use species and rare plant communities. Spot spraying, wicking, mowing or hand-picking are acceptable measures for weed control in these areas (BC MOE 2012).</li> </ul> </li> <li>Traditional use plants are considered in Section 11.3.1.1 the Amendment.</li> </ul>

## 11.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, additional mitigation measures (to the 2014 EAC), anticipated residual effects, changes to the EAO Assessment Report (EAO 2014a) and Application (PRGT 2014a) effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment.

The Amendment will include the same indicators (defined in Table 13-1 of the Application; PRGT 2014a) as the Application (PRGT 2014a), except that pine mushroom and western redcedar are not included, as habitat for these species is not present. In addition to OGMAs, OGDAs will be considered in the assessment on old forest.

### 11.3.1 Potential Effects and Mitigation Measures

The Amendment considers two potential effects on vegetation and wetland resources: change in abundance of plant species of interest, and change in abundance or condition of ecological communities of interest (Table 11.1).

**Table 11.7 Measurable Parameters for Vegetation and Wetland Resources**

Potential Effect	Measurable Parameter(s)
Change in plant species of interest	<ul style="list-style-type: none"> <li>Frequency and abundance (density or cover) of federally- or provincially-listed plant species at risk</li> <li>Qualitative risk for introduction of invasive plant species</li> <li>Area of potential habitat for traditional-use plants</li> </ul>
Change in ecological communities of interest	<ul style="list-style-type: none"> <li>Area of ecological communities of interest affected (including red- and blue-listed communities, wetlands, old forests, and those crossed by Project infrastructure) (ha)</li> </ul>





The Amendment route is approximately 172 km and would replace approximately 223 km of the approved eastern end of the Project (see Section 2). The Amendment reduces adverse effects on vegetation and wetland resources relative to the portion of the Project it replaces, because the route is in a highly disturbed area (approximately 45% of the footprint has been disturbed by existing linear infrastructure, forestry, recreation, and agriculture) and is up to 60 km shorter.

Project activities that are anticipated to be undertaken for the Amendment and have potential to affect vegetation and wetland resources are unchanged from those presented in the Application (PRGT 2014a) and will include site preparation of the pipeline footprint, including survey, clearing, topsoil salvaging and stockpiling, and grading.

#### **11.3.1.1 Change in Plant Species of Interest**

The Amendment has the potential to cause a change in the abundance of plant species of interest, including plant species at risk, plants of cultural importance, and invasive plant species. A primarily qualitative approach is used to assess potential effects on plant species of interest. In the absence of a quantitative approach, there are attributes of the Amendment that support a qualitative assessment:

- The Amendment is primarily in a well-travelled and well-studied area where other major projects (e.g., Enbridge T-South, BC Hydro transmission line), infrastructure (e.g., Highway 97, railway), and human development (e.g., recreational areas, forestry, agricultural, and residential) have occurred.
- The Amendment route is less remote than the section of the approved route it would replace and existing conditions are more disturbed by major projects and infrastructure.
- The Amendment will be adjacent to, or partially overlap with, existing disturbance to the extent feasible, and will do so more than the section of the approved route it would replace. Approximately 777 ha (45%) of the Project footprint overlaps existing disturbance, including 189 ha of the Enbridge T-South right-of-way.
- The Amendment is shorter, by approximately 60 km, than the section of the approved route it would replace.

No plant species at risk were identified in the Project footprint in the desktop review and the Amendment is in an area that has been disturbed by linear features such as Highway 97, a BC Hydro transmission line and other disturbed areas. Because of this, the likelihood of a rare plant occurring is lower; however, some species do use disturbed sites.

Species of cultural importance are expected to occur in suitable habitat across the Amendment. None of these species are considered uncommon, and construction could increase suitable habitat for some species (e.g., black huckleberry and soopolallie) after clean-up and reclamation have occurred.

Invasive plant species are common across the Project footprint and will require management to reduce the potential for construction activities spreading these species further.



Mitigation measures for plant species of interest established in the Application and CEMP (PRGT 2016) will also be applied to the Eastern Route Alternative; and are presented in Table 13-25 of the Application (PRGT 2014a). Mitigation measures developed under Condition 25 of the EAC will be applied to the Eastern Route Alternative. Pre-construction surveys will be consistent with the requirements of Condition 25.

#### **11.3.1.2 Change in Ecological Communities of Interest**

The Eastern Route Alternative has the potential to cause a change in abundance or condition of ecological communities of interest, including red- and blue-listed ecological communities, old forest (i.e., OGMA and OGDAs), and wetlands. No known occurrences of ecological communities at risk were identified in the Project footprint in the desktop review.

There are approximately 72.5 ha of blue-listed ecological communities representing upland forest, floodplain and wetland in the Project footprint, representing approximately 27% of these communities in the LAA (Table 11.8; Figure 11.2), and less than 0.1 ha of red-listed narrow-leaf willow (*Salix exigua*) floodplain in the Project footprint. The cottonwood – spruce – red-osier dogwood mid-bench floodplain is the most abundant, blue-listed ecological community, representing 48.7 ha of the Project footprint and 67% of blue-listed ecological communities in the footprint. The extent of the red-listed floodplain community requires field confirmation.



**Table 11.8 Listed Ecological Communities Mapped in the Local Assessment Area**

Biogeoclimatic Variant	Site Series	Scientific Name	English Name	BC List <sup>1</sup>	Area in Footprint (ha)	Area in LAA (ha)	Percent in Footprint (%)
<b>Upland Forest</b>							
SBSwk2	02	<i>Pinus contorta</i> / <i>Vaccinium membranaceum</i> / <i>Cladonia</i> spp.	Lodgepole pine - huckleberry - cladina	Blue	0.4	3.3	13
SBSmk1	04	<i>Picea engelmannii</i> x <i>glauca</i> – <i>Pseudotsuga menziesii</i> – <i>Ptilium crista-castrensis</i>	Engelmann x white spruce - Douglas-fir - Knight's plume	Blue	0.6	2.9	22
SBSwk2	06	<i>Picea engelmannii</i> x <i>glauca</i> – <i>Equisetum</i> spp.	Engelmann x white spruce - horsetail	Blue	10.7	59.1	18
SBSmk1	09a	<i>Picea engelmannii</i> x <i>glauca</i> – <i>Equisetum</i> spp. fluvial phase	Engelmann x white spruce - horsetail, fluvial phase	Blue	1.0	7.3	13
BWBSmw	111	<i>Picea glauca</i> / <i>Ribes triste</i> / <i>Equisetum</i> spp.	White spruce - currant - horsetail	Blue	0.4	0.6	60
BWBSmw	112	<i>Populus balsamifera</i> - <i>Picea glauca</i> / <i>Alnus incana</i> - <i>Cornus sericea</i>	Balsam poplar - white spruce - mountain alder - dogwood	Blue	0.5	2.9	19
<b>Total Upland Forest</b>					<b>13.6</b>	<b>76.0</b>	<b>18</b>
<b>Floodplain</b>							
BWBSmw, SBSmk1, SBSwk2	FI01	<i>Alnus incana</i> / <i>Equisetum arvense</i>	Mountain alder - common horsetail	Blue	3.4	24.2	14
SBSwk2	FI05	<i>Salix drummondiana</i> / <i>Calamagrostis canadensis</i>	Drummond's willow - bluejoint	Blue	<0.1	0.1	18
SBSwk2	FI06	<i>Salix exigua</i> Shrubland	Narrow-leaf willow shrubland	Red	<0.1	0.1	7
SBSwk2	Fm02	<i>Populus trichocarpa</i> - <i>Picea engelmannii</i> x <i>glauca</i> / <i>Cornus sericea</i>	Cottonwood - spruce - red-osier dogwood	Blue	48.7	134.0	36
<b>Total Floodplain</b>					<b>52.1</b>	<b>158.4</b>	<b>33</b>



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Biogeoclimatic Variant	Site Series	Scientific Name	English Name	BC List <sup>1</sup>	Area in Footprint (ha)	Area in LAA (ha)	Percent in Footprint (%)
<b>Wetland - Bog</b>							
SBSmk1	Wb01	<i>Picea mariana</i> / <i>Gaultheria hispidula</i> / <i>Sphagnum</i> spp.	Black spruce - creeping-snowberry - peat -moss	Blue	0.5	1.4	34
<b>Total Wetland - Bog</b>					<b>0.5</b>	<b>1.4</b>	<b>34</b>
<b>Wetland - Marsh</b>							
SBSwk2	Wm02	<i>Equisetum fluviatile</i> - <i>Carex utriculata</i>	Swamp horsetail - beaked sedge	Blue	<0.1	0.2	19
<b>Total Wetland - Marsh</b>					<b>&lt;0.1</b>	<b>0.2</b>	<b>19</b>
<b>Wetland - Swamp</b>							
SBSmk1, SBSwk2	Ws03	<i>Salix bebbiana</i> / <i>Calamagrostis canadensis</i>	Bebb's willow - bluejoint	Blue	1.8	11.0	17
SBSwk2	Ws06	<i>Salix sitchensis</i> / <i>Carex sitchensis</i>	Sitka willow - Sitka sedge	Blue	0.2	1.0	20
SBSwk2	Ws07	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	Engelmann x white spruce - horsetail - leafy moss	Blue	2.3	13.4	17
SBSmk1	09 / Ws07	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp.	Engelmann x white spruce – horsetail	Blue	1.9	9.4	20
<b>Total Wetland – Swamp</b>					<b>6.3</b>	<b>34.9</b>	<b>18</b>
<b>Total Wetland</b>					<b>6.8</b>	<b>36.5</b>	<b>19</b>
<b>Total Listed Ecological Communities</b>					<b>72.5</b>	<b>270.9</b>	<b>27</b>



The Project footprint overlaps with approximately 83 ha of OGMAs and 203 ha of OGDAs. Five OGMAs are overlapped, ranging from <0.1 ha to 44.2 ha of overlap. There are 55 OGDA polygons overlapped by the Project footprint; overlap ranges from <0.1 ha to 25.3 ha.

Mitigation measures for change in abundance or condition of ecological communities of interest are presented in Table 13-28 of the Application and CEMP (PRGT 2016) and will be applied to the Eastern Route Alternative. Condition 25 of the EAC will be applied to the Amendment.

The pre-construction surveys will be consistent with the requirements of Condition 25, and results of pre-construction surveys will be used to inform site-specific mitigation and updates to the construction worksheets and environmental management plans.

The Project footprint overlaps with approximately 39.8 ha of wetlands, representing 21% of wetlands in the LAA (Table 11.9; Figure 11.2). Swamps are the most abundant class of wetlands, representing 20.6 ha or over half of wetlands in the Project footprint. Bogs and fens each represent approximately 20% of the wetlands in the Project footprint (7.9 and 7.6 ha, respectively), while marshes and shallow open water each represent approximately 5% of wetlands in the Project footprint (2.0 and 1.6 ha, respectively).



**Table 11.9 Wetland Ecological Communities Mapped in the Local Assessment Area**

Biogeoclimatic Variant	Wetland Association / Site Series	Scientific Name	English Name	Area in Footprint (ha)	Area in LAA (ha)	Change from Footprint (%)
<b>Wetland - Bog</b>						
SBSmk1	Wb01	<i>Picea mariana</i> / <i>Gaultheria hispidula</i> / <i>Sphagnum</i> spp.	black spruce - creeping-snowberry – peat-moss	0.5	1.4	34
SBSmk1, SBSwk2	10 / Wb05	<i>Picea mariana</i> / <i>Carex aquatilis</i> / <i>Sphagnum</i> spp.	black spruce - water sedge - peat moss	5.6	26.0	21
SBSmk1, SBSwk2	Wb08	<i>Picea mariana</i> / <i>Carex disperma</i> / <i>Sphagnum</i> spp.	black spruce - soft-leaved sedge - sphagnum	1.8	5.8	30
SBSwk2	Wb09	<i>Picea mariana</i> / <i>Equisetum arvense</i> / <i>Sphagnum</i> spp.	black spruce - common horsetail - peat-moss	<0.1	4.1	<1
SBSmk1	Wb	N/A	undifferentiated bog	0.1	0.1	60
<b>Total Wetland - Bog</b>				<b>7.9</b>	<b>37.4</b>	<b>21</b>
<b>Wetland - Fen</b>						
ESSFmv2, SSmk1, SBSwk2	Wf01	<i>Carex aquatilis</i> – <i>Carex utriculata</i>	water sedge - beaked sedge	1.9	9.9	19
SBSmk1, SBSwk2	Wf02	<i>Betula nana</i> / <i>Carex aquatilis</i>	scrub birch - water sedge	5.1	19.2	27
SBSwk2	Wf03	<i>Carex aquatilis</i> / <i>Sphagnum</i> spp.	water sedge - peat moss	0.3	0.3	92
ESSFmv2, SSmk1, SBSwk2	Wf04	<i>Salix barclayi</i> / <i>Carex aquatilis</i> / <i>Aulacomnium palustre</i>	Barclay's willow - water sedge - glow moss	0.0	1.2	0
SBSmk1	Wf07	<i>Betula nana</i> / <i>Menyanthes trifoliata</i> - <i>Carex limosa</i>	scrub birch - buckbean - shore sedge	0.1	1.5	7
SBSmk1	Wf	N/A	undifferentiated fen	0.1	0.1	100
<b>Total Wetland - Fen</b>				<b>7.6</b>	<b>30.6</b>	<b>25</b>



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Biogeoclimatic Variant	Wetland Association / Site Series	Scientific Name	English Name	Area in Footprint (ha)	Area in LAA (ha)	Change from Footprint (%)
<b>Wetland - Marsh</b>						
SBSmk1 SBSwk2	Wm01	<i>Carex utriculata</i> – <i>Carex aquatilis</i>	beaked sedge - water sedge	1.3	8.1	16
SBSwk2	Wm02	<i>Equisetum fluviatile</i> - <i>Carex utriculata</i>	swamp horsetail - beaked sedge	<0.1	0.2	14
SBSwk2	Wm	N/A	undifferentiated marsh	0.7	1.7	42
<b>Total Wetland - Marsh</b>				<b>2.0</b>	<b>10.0</b>	<b>20</b>
<b>Wetland - Swamp</b>						
SBSmk2, SBSwk2	Ws03	<i>Salix bebbiana</i> / <i>Calamagrostis canadensis</i>	Bebb's willow – bluejoint reedgrass	2.1	11.6	18
SBSmk2, SBSwk2	Ws04	<i>Salix drummondiana</i> / <i>Carex rostrata</i>	Drummonds willow – beaked sedge	3.8	17.8	21
SBSwk2	Ws06	<i>Salix sitchensis</i> / <i>Carex sitchensis</i>	Sitka willow - Sitka sedge	0.2	1.0	20
SBSmk1, SBSwk2	09 / Ws07	<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	Engelmann x white spruce - horsetail - leafy moss	12.0	53.8	22
ESSFmv3	Ws08	<i>Abies lasiocarpa</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	subalpine fir / horsetails / leafy mosses	0.7	2.4	28
ESSFmv3, SBSmk1, SBSwk2	Ws	N/A	undifferentiated swamp	1.8	12.9	14
<b>Total Wetland - Swamp</b>				<b>20.6</b>	<b>99.4</b>	<b>21</b>
<b>Wetland – Shallow Open Water</b>						
SBSmk1, SBSwk2	Ww	N/A	shallow open water	1.6	9.5	17
<b>Total Wetland – Shallow Open Water</b>				<b>1.6</b>	<b>9.5</b>	<b>17</b>
<b>Wetland - Disturbed</b>						
BWBSmw, SBSwk2	Wd	N/A	disturbed wetland	0.2	0.2	100
<b>Total Wetland – disturbed</b>				<b>0.2</b>	<b>0.2</b>	<b>100</b>
<b>Total Wetland</b>				<b>39.8</b>	<b>188.7</b>	<b>21</b>





Table 11.10 summarizes changes to potential effects and mitigation measures for vegetation and wetland resources based on proposed changes associated with the Eastern Route Alternative.

**Table 11.10 Summary of Potential Effects and Mitigation Measures – Vegetation and Wetland Resources**

Proposed Amendment Component	Project Phase	Change in Proposed Works or Activities	Change in Potential Effects	Change in Mitigation or Enhancement Measures	Change in Mitigation or Enhancement Measures Success Rating
Eastern Route Alternative	Construction	No	No	No change	No change
	Operations	No	No	No change	No change

### 11.3.2 Residual Effects

Residual effects of the Amendment on vegetation and wetland resources are predicted to be similar or lower magnitude than the portion of the approved alignment it would replace because this Amendment would lessen the overall Project footprint, duration of construction, and the spatial extent of maintenance and inspection activities during operation (see Section 2.0 of this Amendment).

As stated in the Assessment Report (EAO 2014a), residual effects include a change in abundance of plant species of interest and change in abundance or condition of ecological communities of interest as a result of construction. In consideration of the predicted effects on vegetation and wetland resources, the conclusions presented in the EAO Assessment Report (EAO 2014a) remain valid with the proposed changes.

### 11.3.3 Changes to Characterization of Residual Effects

Based on a desktop review of new information on vegetation and wetland resources for the Amendment, a reduction in the overlap of the Project with vegetation and wetland resources (i.e., from a 233-km long section to a 172-km long section), and mitigation described in the Application and CEMP (PRGT 2016), a change to the characterization of residual effects in the EAO Assessment Report (EAO 2014a) is not expected to be necessary.

#### 11.3.3.1 Change in Plant Species of Interest

There are no known occurrences of red- or blue-listed plant species in the Project footprint, and if any are found during pre-construction field studies, mitigation measures established in the Application and CEMP (PRGT 2016) will be implemented. In addition, mitigation measures developed under Condition 25 of the EAC will be applied to the Amendment. Species of cultural importance are expected to be present along the Project footprint in suitable habitat and these species will be included in restoration efforts.



Based on a desktop review of new information on plant species of interest for the Amendment, a reduction in the overlap of the Project with vegetation and wetland resources, and mitigation described in the Application and CEMP (PRGT 2016), a change to the characterization of residual effects in the EAO Assessment Report (EAO 2014a) is not expected to be necessary.

#### **11.3.3.2 Change in Ecological Communities of Interest**

Potential residual effects of the Amendment on vegetation and wetland resources are predicted to be of similar or lower magnitude when compared to the portion of the approved alignment that the Amendment components would replace because this Amendment would lessen the overall project footprint, the duration of construction, and the spatial extent of maintenance and inspection activities during operation. Potential residual effects include a change in abundance and condition of ecological communities of interest, including red- and blue-listed ecological communities, old forest and wetlands, as a result of construction. In consideration of the predicted effects on vegetation and wetland resources, the conclusions presented in the EAO Assessment Report (EAO 2014a) remain valid with the proposed changes. A comparison of the conclusions from the EAO Assessment Report (EAO 2014a) and proposed Amendment residual effects is presented in Table 11.11.



**Table 11.11 Changes to EAO Assessment Report Characterization of Residual Effects – Vegetation and Wetland Resources**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>2</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<i>Low to High Sensitivity</i>	<i>The resilience of plant species at risk, traditional use plants and pine mushrooms, and ecological communities including old forests and wetlands, varies along the proposed route by species and community. For example, upland forests are expected to be resilient and regenerate well. Other communities such as grassland or certain wetland ecosystems (e.g., peatlands) are expected to be less resilient.</i>	No change
Magnitude	<i>Low to Moderate</i>	<i>The magnitude of effects depends on the extent and rarity of ecological communities and plant species at risk occurrences. The magnitude is low for most ecological communities, but moderate for plant species at risk, wetland function (effects of wetland hydrologic alteration would be detectable until natural flow patterns were restored, while loss of treed habitat is considered moderate in magnitude), as well as for red or blue listed ecological communities. Magnitude of the effects from invasive species is considered low with the implementation of mitigation measures to control any invasive species that may be on-site.</i>  <i>In some cases, translocation of plant species at risk may be successful at mitigating effects to plant species at risk. Compensation may also be required to achieve “no net loss” of wetland function.</i>	No change <sup>1</sup>
Extent	<i>Local</i>	<i>The effects of the proposed Project are expected to be confined to the Project footprint with the exception of potential for indirect effects on windthrow, microclimate, hydrology, light penetration, and susceptibility to invasive species, extending into the LAA.</i>	No change
Duration	<i>Short- to Long-Term</i>	<i>The regeneration of vegetation and wetland resources varies by species or type of ecological community and site-specific conditions.</i>  <i>Residual effects to species at risk are medium- term in duration, due to the possible need for translocation.</i>  <i>Residual effects in old forests, pine mushroom habitat and some ecological communities at risk (e.g., climax communities), would not be reversible until the long term. Residual effects from invasive species are also anticipated to be long-term in duration.</i>  <i>Re-establishment of other types of vegetation such as shrubs and forbs would occur in the short- to medium-term.</i>	No change

<sup>2</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>2</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
		<i>Wetland habitat is generally expected to recover over the short-term, but effects to treed wetland habitat would take longer to recover and habitat may not fully re-establish until after decommissioning, making the effects long-term.</i>	
Reversibility	Reversible/Irreversible	<i>Residual effects to terrestrial vegetation are expected to be reversible, with the exception of the potential for irreversible effects to some grassland communities and ecological communities at risk.</i>  <i>For any areas with permanent loss of wetland (e.g., due to location of compressor or meter stations) the impacts at the site would be irreversible, but these areas would be subject to compensation and therefore the impact to wetland function is considered reversible.</i>	No change
Frequency	Once to Periodic	<i>The main disturbance would occur during the construction phase, and repeated periodic disturbance would occur during operations from vegetation management on the ROW.</i>	No change
Likelihood	<i>The proposed Project is highly likely to result in residual adverse effects to vegetation and wetlands.</i>		No change
Significance	<i>Residual adverse effects are considered significant when there is a long-term or irreversible residual adverse effect with a magnitude that is predicted to exceed an acceptable biological threshold or standard or is predicted to affect the indicator population such that stated management or conservation objectives might not be attainable.</i>  <i>EAO considered the low to moderate magnitude effect to vegetation and wetlands, the short to long term duration and the reversibility to some communities and the potential for permanent and irreversible effects to other communities. EAO considered the mitigation and monitoring measures identified by the proponent and proposed conditions requiring site assessment surveys for red and blue listed species, the development of a Wetland Management Plan and the development of the EMP which includes development and implementation of a Plant Species or Ecological Communities of Concern Contingency Plan and an Invasive Plant Species and Vegetation Management Plan, and post-construction effectiveness monitoring. EAO concludes that the proposed Project would not have significant residual effects on vegetation and wetlands.</i>		-
Confidence	<i>Moderate Confidence – The level of confidence is determined by the understanding of the Project VC interaction, the level of information relevant to the project area and the understanding of the effectiveness of mitigation.</i>  <i>The significance determination and likelihood for vegetation and wetland resources is determined with moderate confidence. EAO believes there is a good understanding of Project-VC interactions and effectiveness of mitigation. EAO took into consideration the TEM survey intensity level of 5 and considered the information provided with respect to the Project area to be sufficient to provide a moderate level of confidence in determining the significance and likelihood of residual effects.</i>		No change

Notes:

EMP = Environmental Management Plan; TEM = terrestrial ecosystem mapping

Source: EAO 2014a



#### **11.3.4 Cumulative Effects Assessment**

Cumulative effects for vegetation and wetland resources are expected to be lower with this Amendment than for the approved Project. The Amendment is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are all within the same corridor, rather than spread across the landscape. The Project footprint will be routed through some of these disturbances, reducing effects on vegetation and wetland resources.

Cumulative effects on vegetation and wetland resources are predicted to be consistent with the conclusions of the EAO Assessment Report (EAO 2014a) and its conclusions remain valid.

#### **11.3.5 Risks and Data Uncertainty**

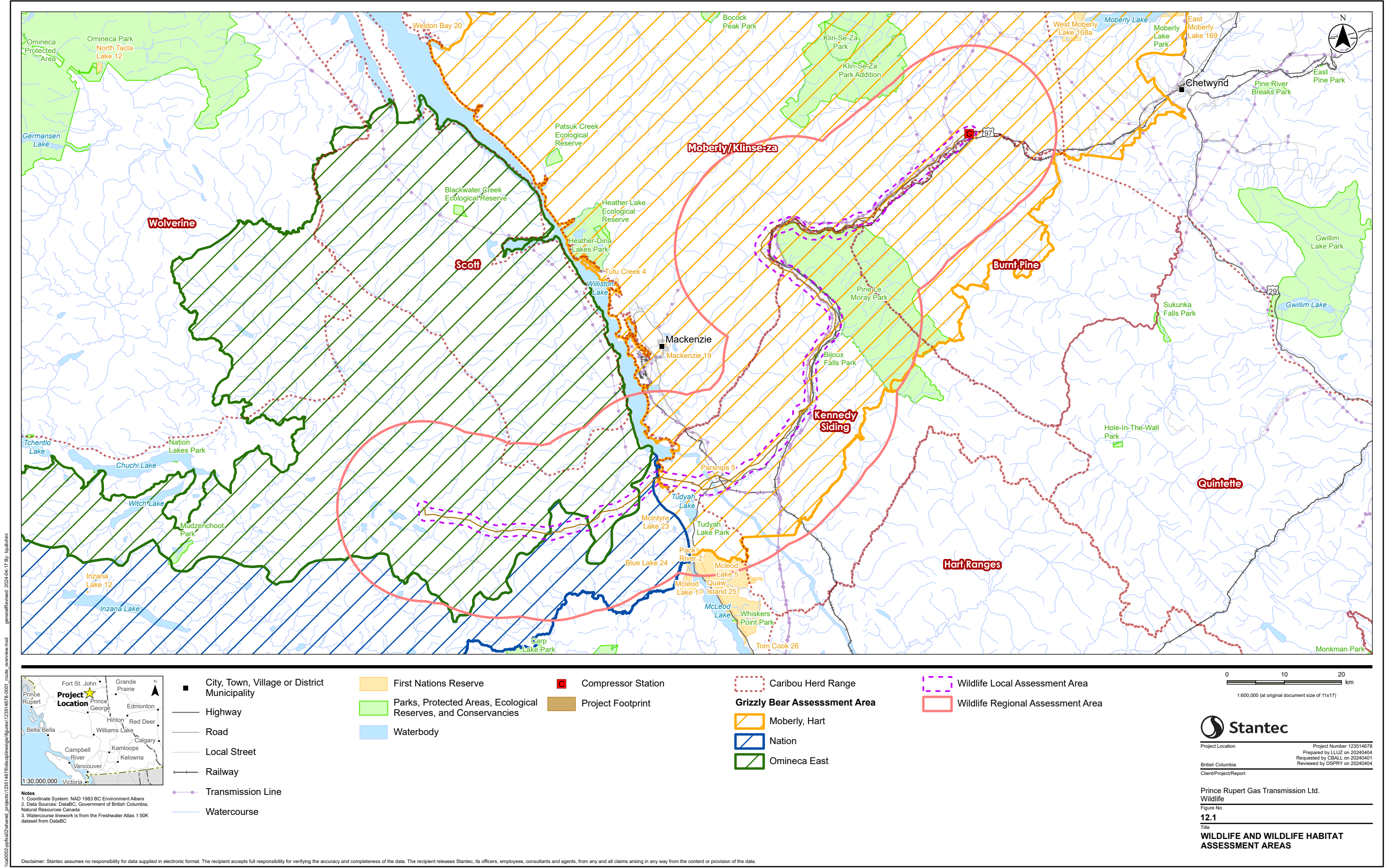
The level of uncertainty for predicted effects on vegetation and wetland resources is considered moderate due to the lack of supporting field surveys in the amended route; however, this will be managed by implementing pre-construction field surveys consistent with requirements in Condition 25 of the EAC. The understanding of Project effects, the broad understanding of other past, present, and reasonably foreseeable projects and activities, the current and future application of statutory requirements and management objectives, the use of conservative assumptions, and the use of proven measures and best management practices will help to avoid and mitigate effects on vegetation and wetlands for the Project and other interacting cumulative projects. As the uncertainty in this prediction is not high, no additional risk analysis is necessary.



## **12 Wildlife and Wildlife Habitat**

Wildlife and wildlife habitat were identified as a VC in the Application Information Requirements (PRGT 2014b) for the Application (PRGT 2014a) due to anticipated project interactions with wildlife and wildlife habitat and in recognition of their economic, cultural, and ecological significance to Indigenous Nations, and their role in ecosystem health, function, and overall biodiversity. This section describes potential residual and cumulative effects of the Amendment for the wildlife and wildlife habitat VC. Information presented in this section is consistent with the Application (PRGT 2014a) and updated where necessary and relevant. The definition of the terrestrial wildlife LAA and RAA is the same as presented in the Application (PRGT 2014a), and therefore applied to this Amendment (Figure 12.1). In alignment with the Application (PRGT 2014a), the assessment areas for caribou are the Provincial caribou herd range boundaries for each herd intersected by the Project footprint (Figure 12.1). These include the Moberly/Klinse-za, Kennedy Siding, and Burnt Pine caribou herd ranges. These three herds are included in the Pine River Local Population Unit of the federal recovery strategy (Environment Canada 2014), however the federal boundaries do not align with the current provincial boundaries. As the provincial herd range boundaries were updated in 2022, it assumed that those updates were in alignment with objectives of the s.11 Conservation Agreement for the area and included engagement between British Columbia, Canada, West Moberly First Nations, and Sauteau First Nation. The grizzly bear assessment areas (GBAAs) used for the Application (PRGT 2014a) are also used for this Amendment; however, the Moberly/Hart GBAA was extended to encapsulate the Amendment (Figure 12.1). The marine birds LAA and RAA is not applicable to the Amendment.





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## 12.1 Baseline Conditions

Existing conditions for the assessment of effects on wildlife and wildlife habitat in this Amendment are supported by the methods used in the Application (PRGT 2014a), including the use of third-party and project-specific data and a review of new information that is directly relevant to the Amendment.

In the Application (PRGT 2014a), 54 species of conservation concern had potential to interact with the Project. There are 27 species/subspecies with potential to interact with the proposed Amendment (Table 12.1),<sup>1</sup> after accounting for changes that have occurred since the Application (PRGT 2014a) was approved (i.e., taxonomy updates and species status additions, deletions, or changes). The criteria for species of conservation concern, per the Application (Appendix P, Section 3.2 [PRGT 2014a]) are:

- Designated as Extinct, Endangered, Threatened, or Special Concern on Schedule 1 of the SARA (SRPR 2024), or
- Designated as Extinct, Endangered, Threatened, or Special Concern by COSEWIC (COSEWIC 2024), or
- Red- or Blue-listed by the BC Conservation Data Centre (BC CDC 2024a,b)

**Table 12.1 Wildlife Species of Conservation Concern Known or Likely to Overlap with the Amendment**

Species <sup>1</sup>	Conservation Status		
	SARA Schedule 1 <sup>2</sup>	COSEWIC <sup>3</sup>	CDC List <sup>4</sup>
<b>Mammals</b>			
Eastern Red Bat	-	E	Unknown
Fisher (boreal population)	-	-	Blue
Fisher (Columbian population)	-	-	Red
Grizzly Bear	SC	SC	Blue
Hoary Bat	-	E	Blue
Little Brown Myotis <sup>8</sup>	E	E	Blue
Mountain Goat <sup>8</sup>	-	-	Blue
Northern Myotis	E	E	Blue
Silver-haired Bat	-	E	Yellow
Wolverine, <i>luscus</i> subspecies <sup>5</sup>	SC	SC	Blue
Woodland Caribou (Southern Mountain - Central Group)	T	T	Blue

<sup>1</sup> Scientific names for species are provided in Attachment A and Attachment B of Appendix P of the Application: Wildlife and Wildlife Habitat Technical Data Report (PRGT 2014a). The only applicable change to scientific names is addressed in Note 6 of Table 12.1 of this Amendment.



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Species <sup>1</sup>	Conservation Status		
	SARA Schedule 1 <sup>2</sup>	COSEWIC <sup>3</sup>	CDC List <sup>4</sup>
<b>Birds</b>			
Northern Goshawk ( <i>atricapillus</i> subspecies)	-	-	Blue
Bank Swallow <sup>5</sup>	T	T	Yellow
Barn Swallow <sup>5,9</sup>	T	SC	Yellow
Black Swift <sup>8</sup>	E	E	Blue
Common Nighthawk <sup>7</sup>	SC	SC	Blue
Evening Grosbeak	SC	SC	Yellow
Horned Grebe <sup>5</sup>	SC	SC	Yellow
Killdeer <sup>8</sup>	-	-	Blue
Lesser Yellowlegs	-	T	Blue
Olive-sided Flycatcher <sup>7,9</sup>	SC	SC	Yellow
Red-necked Phalarope <sup>5</sup>	SC	SC	Blue
Rough-legged Hawk	-	NAR	Blue
Rusty Blackbird	SC	SC	Blue
Short-eared Owl	SC	T	Blue
Surf Scoter	-	-	Blue
Tundra Swan	-	-	Blue
<b>Amphibians</b>			
Western Toad <sup>9</sup>	SC	SC	Yellow

Notes:

- <sup>1</sup> Species downlisted since the Application (PRGT 2014a) and no longer satisfying the criteria for species of conservation concern are excluded. These include long-eared myotis (see Note 6), cackling goose, and sooty grouse.
- <sup>2</sup> *Species at Risk Act* (SARA) Schedule 1 status: E—endangered (species facing imminent extirpation or extinction); T—threatened (species likely to become endangered if limiting factors are not reversed); SC—special concern (species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats).
- <sup>3</sup> COSEWIC status: same definitions as SARA but with the addition of NAR—not at risk (species that has been evaluated and found to be not at risk of extinction given the current circumstances).
- <sup>4</sup> BC CDC list status (BC CDC 2024b): Red—species at risk of being lost (extirpated, endangered, or threatened); Blue—species of special concern; Yellow—species that are apparently secure or secure (least risk of being lost); Unknown—species for which the provincial conservation status is unknown due to extreme uncertainty.
- <sup>5</sup> Added to Schedule 1 of the SARA since the Application (PRGT 2014a).
- <sup>6</sup> Population genetics revealed *Myotis keenii* (Keen's myotis) and *Myotis evotis* (long-eared myotis) to be a single species, long-eared myotis (Lausen et al. 2019); long-eared myotis is Yellow-listed.
- <sup>7</sup> Olive-sided flycatcher and common nighthawk were downlisted from Threatened in 2023.
- <sup>8</sup> Added to provincial Blue list since the Application (PRGT 2014a).
- <sup>9</sup> Down-listed from Blue list to Yellow list since the Application (PRGT 2014a)



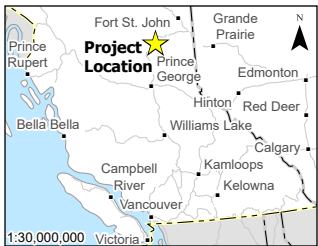
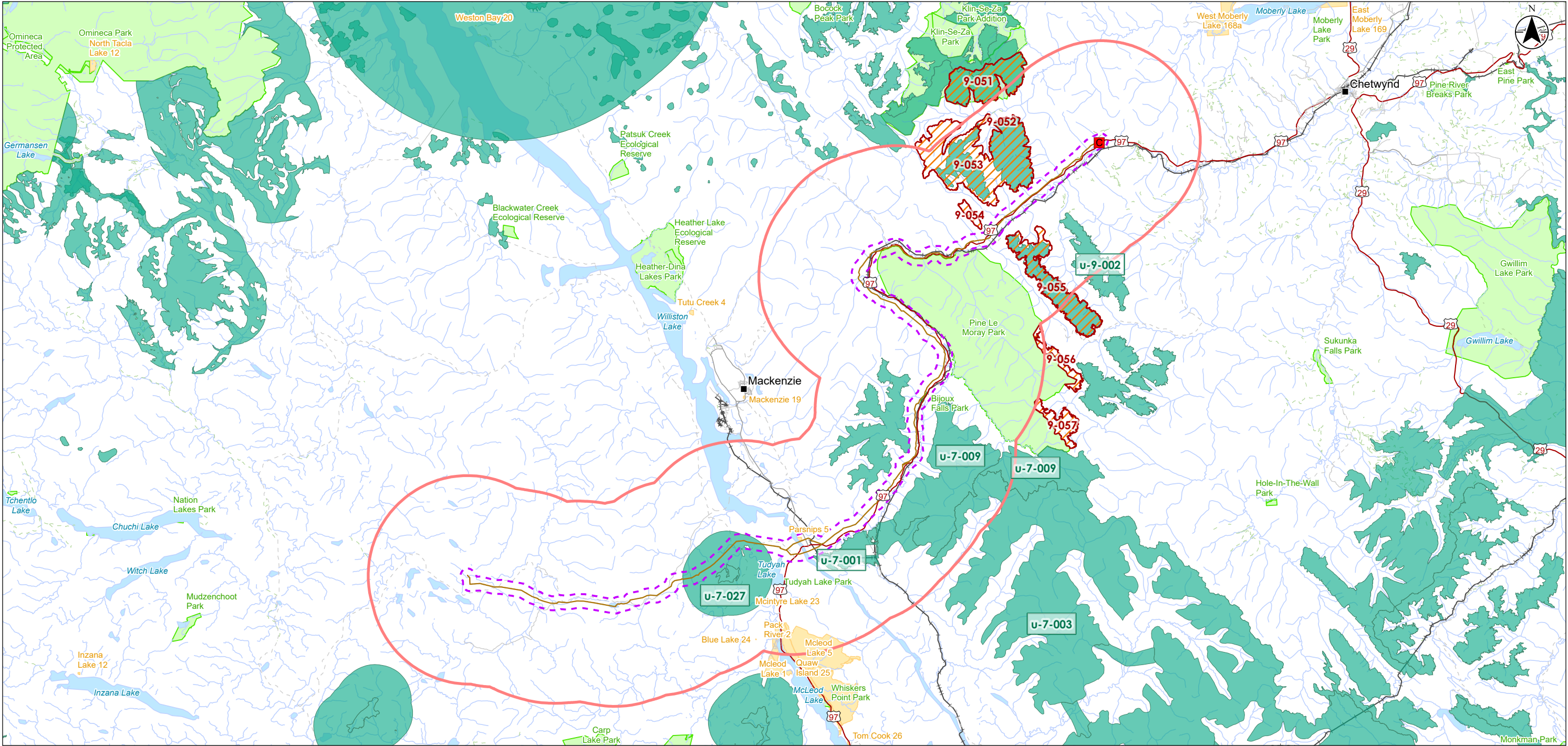
## 12.1.1 Mammals

The Project footprint overlaps one Ungulate Winter Range (UWR) designated for moose (u-7-027). The terrestrial wildlife LAA overlaps two additional UWRs: u-7-001 and u-7-009 designated for caribou (Table 12.2). The general wildlife measures associated with these UWRs relate primarily to forest cover retention and the construction of permanent roads. The terrestrial wildlife RAA overlaps these three UWRs and an additional two UWRs, u-7-003 designated for caribou and u-9-002 designated for caribou, mountain goat, and bighorn sheep (Figure 12.2). The terrestrial wildlife LAA does not overlap any WHAs, however, the terrestrial wildlife RAA overlaps seven WHAs designated for caribou (Figure 12.2). General wildlife measures associated with those WHAs include retaining forest cover and restricting road development.

**Table 12.2 Area of Overlap with Ungulate Winter Range and Wildlife Habitat Area**

UWR or WHA ID	Species	Area of Overlap (ha)		
		Project Footprint	Terrestrial Wildlife LAA	Terrestrial Wildlife RAA
Ungulate Winter Range				
u-7-001	Caribou	-	3	2,892
u-7-003	Caribou	-	-	3,822
u-7-009	Caribou	-	25	27,858
u-7-027	Moose	142	2,881	13,580
u-9-002	Caribou, mountain goat, bighorn sheep	-	-	14,541
Total		142	2,909	62,603
Wildlife Habitat Area				
9-051	Caribou	-	-	435
9-052	Caribou	-	-	159
9-053	Caribou	-	-	12,919
9-054	Caribou	-	-	513
9-055	Caribou	-	-	3,857
9-056	Caribou	-	-	257
9-057	Caribou	-	-	20
Total		-	-	18,160



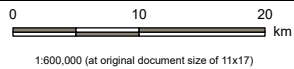


**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

- City, Town, Village or District Municipality
- Railway
- Trail
- Highway
- Road
- Local Street
- Resource Road
- Watercourse

- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody
- Compressor Station
- Project Footprint

- Ungulate Winter Range
- Wildlife Habitat Area
- Wildlife Local Assessment Area
- Wildlife Regional Assessment Area



Project Location  
Project Number 123514678  
Prepared by LLUZ on 20240404  
Requested by CBALL on 20240401  
Reviewed by DSPRY on 20240404  
British Columbia  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Wildlife  
Figure No.  
**12.2**  
Title  
**UNGULATE WINTER RANGES AND WILDLIFE HABITAT AREAS WITHIN THE LOCAL AND REGIONAL ASSESSMENT AREAS**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

The terrestrial wildlife LAA and the Project footprint overlap three caribou herd ranges that are part of the Southern Mountain – Central Group population of woodland caribou: Burnt Pine, Kennedy Siding, and Moberly/Klinse-za (Table 12.3; Figure 12.3). The terrestrial wildlife LAA does not overlap the Scott caribou herd range, but the terrestrial wildlife RAA does overlap the Scott herd range (Table 12.3). At the time the Application (PRGT 2014a) was prepared, the Scott caribou herd range was divided by the Williston Reservoir (Environment Canada 2014) and each area was colloquially known as ‘Scott East’ and ‘Scott West’. Scott East was amalgamated with the Moberly/Klinse-za caribou herd range in May 2021 along with other range boundary adjustments made for the Southern Mountain – Central Group population (Ministry of Environment and Climate Change Strategy [MECCS] 2024). In 2021 the populations of the Kennedy Siding and Moberly/Klinse-za herds were estimated at 99 and 101 individuals, respectively, with both herds experiencing a long-term (18-27 years) decline but a short-term increase (past 2-5 years) in populations (Government of British Columbia 2021). The Burnt Pine herd was confirmed extirpated in 2014 (Environment Canada 2014).

On February 21, 2020, the Province of British Columbia, Canada, Saluteau First Nations, and West Moberly First Nations signed the Intergovernmental Partnership Agreement for the Conservation of the Central Group of the Southern Mountain Caribou. The Partnership Agreement identifies different zones relating to management designations and directions (Government of Canada 2020). The Project footprint overlaps 315 ha of Zone B1, of which 108 ha are previously disturbed (Figure 12.3).

**Table 12.3 Area of Overlap with Caribou Herd Range**

Caribou Herd Range	Area of Overlap (ha)		
	Project Footprint	Terrestrial Wildlife LAA	Terrestrial Wildlife RAA
Burnt Pine	19	938	52,520
Kennedy Siding	817	16,289	139,667
Moberly/Klinse-za	410	8,143	145,297
Scott	0	0	10,001

The terrestrial wildlife LAA overlaps five grizzly bear population units (GBPUs): Hart, Moberly, Nation, Omineca, and Parsnip (Figure 12.4; Table 12.4). Each GBPU in British Columbia is assigned a conservation rank, which ranges from high to negligible concern, based on population size and trend, genetic and demographic isolation, and overall threat to grizzly bears and bear habitat (Morgan et al. 2019; Government of British Columbia 2020). The five GBPUs that overlap the Amendment have stable populations (FLNRORD and MECCS 2022).



**Table 12.4 Grizzly Bear Population Units Overlapping the Project Footprint and the Wildlife Local and Regional Assessment Areas**

GBPU	Area of Overlap (ha)			Population Estimate <sup>1</sup>
	Project Footprint	Terrestrial Wildlife LAA	Terrestrial Wildlife RAA	
Hart	69	4,039	75,974	240
Moberly	1,024	16,506	190,237	71
Nation	254	5,109	78,578	170
Omineca	345	7,324	120,385	402
Parsnip	23	2,344	60,281	455

<sup>1</sup> Source: Government of British Columbia 2020

The terrestrial wildlife LAA overlaps the ranges of the red-listed Columbian fisher population and the blue-listed boreal fisher population (Fogarty et al. 2022). Omineca Region 7B is closed to fisher harvest to protect the Columbian population. The Omineca Region overlaps the terrestrial wildlife LAA west of Pine-Le Moray Provincial Park.

The terrestrial wildlife LAA overlaps the ranges of five bat species of conservation concern (Table 12.1). Critical habitat has been partially identified for northern myotis and little brown myotis (ECCC 2018), however the terrestrial wildlife LAA does not overlap any mapped critical habitat areas designated for bats. There are no publicly available bat occurrence records within the terrestrial wildlife LAA, however bats are expected to forage in open habitat and forest gaps, and roost in forested areas, cliffs, and rock crevices (Lausen et al. 2022).

### 12.1.2 Birds

The terrestrial wildlife LAA does not overlap Important Bird Areas, federally designated Migratory Bird Areas, or mapped critical habitat areas for federally listed birds. There are two records from 1997 of bald eagle nests within the terrestrial wildlife LAA along the Pack River (Merkens et al. 1999). There is one record from 2013 of an osprey nest within the terrestrial wildlife LAA adjacent to Highway 97 north of Kennedy (Cornell Lab of Ornithology 2024). It is unknown whether those nests are still active but bald eagle nesting territories may be used continually for over 50 years (United States Fish and Wildlife Service [USFWS] 2007) and osprey commonly reuse their nests year over year (Bierregaard et al. 2020), suggesting that these nests could still be active or that nesting may be occurring nearby. There are no publicly available northern goshawk nest records within the terrestrial wildlife LAA, however there are bird observation records within the terrestrial wildlife LAA (Cornell Lab of Ornithology 2024).



Since the Application (PRGT 2014a) was approved, residence descriptions under SARA for bank swallow and barn swallow have been made available (ECCC 2022). There are three documented records of barn swallow nests, and no documented records of bank swallow nests, within the terrestrial wildlife LAA (Birds Canada 2023a,b). Barn swallow and bank swallow are both widely distributed throughout the terrestrial wildlife LAA (Cornell Lab of Ornithology 2024) and are likely to be found where suitable nesting habitat occurs. Barn swallow suitable nesting habitat includes a wide variety of anthropogenic structures (e.g., bridges, large culverts, various structures and buildings) adjacent to open areas for foraging (e.g. fields, road verges, wetlands, rivers) (COSEWIC 2022), and bank swallow suitable nesting habitat includes river banks, lake shores, sandpits or piles, and road cuts that are steep and comprised of silt, sand, or organic matter (ECCC 2021). The nests of both species are expected to be present where suitable nesting habitat is present.

To assess project effects on songbirds, the songbird community was split into four groups based on broad habitat associations during the breeding season: 1) old forest songbird community, 2) young forest songbird community, 3) grassland and shrubland songbird community, and 4) wetland songbird community. The species included in each community are listed in the Application (Attachment I of Appendix P in PRGT 2014a). Some species may be included in more than one community if they use multiple broad habitat types during the breeding season. The birds included in the old forest songbird community use old and mature forest for breeding (Section 6.1.6.10 in Appendix P of PRGT 2014a). The terrestrial wildlife LAA overlaps several old growth management areas and areas of old or mature forest that may provide suitable habitat for the old forest songbird community (Section 11.1.2). This community includes two species of conservation concern: olive-sided flycatcher and evening grosbeak. Olive-sided flycatcher is also included as a stand-alone indicator per the Application (PRGT 2014a). There are records of both olive-sided flycatcher and evening grosbeak in the terrestrial wildlife LAA (BC BBA 2012; Cornell Lab of Ornithology 2024). Other species included in this community include American three-toed woodpecker, Hammond's flycatcher, least flycatcher, and Townsend's warbler.

The birds included in the young forest songbird community use coniferous, deciduous, and mixed-wood forests in structural stages 4 and 5 for breeding (Section 6.1.6.11 in Appendix P of PRGT 2014a). This community includes one species of conservation concern: olive-sided flycatcher. Olive-sided flycatcher is also included as a stand-alone indicator per the Application (PRGT 2014a). There are records of olive-sided flycatcher in the terrestrial wildlife LAA (British Columbia Breeding Bird Atlas [BC BBA] 2012; Cornell Lab of Ornithology 2024). Other species included in this community include red-breasted sapsucker, song sparrow, and cedar waxwing.

The birds included in the grassland and shrubland songbird community use relatively open habitat such as alpine or subalpine meadows, pastures, croplands, patchy subalpine fir units, shrubby thickets, or utility corridors for breeding (Section 6.1.6.12 in Appendix P of PRGT 2014a). Disturbed areas of the terrestrial wildlife LAA may provide suitable habitat for species included in this community. There are no species of conservation concern included in the grassland and shrubland bird community. Common nighthawk was not included in the grassland and shrubland bird community because it was assessed separately as a stand-alone indicator species, but does use dry, open, sparsely vegetated habitat for nesting (COSEWIC 2018). There are records of this species in the terrestrial wildlife LAA (Cornell Lab of Ornithology 2024).



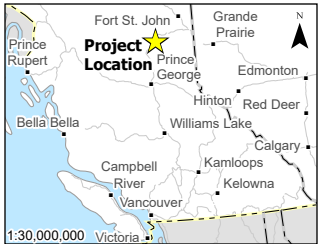
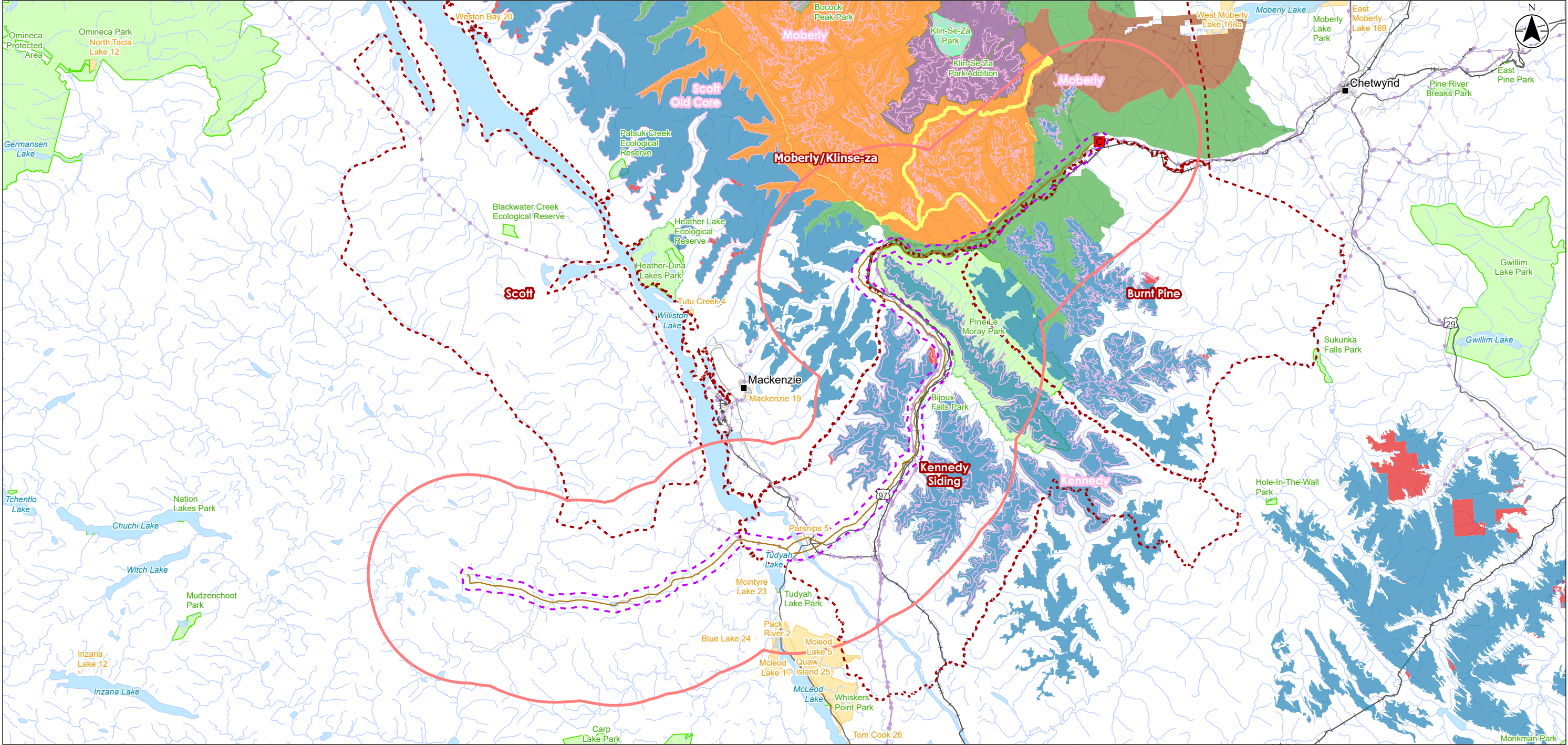


The birds included in the wetland songbird community use wetland habitats such as fens, bogs, swamps, marshes, and shallow open water ecosystems for breeding (Section 6.1.6.13 in Appendix P of PRGT 2014a). This community includes two species of conservation concern: rusty blackbird and olive-sided flycatcher. Both rusty blackbird and olive-sided flycatcher are also included as stand-alone indicators per the Application (PRGT 2014a). There are records of both species within the terrestrial wildlife LAA (Cornell Lab of Ornithology 2024).

### **12.1.3 Amphibians**

Western toad is expected to be widespread throughout the terrestrial wildlife LAA. The species is known to use a variety of aquatic habitats for breeding, such as shallow, sandy margins of lakes, ponds, streams, river deltas, estuaries, and geothermal springs (COSEWIC 2012). Anthropogenic water features such as ditches, road ruts, tailings ponds, dug outs, and borrow pits may also be used as breeding sites (COSEWIC 2012). Following breeding, adults may remain in adjacent wetland or riparian habitat, or they may travel to other wetlands or uplands sites (COSEWIC 2012). Western toad hibernates underground in peat hummocks, squirrel middens, abandoned beaver lodges, and in decayed root channels and other ground cavities (COSEWIC 2012). Habitat connectivity between summer breeding and foraging areas and overwintering areas is important.





**Notes**  
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- City, Town, Village or District Municipality
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- Transmission Line
- Watercourse

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- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Project Footprint

- Caribou Herd Range
- High Elevation Caribou Winter Range
- Wildlife Local Assessment Area
- Wildlife Regional Assessment Area

**Partnership Agreement Zone**

- A1
- A2
- B1
- B2
- B3
- B4
- B5
- Zone B2 (Klin-Se-Za Park)
- Zone B3 (Bocock Peak Park)

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1:600,000 (at original document size of 11x17)

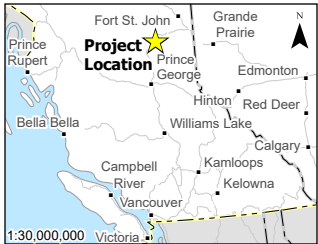
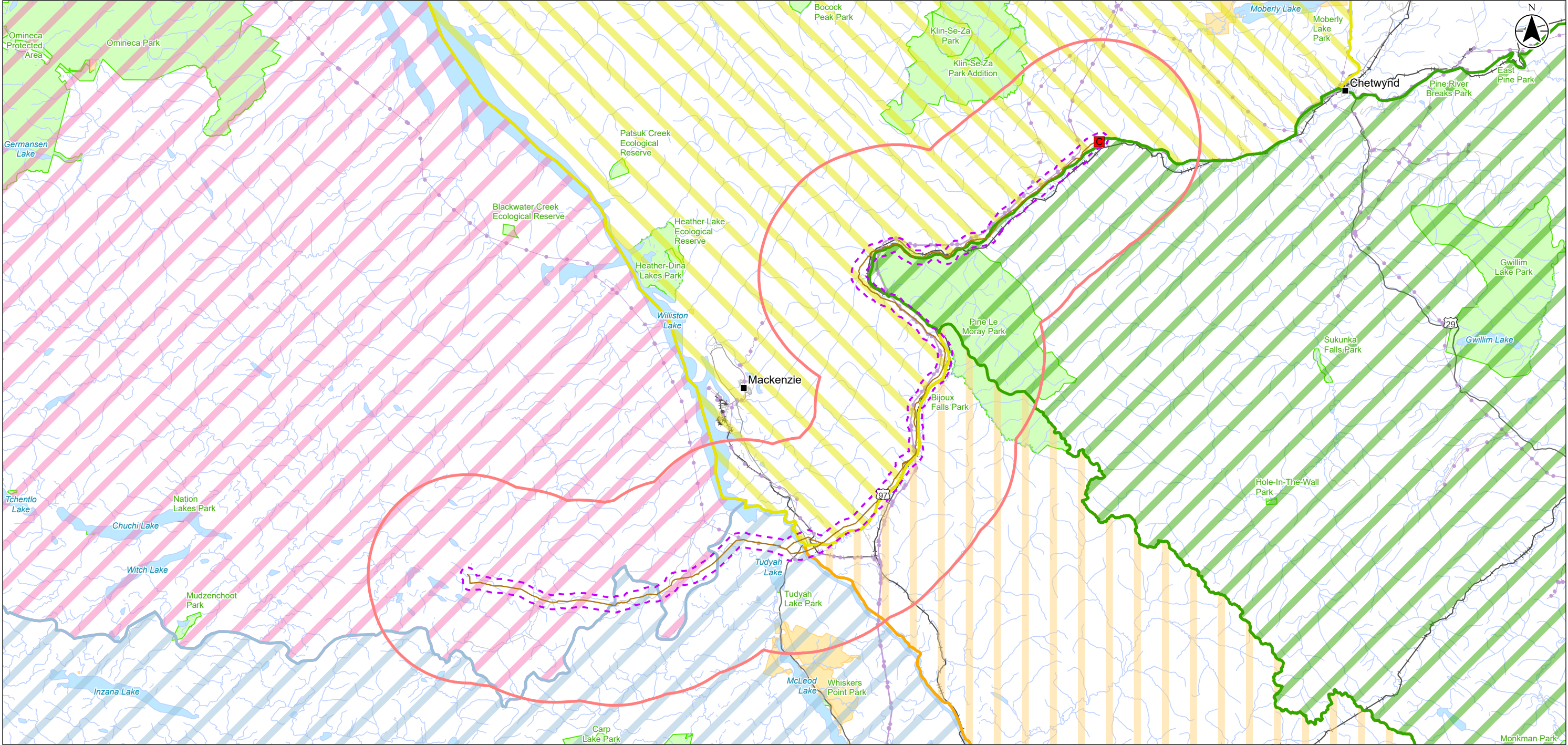


Project Location  
Project Number 123514678  
Prepared by LLUZ on 20240404  
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Reviewed by DSPRY on 20240404  
British Columbia  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Wildlife  
Figure No.  
**12.3**  
Title  
**CARIBOU HERD RANGES AND PARTNERSHIP AGREEMENT ZONES WITHIN THE REGIONAL ASSESSMENT AREA**

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**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- Road
- Local Street
- Railway
- Transmission Line
- Watercourse

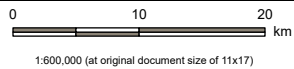
- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Project Footprint

**Grizzly Bear Population Unit (GBPU)**

- Hart
- Moberly
- Nation
- Omineca
- Parsnip

- Wildlife Local Assessment Area
- Wildlife Regional Assessment Area



Project Location  
Project Number 123514678  
Prepared by LLUZ on 20240404  
Requested by CBALL on 20240401  
Reviewed by DSPRY on 20240404  
British Columbia  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Wildlife  
Figure No.  
**12.4**  
Title  
**GRIZZLY BEAR POPULATION UNITS WITHIN THE REGIONAL ASSESSMENT AREA**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

## **12.2 Influence of Engagement and Consultation**

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to wildlife. Doig River First Nation, Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Sauteau First Nations, Takla Nation, and West Moberly First Nations each identified an interest in harvesting wildlife (Firelight 2014a, 2014b, 2015; DMCS and HRFN 2014; CSTC 2014b; TLFN and Sharp 2014; WMFN 2015). This feedback has been considered and summarized in Table 12.5 and has been integrated into the wildlife effects assessment.



**Table 12.5 Summary of Engagement Feedback Related to Wildlife**

Comment	Sources	PRGT Response
Doig River First Nation expressed concern that harvested animals show signs of illness and attributed this to contamination of air, water, and plants from chemicals found in industrial areas and herbicides sprayed for clearing areas.  Doig River First Nation identified important harvesting habitat in the Pine River and John Hart Highway areas (which are intersected and paralleled by the Eastern Route Alternative), Callazon Creek (crossed by the Eastern Route Alternative), and Tudyah Lake and Windy Point Lake (within the Indigenous Interests LAA).	Firelight 2014a; NGTL 2015a, 2015b; AiM 2021a; DRFN 2023b	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> <li>• Amendment-related effects on water quality are assessed in Section 7.</li> <li>• Amendment-related effects on soils are assessed in Section 10.</li> <li>• Amendment-related effects on vegetation are assessed in Section 11.</li> <li>• Waste management during construction is detailed in the CEMP.</li> <li>• PRGT acknowledges that Doig River First Nation has identified important harvesting habitat in these areas and will continue to engage with Doig River First Nation around how these areas will be managed during construction planning.</li> </ul>
Halfway River First Nation expressed concern about the decreasing population of moose and caribou, attributing these changes to industrial activity.	T8FNCAT 2012; Stantec 2021	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose and caribou are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> </ul>
McLeod Lake Indian Band expressed concern regarding potential effects of the Project on wildlife, including noise, habitat destruction and fragmentation and changes in predator-prey dynamics. McLeod Lake Indian Band also previously expressed concerns regarding changes in wildlife, reporting animals with green or yellow internal organs and a general decline in animal health particularly around areas of industrial development.	Firelight 2015	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> <li>• Waste management during construction is detailed in the CEMP.</li> <li>• Mitigation for spills is detailed in Appendix 6: Spill Contingency Plan of the CEMP.</li> </ul>
Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en indicated that salmon numbers have declined to a point of collapse and expressed concern for caribou.	April 2024 engagement	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for caribou are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> </ul>



**Prince Rupert Gas Transmission Project:**  
**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 12 Wildlife and Wildlife Habitat**  
August 2024

Comment	Sources	PRGT Response
<p>Nak'azdli Whut'en previously reported that large game species, in particular moose, are under increased hunting pressure. Nak'azdli Whut'en also noted concerns about woodland caribou and their habitat.</p> <p>Nak'azdli Whut'en expressed concerns about the health of traditionally hunted wildlife species and reported health issues, such as poor meat quality and cysts in large game species, especially moose. Nak'azdli Whut'en also reported concerns about the potential effects of gas leaks, noise, vibration, and dust pollution on terrestrial wildlife species. Nak'azdli Whut'en previously recommended baseline conditions for wildlife should be adequately understood, and key species (including moose and caribou) are monitored during the Project because Nak'azdli Whut'en members rely heavily on traditionally hunted wildlife species for daily subsistence and are significant to the identity and cultural construct of Nak'azdli Whut'en members.</p> <p>Nak'azdli Whut'en previously identified harvesting areas in the Phillip Creek area, which is intersected by the Eastern Route Alternative.</p>	CSTC 2014b	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> <li>• Amendment-related effects on water quality are assessed in Section 7.</li> <li>• Amendment-related effects on air quality are assessed in Section 5.</li> <li>• Amendment-related effects on soils are assessed in Section 10.</li> <li>• Waste management during construction is detailed in the CEMP.</li> <li>• Mitigation for spills is detailed in Appendix 6: Spill Contingency Plan of the CEMP.</li> <li>• PRGT acknowledges that Nak'azdli Whut'en has identified important harvesting habitat in this area and will continue to engage with Nak'azdli Whut'en around how this area will be managed during construction planning.</li> </ul>



**Prince Rupert Gas Transmission Project:**  
**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 12 Wildlife and Wildlife Habitat**  
August 2024

Comment	Sources	PRGT Response
<p>Saulteau First Nations previously noted that roads, traffic noise and the increase of recreational hunters has negatively affected wildlife. Ungulates such as moose, elk, and caribou were reported as declining, as well as furbearer populations (Golder 2013). Saulteau First Nations reported that the low numbers of caribou are a particular concern.</p> <p>An important issue for Saulteau First Nations is food security. The amount of contamination entering the food chain has been an issue of concern for Saulteau First Nations members as they have seen sickness in harvested moose such as growths in the meat and black blood. Because of this, harvesters explained that they cannot always eat the meat even after a successful hunt.</p>	<p>Firelight 2014c; Golder 2013</p>	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> <li>• Amendment-related effects on air quality are assessed in Section 5.</li> <li>• Amendment-related effects on water quality are assessed in Section 7.</li> <li>• Amendment-related effects on soils are assessed in Section 10.</li> <li>• Amendment-related effects on vegetation are assessed in Section 11.</li> <li>• Waste management during construction is detailed in the CEMP.</li> <li>• Mitigation for spills is detailed in Appendix 6: Spill Contingency Plan of the CEMP.</li> </ul>
<p>Takla Nation noted that caribou are an integral component of Takla Nation's culture and acknowledged that the Eastern Route Alternative has been routed to avoid the Moberly caribou herd. Takla Nation also noted that the many herds located in Takla Nation's territory are in decline, particularly the Takla herd.</p>	<p>July 2024 engagement</p>	<ul style="list-style-type: none"> <li>• PRGT acknowledges Takla Nation's comment around the importance of caribou and will continue to work with Takla Nation on this comment.</li> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• The length of the Amendment within caribou herd range is approximately 11 km shorter than the section of the approved route it would replace.</li> </ul>





**Prince Rupert Gas Transmission Project:**  
**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 12 Wildlife and Wildlife Habitat**  
August 2024

Comment	Sources	PRGT Response
<p>Takla Nation has expressed concern about effects on wildlife health, wildlife movement, and wildlife access as a result of Project activities including potential increase in traffic, noise and dust pollution, and contaminated soil and water resulting from leaks or spills associated with compression stations.</p>	<p>TLFN and Sharp 2014</p>	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> <li>• Amendment-related effects on air quality are assessed in Section 5.</li> <li>• Amendment-related effects on water quality are assessed in Section 7.</li> <li>• Amendment-related effects on soils are assessed in Section 10.</li> <li>• Amendment-related effects on vegetation are assessed in Section 11.</li> <li>• Waste management during construction is detailed in the CEMP.</li> <li>• Mitigation for spills is detailed in Appendix 6: Spill Contingency Plan of the CEMP.</li> </ul>
<p>West Moberly First Nations previously reported a decrease in caribou and moose population. West Moberly First Nations has indicated that oil and gas sites have caused changes in ungulates with harvesters noticing diseases, physical abnormalities, and changes in animal behaviour. The Pine River was previously identified as an important harvesting area and it is intersected and paralleled by the Eastern Route Alternative.</p>	<p>AiM 2021a</p>	<ul style="list-style-type: none"> <li>• Amendment-related effects of increased access on mortality risk for moose, caribou, and furbearers (marten and fisher) are assessed in Sections 12.3.1.3 and 12.3.2.3.</li> <li>• Amendment-related effects on vegetation are assessed in Section 11.</li> <li>• Amendment-related effects on wildlife habitat, including effects of disturbance, are assessed in Sections 12.3.1.1 and 12.3.1.2.</li> <li>• Waste management during construction is detailed in the CEMP.</li> <li>• Mitigation for spills is detailed in Appendix 6: Spill Contingency Plan of the CEMP.</li> </ul>



## 12.3 Amendment Effects Assessment

This section outlines the changes to the assessment methods, anticipated potential effects, anticipated residual effects, changes from the EAO Assessment Report (EAO 2014a) and Application (PRGT 2014a) effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment, for the wildlife and wildlife habitat VC. This assessment is informed by a desktop review of recent wildlife information available for the assessment boundaries, including summary metrics from publicly available spatial data.

Indicators for wildlife and wildlife habitat as assessed in the Application (PRGT 2014a) and having the potential to interact with effects of the Amendment are assessed. Indicators that do not have potential to interact with effects of the Amendment are excluded, which are marine birds, great blue heron *fannini* subspecies, western screech-owl, band-tailed pigeon, Canada warbler, and coastal tailed frog. Interactions with these species or species groups are not expected because the ranges and habitats of those indicators do not overlap with the wildlife and wildlife habitat assessment areas for the Amendment. Mountain goat is also excluded as an indicator because there are no UWRs or WHAs designated for mountain goat within 500 m of the Project footprint, which was the criterion for inclusion in the Application (PRGT 2014a). The wildlife indicators for the Amendment comprise 15 species or species groups:

- grizzly bear
- American marten
- fisher
- woodland caribou
- moose
- northern goshawk
- common nighthawk
- olive-sided flycatcher
- rusty blackbird
- old-forest songbird community
- young-forest songbird community
- grassland and shrubland songbird community
- wetland songbird community
- western toad
- pond-dwelling amphibians



### 12.3.1 Potential Effects and Mitigation Measures

The Application (PRGT 2014a) considered three potential effects for the wildlife and wildlife habitat VC: 1) change in habitat; 2) change in mortality risk, and; 3) change in movement. Based on the content of the Application (PRGT 2014a) and the information gathered during the Application review, the EAO Assessment Report (EAO 2014a) considered the same potential effects for the wildlife and wildlife habitat VC. A primarily qualitative approach is used for the assessment of effects on the wildlife and wildlife habitat VC (Table 12.6). In the absence of a quantitative approach, there are attributes of the Amendment that support a qualitative assessment:

- The Amendment is primarily in a well-travelled and well-studied area where other major projects (e.g., Enbridge T-South, BC Hydro transmission line), infrastructure (e.g., Highway 97, railway), and human development (e.g., recreational areas, forestry, agricultural, and residential) occur.
- The Amendment route is less remote than the section of the approved route it would replace and existing conditions are more disturbed by major projects and infrastructure.
- The Amendment will be adjacent to, or partially overlap with, existing disturbance to the extent feasible, and will do so more than the section of the approved route it would replace. Approximately 777 ha (45%) of the Project footprint overlaps existing disturbance, including 189 ha of the Enbridge T-South right-of-way.
- The Amendment is shorter, by approximately 60 km, than the section of the approved route it would replace.
- Species occurrence records are more readily available for the Amendment than was available for the section of the approved route it would replace (because of multiple other projects and human presence).

**Table 12.6 Potential Effects and Measurable Parameters for Wildlife and Wildlife Habitat**

Potential Effect	Measurable Parameter
Change in habitat	<ul style="list-style-type: none"> <li>• Change in habitat is assessed qualitatively for each indicator</li> </ul>
Change in movement	<ul style="list-style-type: none"> <li>• Change in movement is assessed qualitatively for each indicator</li> <li>• Habitat connectivity, corridor width, avoidance of temporary equipment or ancillary infrastructure</li> <li>• Spatial extent and temporal duration of terrestrial construction equipment, and number and location of permanent above-ground facilities</li> </ul>
Change in mortality risk	<ul style="list-style-type: none"> <li>• Change in mortality risk is primarily assessed qualitatively</li> <li>• Change in linear feature density (km/km<sup>2</sup>) as a correlate of access potential is used to inform the assessment for grizzly bear, moose, and caribou</li> <li>• Change in trapping pressure on marten or fisher as a correlate of new access the Project will provide to active and inactive trapline tenures</li> </ul>



### **12.3.1.1 Change in Habitat**

The Amendment has the potential to cause a change in habitat for the selected indicators. The assessment of potential effects on wildlife and wildlife habitat for this Amendment uses a qualitative approach and relies on publicly available information within the terrestrial wildlife LAA, knowledge of the assessment area and project activities, experience of the assessment team with pipeline projects in northern BC, consideration of factors that contribute to the sensitivity of a species or species group to the project-specific effect mechanisms, and consideration of the project design.

The primary pathway for change in habitat is vegetation clearing associated with construction of the Project and sensory disturbance (e.g., noise, vibration) associated with construction and operation resulting in habitat avoidance or decreased habitat use. Approximately 45% of the Project footprint overlaps existing disturbance features, which will reduce the amount of undisturbed habitat that could be affected by the Amendment.

Mitigation measures identified in the Application (Table 14-14 in PRGT 2014a) and the CEMP (PRGT 2016) and associated management plans that are applicable to change in habitat are expected to be applicable to the Amendment. There is one addition to the mitigation described in the Application (PRGT 2014a), which is the inclusion of pre-clearing surveys for pileated woodpecker nest cavities and subsequent mitigation (ECCC 2023). A pileated woodpecker nest cavity that is not 'abandoned' is protected under the Migratory Birds Regulations, 2022.<sup>2</sup> A pileated woodpecker nest may be removed or relocated before it is considered abandoned subject to certain criteria and issuance of a permit under the Migratory Birds Regulations.

### **12.3.1.2 Change in Movement**

The Amendment has the potential to cause a change in movement for the selected indicators. Change in movement is assessed qualitatively relative to existing conditions for wildlife and relative to the Application (PRGT 2014a). The qualitative assessment is based on available literature, knowledge of the assessment area and project activities, experience of the assessment team with pipeline projects in northern BC, consideration of factors that contribute to the sensitivity of a species or species group to the project-specific effect mechanisms, consideration of the project design and mitigation measures, and professional judgment.

The effect pathway for change in movement is the alteration or impediment of wildlife movement due to vegetation removal (i.e., creation of gaps in forested habitat), physical barriers, and sensory disturbance. The project-related effect mechanisms are vegetation clearing for the right-of-way and temporary workspace during the construction phase, maintenance of the right-of-way during the operation phase, presence of physical barriers (e.g., open pipeline trench, strung pipe, topsoil piles) during the construction phase, and sensory disturbance related to vehicles, machinery, and human activity during the construction phase.

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<sup>2</sup> 'abandoned' means a nest cavity that has not been used by pileated woodpecker or any other migratory bird for a period of 36 months since it was last used.



Mitigation measures identified in the Application (Table 14-14 in PRGT 2014a) and the CEMP (PRGT 2016) and associated management plans that are applicable to change in movement (i.e., mitigation measures that focus on landscape connectivity and wildlife sensory disturbance) are expected to be applicable to the Amendment.

### **12.3.1.3 Change in Mortality Risk**

The Amendment has the potential to cause a change in mortality risk for the selected indicators through increased access by people and predators. Change in mortality risk was assessed for grizzly bear, moose, and caribou because the relationships between changes in access and changes in mortality risk are generally well-documented for those species (PRGT 2014a). Change in mortality risk was assessed for marten and fisher because increased access may result in increased trapping pressure. Mitigations described in the Application (Table 14-4 in PRGT 2014a) and the CEMP (PRGT 2016) and associated management plans for change in mortality risk are applicable to the Amendment. Since the Application (PRGT 2014a) was approved, residence descriptions under SARA for bank swallow and barn swallow have been made available (ECCC 2022). These descriptions affect existing mitigations relating to the timing windows for these species. These changes will be reflected in an update to the CEMP.

#### **12.3.1.3.1 Grizzly Bear**

The effect mechanism for change in mortality risk for grizzly bear is primarily through increased human access opportunities via the Project footprint, as described in the Application (PRGT 2014a). Mortality risk for grizzly bear has been altered since the EAO Assessment Report (EAO 2014a) because the province halted grizzly bear trophy hunting in 2017. Grizzly bear mortality risk however may still be high in some areas from collisions with vehicles or trains, bear-human conflict (FLNRORD and MECCS 2022; Lamb et al. 2023), and illegal hunting.

#### **12.3.1.3.2 Caribou**

The Project footprint overlaps three caribou herd ranges (Section 12.1), one of which is now extirpated. Project presence in the operation phase was identified as the primary effect mechanism for change in mortality risk for caribou (EAO 2014a). Linear features increase mobility of caribou predators and alter predator-prey-dynamics, an effect that is expected to last through the operation phase and beyond (PRGT 2014a).

#### **12.3.1.3.3 Moose**

The primary effect mechanism for change in mortality risk for moose is increased linear feature density resulting in increased access for predators and hunters during the operation phase (EAO 2014a). The Project footprint overlaps 142 ha of designated moose UWR and the terrestrial wildlife LAA overlaps 2,881 ha of moose UWR (Table 12.2), where moose may be particularly vulnerable to changes in access. The provincial government has been undertaking research projects to determine the causes of declines in moose populations in central BC from 2012-2023 (Government of BC 2023). Some of the areas chosen for study are in proximity to the terrestrial wildlife LAA, including Moberly and West Parsnip. Results of the study to date indicate that increased disturbance was not linked to increased mortality of adult cows but



investigation into effects of disturbance on calf mortality is still ongoing (Anderson et al. 2023). The study did not assess effects of disturbance on mortality of bulls.

#### 12.3.1.3.4 Marten and Fisher

Marten and fisher are assessed as a group. The cleared area within the Project footprint will provide the effect mechanism of mortality risk from increased human access and a potential subsequent increase in trapping pressure for at least the duration of the operation phase as described in the Application (PRGT 2014a). Fisher harvest is closed in the Omineca region (west of Pine Le Moray Park; Government of British Columbia 2022a) to protect the red-listed Columbian fisher population but fisher is often caught as by-catch by trappers targeting marten (Fogarty et al. 2022).

### 12.3.2 Residual Effects

Potential residual effects of this Amendment on the selected indicators are predicted to be less than effects predicted for the section of the Application (PRGT 2014a) that the Amendment would replace. Potential residual effects include a change in habitat, change in movement, and change in mortality risk, but to a lesser extent than the approved alignment because this Amendment would lessen the overall Project footprint, and the spatial extent of maintenance and inspection activities during operation.

#### 12.3.2.1 Change in Habitat

The Amendment is approximately 172 km in length, which is approximately 60 km shorter than the section of the approved route it would replace. The Amendment has a Project footprint that is 1,714 ha based on an assumed 100-m wide construction corridor, although the entirety of this area is not expected to be needed for construction or operation. Approximately 45% of the Project footprint overlaps with areas that are already disturbed.

The area west of where the Amendment crosses Highway 39 is comprised of a mosaic of forested habitat and disturbed area. East of where the Amendment crosses Highway 39 the route is largely within 1 km of Highway 97, Enbridge's T-South pipeline right-of-way and/or the BC Hydro transmission line and traverses forested and disturbed areas. T-South branches off to the south of the Amendment just southwest of the Hwy 39 intersection.

Clearing of forested areas may increase available habitat for open-habitat species such as common nighthawk, killdeer, and bats, although those areas may be temporarily avoided or used less often while vegetation clearing and construction activities are occurring. Overall, the shorter route and relatively more disturbed landscape that the Amendment traverses is expected to result in reduced residual effects relative to the section of the approved route it would replace.

The Project footprint overlaps 115 ha of the Nation GBAA, 1,255 ha of the Moberly-Hart GBAA, and 345 ha of the Omineca East GBAA. The Project footprint overlaps a mosaic of forested and disturbed areas and is relatively more disturbed than the section of the approved route that the Amendment replaces. Some disturbed areas, such as areas with abundant berry-producing shrubs, may provide effective habitat for grizzly bear. The Amendment is also approximately 60 km shorter than the section of



the approved route it would replace. Because of the more disturbed environment and reduced route length, residual effects on grizzly bear are expected to be less relative to the section of the approved route it would replace.

The terrestrial wildlife LAA overlaps with the Burnt Pine, Kennedy Siding, and Moberly/Klinse-za caribou herd ranges. The Project footprint overlaps 817 ha of the Kennedy Siding caribou herd range and 410 ha of the Moberly/Klinse-za caribou herd range (Table 12.3). Although the terrestrial wildlife LAA overlaps 152 ha of high-elevation winter range for the Kennedy Siding herd, high-elevation winter range is not overlapped by the Project footprint (Figure 12.3; Table 12.3). Effective caribou habitat was defined as all structural stage 4 through 7 forest within caribou herd range (Appendix P, Section 6.1.5.4 in PRGT 2014a). The Amendment overlaps a mosaic of forested and disturbed areas and is relatively more disturbed than the section of the approved route the Amendment replaces. Approximately 45% of the Project footprint overlaps existing disturbances, which are not expected to provide effective habitat for caribou. The length of the Amendment within caribou herd range is approximately 11 km shorter than the section of the approved route it would replace, which is also expected to reduce residual effects on caribou relative to the approved route.

### **12.3.2.2 Change in Movement**

The section of the Project footprint that is west of the Parsnip River traverses an area that is primarily a mosaic of harvested and forested areas and forestry roads. This landscape context is comparable to the section of the approved route that the Amendment would replace. For this reason, during all project phases, the section of the Project footprint that is west of the Parsnip River is predicted to have residual effects on movement for the terrestrial wildlife indicators that are consistent with those predicted for the Application (PRGT 2014a).

The section of the Project footprint that is northeast of the Parsnip River runs through an area that has been subject to a variety of human activity, vegetation clearing, and industrial and linear development that has occurred over several decades.<sup>3</sup> This landscape context is more developed, and has a longer history of development, than the section of the approved route that the Amendment would replace (except for the north end of the approved route that would have traversed agricultural lands in the vicinity of Beryl Prairie). The Pine and Misinchinka river valleys may be used as movement corridors for wildlife, particularly large mammals (e.g., ungulates, canids, bears), and it is expected that the present patterns of wildlife movement within these valleys reflect past and current disturbances, including potentially altered historical daily and seasonal routes and behaviours.

Wildlife present within the Pine and Misinchinka river valleys may be more tolerant of disturbance or less abundant because of existing disturbance. However, during the construction phase, the section of the Project footprint that is west of the Parsnip River is predicted to have residual effects on movement for the terrestrial wildlife indicators that are broadly consistent with those predicted for the Application (PRGT 2014a). This is because novel or infrequent disturbances (e.g., vegetation clearing, pipeline construction) and temporary barriers created by equipment and construction activities are assumed to

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<sup>3</sup> For example, the section of Highway 97 from Prince George to Dawson Creek ('John Hart Highway') was officially opened in 1952 (Roberts 1990)





affect wildlife movement similarly (e.g., through deflection, hesitancy, retreat, attraction) regardless of the landscape context.

The section of the Project footprint that is northeast of the Parsnip River has extensive direct and indirect overlap with existing disturbances. Direct overlap occurs where the Project footprint crosses or shares space with existing areal disturbances (e.g., cutblocks, rural lands, pipeline, and utility rights-of-way). Indirect overlap occurs where a sensory 'zone of influence', often resulting from nearby noise or human activity, such as for Highway 97, overlaps the Project footprint or the LAA. The Project footprint is within 1 km of Highway 97 for approximately 107 km of its length and overlaps with existing disturbances (Section 12.3.2.1; Figure 12.1). This extensive overlap reduces the creation of new forest habitat fragmentation compared to the Application (PRGT 2014a) and based on the landscape contexts in which present patterns of wildlife movement have been established, reduces the incremental contribution to disruption of wildlife movement compared to the Application (PRGT 2014a). The section of the Project footprint that is northeast of the Parsnip River will increase the width of existing forest gaps in some locations (e.g., where the route is contiguous with the Enbridge T-South right-of-way in the Pine Pass area). However, during the operation phase, overall and primarily because of the difference in development intensity, the section of the Project footprint that is northeast of the Parsnip River is predicted to have residual effects on movement for the terrestrial wildlife indicators that are less adverse than those predicted for the Application (PRGT 2014a).

### **12.3.2.3 Change in Mortality Risk**

The Amendment is likely to result in a change in mortality risk for some wildlife indicators because of predators and people. Residual effects are expected for grizzly bear, caribou, moose, and marten and fisher.

#### **12.3.2.3.1 Grizzly Bear**

Change in grizzly bear mortality risk was assessed using:

- Change in grizzly bear habitat suitability as a function of linear feature density
- Change in core security habitat (areas greater than 10 km<sup>2</sup>)

For individual GBAs, the residual decrease in habitat suitability as a function of linear feature density at Amendment case ranges from 0.4% to less than 0.1% (Table 12.7).



**Table 12.7 Change in Grizzly Bear Habitat Suitability (Class 1 to Class 3) as a Function of Linear Feature Density**

Grizzly Bear Assessment Area	Base Case (ha)	Amendment Case (ha)	Change (ha)	Change (%)
Nation	165,178	165,160	-18	<0.1
Moberly/Hart	395,692	395,478	-214	<0.1
Omineca East	130,119	129,625	-494	-0.4

The area of core security habitat is 48% for the Nation GBAA at base case and Amendment case, 49% for the Omineca East GBAA at base case and Amendment case, and 62% for the Moberly/Hart GBAA at base case and Amendment case. The province has not defined thresholds for core security area, but the interim provincial cumulative effects assessment protocol uses a threshold of 60% (PGBTWG 2020). For individual GBAA's, the residual decrease in core security habitat at Amendment case is less than 0.5%, ranging from 0.4% (1,928 ha) to less than 0.1% (23 ha) (Table 12.8).

**Table 12.8 Change in Grizzly Bear Habitat Core Security Habitat**

Grizzly Bear Assessment Area	Core Area	Base Case (ha)	Amendment Case (ha)	Change (ha)	Change (%)
Nation	>10 km <sup>2</sup>	290,894	290,871	-23	<0.1
	<10 km <sup>2</sup>	35,803	35,725	-78	-0.2
Moberly/Hart	>10 km <sup>2</sup>	541,876	539,948	-1,928	-0.4
	<10 km <sup>2</sup>	30,367	30,855	498	1.6
Omineca East	>10 km <sup>2</sup>	257,841	257,411	-430	-0.2
	<10 km <sup>2</sup>	24,784	24,814	30	0.1

Linear feature density itself was not characterized as a residual effect in the Application (PRGT 2014a) but was reported as a means to identify potential concerns for grizzly bear (PRGT 2014a). A linear disturbance threshold of 0.6 km/km<sup>2</sup> is used to indicate potential changes in mortality risk for grizzly bear in this Amendment, consistent with the Application (PRGT 2014a).

At base case, linear density in all three GBAA's exceeds the 0.6 km/km<sup>2</sup> threshold (Table 12.9). In all three GBAA's the change in linear feature density at Amendment case is less than 0.01 km/km<sup>2</sup> (Table 12.9). The increase at Amendment case is partly moderated by the location of the Project footprint (within 1 km of Highway 97 in most sections and overlapping existing disturbances over 45% of the footprint area) and by its reduced length compared to the section of the approved route that the Amendment would replace (Section 12.3.2.1; Figure 1.1).



**Table 12.9 Change in Linear Feature Density within Grizzly Bear Assessment Areas**

Grizzly Bear Assessment Area	Base Case (km/km <sup>2</sup> )	Amendment Case (km/km <sup>2</sup> )	Change (km/km <sup>2</sup> )	Change (%)
Nation	1.68	1.68	<0.01	<0.1
Moberly/Hart	1.41	1.43	0.02	1.0
Omineca East	1.81	1.82	0.01	0.4

#### 12.3.2.3.2 Moose

Consistent with the Application (PRGT 2014a), 1.6 km/km<sup>2</sup> is considered a threshold for linear feature density for Project effects on moose mortality risk. Linear feature densities within the GBAs (Table 12.9) were used to assess moose mortality risk. At base case, linear feature density in the Nation and Omineca East GBAs exceeds the threshold for moose. The increased linear feature density at Amendment case is partly moderated by the proximity of the Project footprint to Highway 97 and other roads, as areas within 1 km of a paved or gravel road are already considered 'disturbed' (Provincial Moose Technical Working Group [PMTWG] 2018). As well, the Amendment route is up to 60 km shorter than the section of the approved route that the Amendment would replace (Section 12.3.2.1; Figure 1.1). With the Amendment's proximity to, and overlap with, existing disturbance, and the shorter overall length in moose habitat (Section 12.3.2.1), the potential for increased access is less than that of the Application (PRGT 2014a).

#### 12.3.2.3.3 Caribou

As described in the EAO Assessment Report (EAO 2014a), linear feature densities of 0.8 km/km<sup>2</sup> and 1.2 km/km<sup>2</sup> are considered the precautionary and critical thresholds, respectively, for project effects on caribou mortality risk for this assessment. A precautionary threshold of 0.8 km/km<sup>2</sup> is considered significant if the effect is not reversible in the long term and would hinder conservation or management actions. If linear feature density exceeds the critical threshold of 1.2 km/km<sup>2</sup>, the effect is considered significant regardless of its reversibility. Linear feature density for all three caribou herds exceeds the critical threshold at base case (Table 12.10). The increase in linear feature density at Amendment case for the Burnt Pine, Kennedy Siding, and Moberly/Klinse-za herds ranges from less than 0.01 km/km<sup>2</sup> to 0.04 km/km<sup>2</sup> (Table 12.10). The increase at Amendment case is partly moderated by the shorter length of the Project footprint (11 km shorter through caribou herd range) and its location (within 1 km of Highway 97 for 107 km of its length), and its overlaps with existing disturbances; approximately 45%; (Section 12.3.2.1; Figure 12.1).



**Table 12.10 Change in Linear Feature Density within Caribou Herd Areas**

<b>Caribou Herd Area</b>	<b>Base Case km/km<sup>2</sup></b>	<b>Amendment Case (km/km<sup>2</sup>)</b>	<b>Change (km/km<sup>2</sup>)</b>	<b>Change (%)</b>
Burnt Pine	1.84	1.84	<0.01	0.1
Kennedy Siding	1.18	1.22	0.04	3.2
Moberly/Klinse-za	1.22	1.23	0.01	0.5

#### 12.3.2.3.4 Marten and Fisher

There are nine trapline tenures (active or inactive) that intersect the Project footprint. The Project footprint is expected to provide additional access for trappers and may result in increased trapping mortality of marten and fisher. The current rate of trapping mortality for the Columbian fisher population has been characterized as unsustainable (Fogarty et al. 2022).

The increase in access is partly moderated by the shorter length of the Project footprint and the Project footprint's location (within 1 km of Highway 97 along 107 km of its length). Approximately 45% of the Project footprint overlaps existing disturbances; Section 12.3.2.1; Figure 12.1), characteristics that will reduce the creation of new access.

### 12.3.3 Changes to Characterization of Residual Effects

The EAO Assessment Report (EAO 2014a) concluded that project effects on wildlife and wildlife habitat are predicted to be not significant, except for residual effects for caribou. Relative to the EAO's characterization of residual effects of the Project for the wildlife and wildlife habitat VC, no changes have been identified for effect pathways and wildlife indicators assessed for the Amendment (Table 12.11).



Table 12.11 Changes to EAO Assessment Report Characterization of Residual Effects

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<b>Grizzly bear:</b> High	<i>Grizzly bear</i> are highly sensitive to human disturbance. Existing average linear disturbance within the GBAA in all but the westernmost GBAA currently exceeds or is approaching the recommended road density threshold of 0.6 km/km <sup>2</sup> . The GBPU that would be traversed by the Project are not considered threatened.	No change
	<b>Caribou:</b> High	<i>Caribou</i> herds that would be affected by the proposed Project are part of a population unit listed as threatened under SARA. Caribou have a high sensitivity and low resilience to human disturbance and some subpopulations have high levels of disturbance currently within their ranges.	No change
	<b>Moose:</b> Moderate	<i>Moose</i> generally have a low sensitivity to habitat disturbance; however, moose in the NWA have declined substantially in recent years and may have a higher sensitivity to disturbance. Moose are more sensitive to human and predator-caused mortality which may be facilitated by disturbance that facilitates increased access.	No change
	<b>Mountain goat:</b> Moderate	<i>Mountain goats</i> are highly sensitive to human caused disturbance, however mountain goat populations in the regions that would be traversed by the route are considered stable.	Not applicable; the Amendment does not overlap with mountain goat range
	<b>Marten:</b> Low	<i>Marten</i> are not a species of conservation concern provincially or federally and have a low sensitivity to human caused disturbance.	No change
	<b>Fisher:</b> Moderate	<i>Fisher</i> have a moderate to high sensitivity to human disturbance as they use mature and old forests, have large home ranges and low reproductive rates.	No change
	<b>Birds and amphibians:</b> Low to high	The sensitivity of <i>bird and amphibian</i> species ranges from low to high depending on their ability to use disturbed habitat, their reliance on early or late seral stage habitat and their current population status.	No change

<sup>4</sup> The text in italics was copied from the Environmental Assessment Office Assessment Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Magnitude	<b>Grizzly bear:</b> Moderate	<i>The magnitude of potential effects to <b>grizzly bear</b> is considered moderate because of the proposed Project's contributions to linear density and mortality risk to grizzly bear. Habitat suitability as a function of linear density would decrease by 0.2% to 0.9% in GBAA's, and core security area would decrease by 0.8% to 4.2% in GBAA's.</i>	No change
	<b>Caribou:</b> Moderate	<i>The magnitude to <b>caribou</b> is considered moderate. EAO considered the location of the proposed Project and that it would not impact provincially identified seasonal ranges, or high use areas, but would still occur within herd boundaries and areas of potential lower use by caribou, resulting in a likely increase in mortality risk. The linear nature of the disturbance would create the potential for increased predation in these areas, a key threat to caribou. EAO also considered the current level of habitat disturbance and predation already occurring for caribou and that available mitigation to reduce impacts of increased predation are still unproven and cannot be relied upon to completely or greatly reduce those effects. Magnitude is considered in relation to recovery strategies and plans.</i>	No change
	<b>Moose:</b> Low to Moderate	<i>The magnitude of residual effects to <b>moose</b> is considered low to moderate because, although there are impacts to moose habitat, moose are less sensitive than other species to habitat disturbance. Effects from access are expected to be mitigated to a low level with implementation of the Access Management Plan. Effects in the Nass Wildlife Area are considered to be moderate because of the substantial declines that have already occurred.</i>	No change
	<b>Mountain Goat:</b> Low	<i>The magnitude of residual effects to <b>mountain goat</b> is considered low. There is no direct disturbance to mountain goat UWR.</i>	Not applicable; the Project footprint does not overlap mountain goat range
	<b>Marten and Fisher:</b> Low	<i>The magnitude of residual effects to <b>marten</b> and <b>fisher</b> is considered low because the mitigation proposed to minimize habitat disturbance and fragmentation and create rollbacks to provide cover are expected to reduce the potential effects.</i>	No change
	<b>Amphibians:</b> Low <b>Birds:</b> Low/negligible	<i>The magnitude of residual effects to <b>amphibians and birds</b> is considered low because the mitigation proposed to minimize habitat disturbance and fragmentation is expected to reduce the residual adverse effects.</i>	No change



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Extent</i>	<b>Grizzly bear, caribou, moose, mountain goat, fisher, marbled murrelet:</b> Regional <b>Amphibians, birds, marten:</b> Local	<i>Residual effects of alteration of habitat, effects on movement and mortality risk would be limited to a local scale (LAA) for most indicator species, except for large mammals and fishers where residual effects for mortality risk and disturbance extend to a regional scale (RAA, GBAA for grizzly bear, and herd range for caribou).</i>	No change; the Amendment does not overlap with mountain goat, marbled murrelet or coastal tailed frog range
<i>Duration</i>	<i>Medium- to long-term</i>	<i>The duration of effects on wildlife are driven by the re-establishment of native vegetation along the ROW, in particular treed habitat, which would not occur until well after decommissioning and abandonment, The re-establishment of herbaceous, shrub land and grassland habitat for grassland, riparian and water / marine birds would occur in a shorter time frame, however, habitat alteration would be long-term considering time for regeneration after reclamation. Residual effects on large mammals from increased access by humans and predators are expected to persist for the long-term.</i>	No change
<i>Reversibility</i>	<i>Reversible</i>	<i>Effects to wildlife are expected to be reversible in the long term upon reclamation of the ROW.</i>	No change
<i>Frequency</i>	<i>Isolated to periodic, continuous</i>	<i>Effects to habitat from vegetation clearing during construction would occur once and clearing for maintenance activities would occur periodically. Mortality risk from construction would occur once and from maintenance activities periodically; however, the primary causes of mortality risk (creation of access) would be ongoing and continuous due to the permanent ROW. Disturbance from permanent facilities such as compressor and meter stations would be continuous.</i>	No change
<i>Likelihood</i>	<i>The proposed Project has a high likelihood of resulting in adverse effects by altering habitat, changing wildlife movement, and increasing the risk of mortality.</i>		No change





Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Significance	<p><i>For wildlife, residual adverse effects are considered significant when there is a long-term or irreversible residual adverse effect that is predicted to exceed an acceptable biological threshold or standard, or is predicted to affect a population such that stated management or conservation objectives might not be attainable.</i></p> <p><i>EAO considered the moderate magnitude of effects on <b>grizzly bear</b>, the sensitivity of grizzly bears to human caused disturbance and the long-term duration of these effects. EAO proposes a condition requiring mitigation to address sensory disturbance to grizzly bears and the risks of creating new access, including monitoring to determine the effectiveness of mitigation and adaptive management to address the results of monitoring. In consideration of the above, including the proposed condition, EAO concludes that residual Project effects to grizzly bear are not likely to be significant based on continued monitoring and adaptive management and the current status of grizzly bears.</i></p> <p><i>EAO considered the moderate magnitude, long-term duration of residual effects on <b>caribou</b>. An important aspect of EAO's consideration is the context of the caribou subpopulations, and the ongoing federal and provincial government efforts to support caribou recovery. EAO also considered the proposed condition requiring a mitigation and monitoring plan to address the potential mortality risk to caribou. It is also recognized that mitigation measures are not yet proven for caribou, and an adaptive management approach would be required as part of the plan. In consideration of the above, including the proposed condition, EAO concludes that residual Project effects to caribou are significant.</i></p> <p><i>EAO considered the low to moderate magnitude of residual effects on <b>moose</b> and potential long-term duration of the effect. With the Proponent's proposed mitigations, as well as conditions requiring development and implementation of management plans, and ongoing government efforts at moose recovery, EAO concludes that residual effects would be not significant.</i></p> <p><i>EAO considered the low magnitude of residual effects on <b>mountain goat</b>, and the potential long-term duration of those effects. With the Proponent's proposed mitigations, as well as conditions requiring development and implementation of management plans and site-specific mitigation, EAO concludes that residual adverse effects would be not significant.</i></p> <p><i>EAO considered the low magnitude of residual adverse effects on the <b>remaining wildlife species</b> and short to long term duration. EAO concludes that residual effects would be not significant.</i></p>		-



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Confidence	<p>The level of confidence is determined by the availability of data, the understanding of the project-VC interaction and effectiveness of mitigation.</p> <p><i>Low to Moderate Confidence – There is low to moderate level confidence in the significance determination for <b>grizzly bear</b>. It is likely that there would be adverse effects to grizzly bears resulting from the proposed Project, however there is considerable uncertainty regarding the magnitude these effects at the landscape or sub-population level, particularly on the eastern portion of the route where lower population densities and higher access densities mean populations are more at risk from further disturbance. There is also uncertainty regarding the effectiveness of mitigation, either proposed or yet to be developed. In light of this uncertainty, EAO has proposed conditions requiring the Proponent to develop a mitigation and monitoring plan for grizzly bear that includes an adaptive management strategy, and requiring the Proponent to participate in a program to support the conservation and management of regional grizzly bear populations.</i></p> <p><i>Low Confidence – There is a low confidence in the significance determination for <b>caribou</b>. There is a good general understanding that linear features in caribou ranges can contribute to the alteration of predator-prey dynamics and result in increased mortality risk to caribou, however the magnitude of effects to caribou from this proposed Project depends on caribou and predator movement on and around the ROW and are difficult to predict. In addition, the project impacts to overall retention and condition of matrix habitat are unknown at this time. There is low confidence in the effectiveness of mitigation related to controlling predator access and efficiency on linear corridors as it has not been proven to be effective and it is uncertain the degree to which mitigation may be successful.</i></p> <p><i>Moderate to High Confidence – There is moderate to high confidence in the significance determination for <b>moose</b>, based on a good understanding of the cause-effect relationship, but moderate confidence in the effectiveness of mitigation related to access management. To address this uncertainty, EAO proposes a condition requiring monitoring to assess the effectiveness of mitigation for moose, as well as a condition specific to mitigation and monitoring for moose in the NWA. An access management plan is proposed as a condition with requirements for monitoring the effectiveness of the plan. EAO also proposed a condition regarding development of a Plan to support the implementation wildlife mitigation measures identified in the Application.</i></p> <p><i>High Confidence – There is high confidence in the significance determination for <b>mountain goat</b> based on a good understanding of the cause-effect relationship and availability of data for the proposed Project area.</i></p>		No change



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>4</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Confidence (cont'd)	<p><i>High Confidence – There is high confidence in the significance determination for <b>marten and fisher</b> based on a good understanding of the cause-effect relationship and data pertinent to the proposed Project area.</i></p> <p><i>Moderate to High Confidence – There is moderate confidence in the significance determination for <b>amphibians</b>, except coastal tailed frog which has high confidence. There is good understanding of cause-effect relationships and data pertinent to the proposed Project area, except that there are limited data related to hibernation habitat for western toad and effects to hibernating pond- dwelling amphibians.</i></p> <p><i>High Confidence – There is high confidence in the significance determination for <b>birds</b> based on a good understanding of the cause-effect relationship and data pertinent to the proposed Project area.</i></p>		



#### **12.3.4 Cumulative Effects Assessment**

The cumulative effects assessment for wildlife and wildlife habitat followed the same general process as described in the Application (PRGT 2014a). The main difference is that the cumulative effects assessment is qualitative for those indicators that were carried forward for detailed assessment in the Application (PRGT 2014a). Activities and projects listed as likely to act cumulatively with the Project are listed in the Application (Appendix D in PRGT 2014a). Additional activities and projects that may interact cumulatively with the Amendment are listed in Appendix A of this Amendment.

The Application (PRGT 2014a) and EAO Assessment Report (EAO 2014a) determined that adverse cumulative effects related to change in habitat and change in movement were not anticipated. EAO concluded in its Assessment Report (EAO 2014a) that cumulative effects were likely for change in mortality risk for grizzly bear, caribou, and moose, driven by increases in linear feature development and associated increases in human and predator access potential. Cumulative effects were characterized as not significant for grizzly bear and moose, but significant for caribou. The cumulative contribution of the Amendment to change in mortality risk for grizzly bear, caribou, and moose is expected to be smaller than that of the Application (PRGT 2014a) because the Amendment would result in a shorter route overall.

The contributions of the Amendment to cumulative effects on mortality risk are likely to be similar to or less than those associated with the Application (PRGT 2014a), as described above. No additional indicators were identified as needing a detailed cumulative effects assessment because of the updated Project Inclusion List (Appendix A) and the residual effects identified for wildlife and wildlife habitat in this Amendment (Section 12.3.2).

#### **12.3.5 Risks and Data Uncertainty**

The assessment of effects for wildlife and wildlife habitat is primarily qualitative for this Amendment. A desktop review of publicly available information was completed. Field surveys are planned to support detailed mitigation planning and relevant results will be incorporated into the CEMP (PRGT 2016) and environmental alignment sheets. This assessment makes use of publicly available information on wildlife occurrences, habitat, and distributions such as the caribou herd ranges, GBPU's and GBAA's, status designations of species and populations, and regulatory changes (i.e., closed harvest for grizzly bear and the Columbian fisher population; updates to the Migratory Birds Regulations).

Recent information on moose population trends was not available and the reasons for the previously noted decline in moose populations are still unclear. Data uncertainties that remain valid from the Application (PRGT 2014a) are related to the effectiveness of access management mitigation to reduce the potential for increased mortality of grizzly bear, caribou, moose, and fisher and marten. However, preliminary results from an access monitoring program for the North Montney Mainline Project in northeast British Columbia indicate that access management measures can be effective at reducing motorized vehicle access along a pipeline right-of-way relative to sections of right-of-way where access mitigation is not implemented (NOVA Gas Transmission Ltd. 2023).



## 13 Employment

Employment was selected as a VC in the Application (PRGT 2014a) to assess potential adverse effects of the Project on local and regional employment and labour force capacity. The employment VC in the Application (PRGT 2014a) assessed the adverse impacts to employment, including: change in labour availability, change in wage rates, change in training requirements, and change in in-migration and labour force stability. The Project's positive effects on regional employment was also provided in the Application (PRGT 2014a).

Spatial boundaries in the Amendment follow the same approach used in the Application (PRGT 2014a). The LAA for Employment in the Application (PRGT 2014a) was divided into six sub-regions. Each sub-region included census subdivisions located within a 200 km corridor (i.e., 100 km on each side) of Project infrastructure that were located within the geographical boundaries of five regional districts (Bulkley-Nechako, Fraser-Fort George, Kitimat-Stikine, Peace River and Skeena-Queen Charlotte) and Nisga'a lands. Of the six sub-regions, the Eastern Route Alternative interacts with three sub-regions: Bulkley-Nechako, Peace River, and Fraser-Fort George. These sub-regions are considered in the Employment LAA for the Amendment.

The RAA for Employment in the Application (PRGT 2014a) included the sub-regions in the LAA as well as communities outside of the LAA that may serve as staging communities or services hubs to the Project by providing some of the labour, goods, and services needed for construction and operation. The City of Prince George and the City of Fort St John, as the closest large communities to the Eastern Route Alternative, are anticipated to act as staging communities. These communities are therefore included in the Employment RAA for the Amendment Application.

The census subdivisions within the LAA and RAA for the Employment VC are illustrated in Table 13.1, Table 13.2 and Figure 13.1.

**Table 13.1 Census Subdivisions in the LAA**

Sub-Region	Census Subdivision	Included in Application
Peace River	Chetwynd, District Municipality	Yes
	East Moberly Lake 169, Reserve Lands (Saulteau First Nations)	Yes
	Halfway River 168, Reserve Lands (Halfway River First Nation)	Yes
	Hudson's Hope, District Municipality	Yes
	Peace River B, Regional District Electoral Area	Yes
	Peace River C, Regional District Electoral Area	No
	Peace River D, Regional District Electoral Area	No
	Peace River E, Regional District Electoral Area	Yes
	Tumbler Ridge, District Municipality	No
	West Moberly Lake 168A, Reserve Lands (West Moberly First Nations)	No



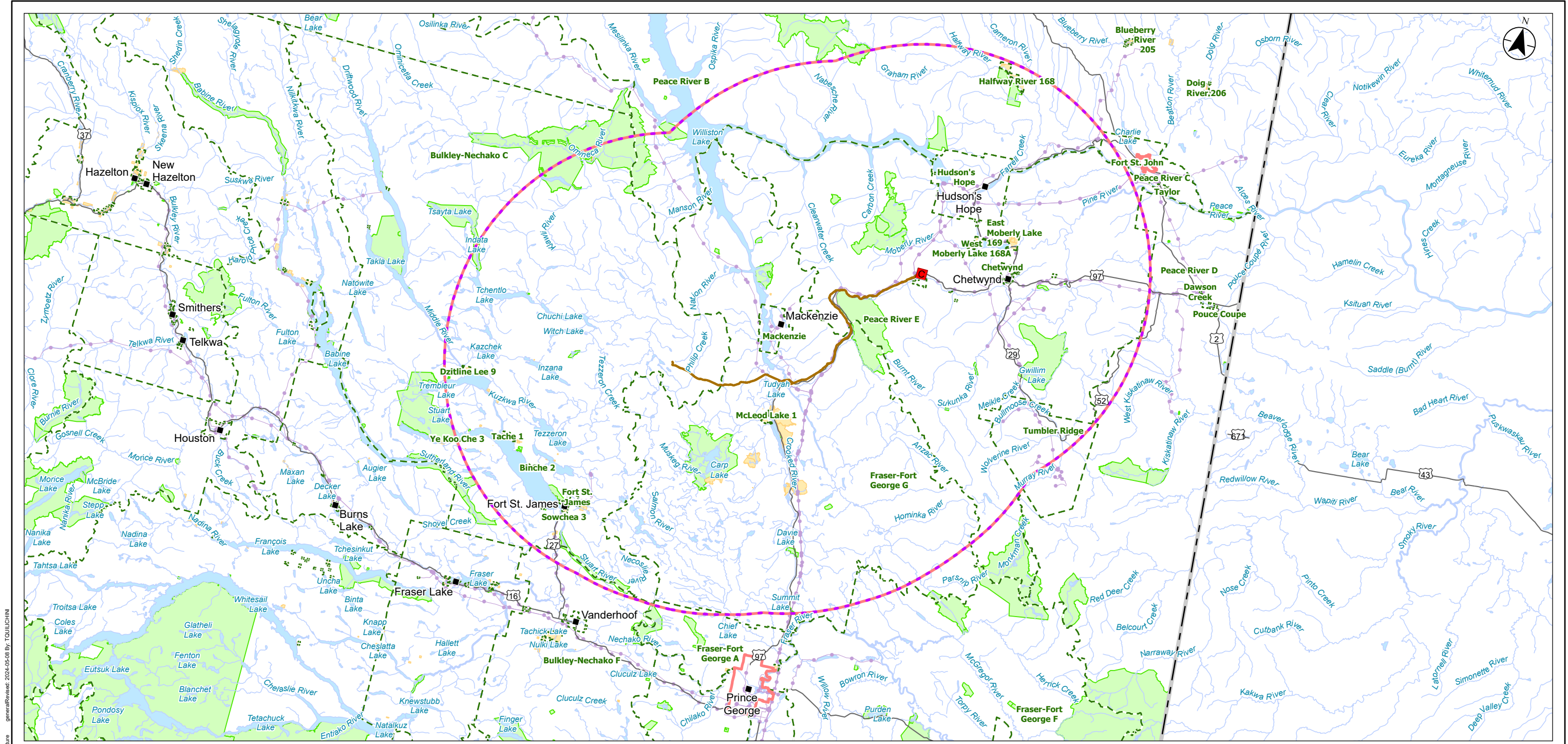
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Sub-Region	Census Subdivision	Included in Application
Fraser-Fort George	Fraser-Fort George A, Regional District Electoral Area	No
	Fraser-Fort George F, Regional District Electoral Area	No
	Fraser-Fort George G, Regional District Electoral Area	Yes
	Mackenzie, District Municipality	Yes
	McLeod Lake 1, Reserve Lands (McLeod Lake)	Yes
Bulkley-Nechako	Binche 2, Reserve Lands (Binche Whut'en)	Yes
	Bulkley-Nechako C, Regional District Electoral Area	Yes
	Bulkley-Nechako F, Regional District Electoral Area	No
	Dzitline Lee 9, Reserve Lands (Tl'azt'en Nation)	Yes
	Fort St. James, District Municipality	Yes
	Mission Lands 17, Reserve Lands (Nak'azdli Whut'en)	No
	Nak'azdli, Reserve Lands (Nak'azdli Whut'en)	Yes
	Sowchea 3, Reserve Lands (Nak'azdli Whut'en)	Yes
	Tache 1, Reserve Lands (Tl'azt'en Nation)	Yes
	Williams Prairie Meadow 1A, Reserve Lands (Nak'azdli Whut'en)	Yes
	Ye Koo Che 3, Reserve Lands (Yekooche First Nation)	No

**Table 13.2 Census Subdivisions in the RAA**

Census Subdivision	Included in Application
See Table 13.1	
Fort St. John, City	No
Prince George, City	Yes





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**Project Location**

**Legend**

City, Town, Village or District Municipality	Parks, Protected Areas, Ecological Reserves, and Conservancies	Compressor Station
Highway	First Nations Reserve	Project Footprint
Provincial Boundary	Waterbody	British Columbia Census Subdivision
Railway		Employment Local Assessment Area
Transmission Line		Employment Regional Assessment Area
Watercourse		

**Notes**

1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
3. Watercourse linework is from the Freshwater Atlas 1:50K dataset from DataBC

**Scale**

0 30 60 km

1:1,700,000 (at original document size of 11x17)

**Stantec**

Project Location: Prince Rupert  
Project Number: 123514678  
Prepared by: TQJULICHINI on 20240312  
Requested by: ATURNER on 20240307  
Reviewed by: SLEMAY on 20240312

British Columbia  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Employment and Economy

Figure No.  
**13.1**

Title  
**EMPLOYMENT LOCAL AND REGIONAL ASSESSMENT AREA**

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## **13.1 Baseline Conditions**

Baseline conditions are presented for the communities most likely to experience employment impacts related to the Eastern Route Alternative. Baseline data collection is focused on desktop review of secondary literature and publicly available information and secondary data using official sources. The employment baseline scope includes the following information:

- Description of the local and regional economy
- Economic development (major projects)
- Description of labour force indicators and trends, including employment/unemployment, current employers, available labour supply, and level of education/skills/training of the labour force
- Description of wage and income information, including income inequality

### **13.1.1 Sources of Information**

Information sources that have been considered for employment baseline conditions include:

- Project description and supporting employment estimates developed by PRGT
- Labour Force Survey and Statistical information from Statistics Canada's Census of the Population and BC Stats
- Secondary studies, plans, and documentation relevant to the area.

### **13.1.2 Population**

Table 13.3 summarizes the change in total population and Indigenous population of the Peace River, Fraser-Fort George, and Bulkley-Nechako sub-regions between 2016 and 2021 (Statistics Canada 2022).

The total population of the LAA in 2021 was 40,720, which was 8% less than five years earlier, where the population was 44,233 in 2016. The total population of the RAA in 2021 was 138,895, which was slightly higher than the population of 138,391 in 2016, due to an increase in population in the larger cities of Prince George and Fort St. John.

In 2021, the total population of the Peace River sub-region was 24,965 (48% women+), a 9% decrease since 2016. In the Fraser-Fort George sub-region, the 2021 population was 8,445 (47% women+), a 5% decrease since 2016 (Statistics Canada 2022). The Bulkley-Nechako sub-region had a total population of 7,310 in 2021 (47% women+), a decrease of 8% since 2016.

The Indigenous population in the LAA in 2021 was 6,330, which was 8% less than five years earlier, where the Indigenous population was 6,905 in 2016. The total Indigenous population in the RAA was 20,560 in 2021, 1% more than the population of 20,305 in 2016. The largest proportion of Indigenous population in the RAA resides in the cities of Fort St. John and Prince George (Statistics Canada 2022). Of the other cities in the RAA, the city of Fort St. John experienced the largest increase in Indigenous population between 2016 and 2021 (23% increase).





**Table 13.3 Total Population, 2016-2021**

Geography	2021 Population			2016 Population			2016-2021 % Change		
	Total	Men+ <sup>1</sup>	Women+ <sup>2</sup>	Total	Men+	Women+	Total	Men+	Women+
<b>Total Population</b>									
Peace River Sub-region	24,965	13,075	11,885	27,467	14,290	13,160	-9%	-9%	-10%
Fraser-Fort George Sub-region	8,445	4,440	4,000	8,845	4,780	4,065	-5%	-7%	-2%
Bulkley-Nechako Sub-region	7,310	3,825	3,490	7,921	4,105	3,785	-8%	-7%	-8%
<b>LAA Total</b>	<b>40,720</b>	<b>21,340</b>	<b>19,375</b>	<b>44,233</b>	<b>23,175</b>	<b>21,010</b>	<b>-8%</b>	<b>-8%</b>	<b>-8%</b>
Prince George	76,710	38,215	38,495	74,003	36,960	37,045	4%	3%	4%
Fort St. John	21,465	11,010	10,455	20,155	10,405	9,755	6%	6%	7%
<b>RAA Total</b>	<b>138,895</b>	<b>70,565</b>	<b>68,325</b>	<b>138,391</b>	<b>70,540</b>	<b>67,810</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>
<b>Indigenous Population</b>									
Peace River Sub-region	3,065	1,595	1,455	3,420	1,750	1,645	-10%	-9%	-12%
Fraser-Fort George Sub-region	1,270	675	585	1,295	705	585	-2%	-4%	0%
Bulkley Nechako Sub-region	1,995	995	995	2,190	1,100	1,095	-9%	-10%	-9%
<b>LAA Total</b>	<b>6,330</b>	<b>3,265</b>	<b>3,035</b>	<b>6,905</b>	<b>3,555</b>	<b>3,325</b>	<b>-8%</b>	<b>-8%</b>	<b>-9%</b>
Prince George	11,465	5,480	5,985	11,160	5,295	5,865	3%	3%	2%
Fort St. John	2,765	1,380	1,390	2,240	1,145	1,095	23%	21%	27%
<b>RAA Total</b>	<b>20,560</b>	<b>10,125</b>	<b>10,410</b>	<b>20,305</b>	<b>9,995</b>	<b>10,285</b>	<b>1%</b>	<b>1%</b>	<b>1%</b>

Notes:

<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.

<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.

<sup>3</sup> Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.

Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on Census Subdivision (CSD) Census Profiles and may not sum across tables.

Source: Statistics Canada 2022



### **13.1.3 Educational Attainment**

A summary of the highest level of educational attainment by gender for the total and Indigenous population aged 15 years old and over in 2021 are summarized in Table 13.4.

In the LAA, 42% of the total population had post-secondary, diploma or a degree as their highest level of education (Statistics Canada 2022). For the other communities in the RAA (i.e., Fort St. John and Prince George) the proportion was 49%. In the LAA, men+ were more likely than women+ to have a post-secondary, diploma or a degree as their highest level of education (43% of total men+, 41% of total women+). Of those with a post-secondary, diploma or a degree as their highest level of education, men+ are more likely to have post secondary certificate or diploma below bachelor level (36% of total men+, 28% of total women+), whereas women+ are more likely to have post-secondary education at a bachelor degree or higher (7% of total men+, 13% of total women+). A larger proportion of men have apprenticeship or trades certificate or diploma. In the other communities within the RAA, an equal proportion of men+ and women+ (both 49%) had post-secondary, diploma or a degree as their highest level of education.

For the Indigenous population in the LAA, 31% of the total Indigenous population had post-secondary, diploma or a degree as their highest level of education, lower than the 42% for the total population. For the Indigenous population in other communities in the RAA, the proportion was 37%, lower than the 49% for the total population in the RAA. In the LAA, Indigenous women+ were more likely than Indigenous men+ to have a post-secondary, diploma or a degree as their highest level of education (35% of total women+, 28% of total men+). In the other communities in the RAA, there was a similar trend (39% of total women+, 34% of total men+).

There are three post-secondary education institutions with campuses in the LAA and RAA: University of Northern British Columbia (UNBC), College of New Caledonia (CNC) and Northern Lights College (NLC). These institutions provide academic and professional training programs as well as training in trades, workplace skills, and safety. UNBC operates in Prince George and offers a range of undergraduate degree, graduate degree, diploma programs and certificate programs (UNBC n.d.a). In 2022-2023 UNBC had a total of 4,385 students (UNBC n.d.b.). CNC has campuses in Fort St. James, Mackenzie and Prince George (CNC n.d.a). The college offers a range of career, technical, vocational and university credit programs with annual enrollment of approximately 5,000 students (CNC n.d.b). NLC has campuses in Fort St. John, Tumbler Ridge and Chetwynd (NLC n.d.a) and offers a range of courses, including courses focused on trades and industry (NLC n.d.b).



Table 13.4 Educational Attainment, Total and Indigenous Population 15 years and over, 2021

	Other RAA Total (i.e., Fort St. John and Prince George)				Total LAA				Peace River Sub-region				Fraser-Fort George Sub-region				Bulkley Nechako Sub-region			
	Total	Percent (%)	Men+ <sup>1</sup>	Women+ <sup>2</sup>	Total	Percent (%)	Men+	Women+	Total	Percent (%)	Men+	Women+	Total	Percent (%)	Men+	Women+	Total	Percent (%)	Men+	Women+
Total Population																				
Total population aged 15 years and over in private households - 25% sample data	78,885	100%	39,205	39,675	31,895	100%	16,715	15,205	19,035	100%	9,950	9,095	6,960	100%	3,685	3,275	5,900	100%	3,080	2,835
No certificate, diploma or degree	13,665	17%	7,205	6,460	7,405	23%	4,270	3,135	4,480	24%	2,565	1,915	1,355	19%	790	565	1,570	27%	915	650
High (secondary) school diploma or equivalency certificate	26,805	34%	12,970	13,835	11,150	35%	5,305	5,825	6,755	35%	3,160	3,595	2,300	33%	1,140	1,155	2,095	36%	1,005	1,085
Postsecondary, diploma or degree	38,405	49%	19,035	19,375	13,355	42%	7,130	6,200	7,810	41%	4,225	3,565	3,310	48%	1,745	1,560	2,235	38%	1,160	1,075
• Postsecondary certificate or diploma below bachelor level	24,285	31%	13,090	11,195	10,270	32%	5,990	4,270	6,110	32%	3,605	2,505	2,465	35%	1,470	990	1,695	29%	915	775
- Apprenticeship or trades certificate or diploma	8,435	11%	6,900	1,535	4,600	14%	3,825	810	2,845	15%	2,335	510	1,060	15%	900	180	695	12%	590	100
- College, CEGEP or other non-university certificate or diploma	13,995	18%	5,505	8,490	5,095	16%	2,025	3,065	2,940	15%	1,200	1,740	1,295	19%	540	755	860	15%	285	565
- University certificate or diploma below bachelor level	1,860	2%	690	1,170	580	2%	135	420	315	2%	55	260	120	2%	40	70	145	2%	40	110
• Bachelor's degree or higher	14,120	18%	5,940	8,180	3,075	10%	1,120	1,935	1,700	9%	610	1,075	850	12%	280	570	525	9%	230	290
Indigenous Population																				
Total population aged 15 years and over in private households - 25% sample data	10,305	100%	4,845	5,460	4,875	100%	2,435	2,455	2,595	100%	1,270	1,320	805	100%	445	355	1,475	100%	720	780
No certificate, diploma or degree	2,950	29%	1,450	1,500	1,745	36%	940	800	925	36%	500	420	220	28%	130	95	600	41%	310	285
High (secondary) school diploma or equivalency certificate	3,560	35%	1,760	1,805	1,600	33%	785	770	880	34%	450	415	260	33%	120	130	460	32%	215	225
Postsecondary certificate, diploma or degree	3,785	37%	1,635	2,155	1,525	31%	680	850	790	30%	325	460	325	40%	185	140	410	28%	170	250
• Postsecondary certificate or diploma below bachelor level	2,945	29%	1,395	1,550	1,300	27%	600	695	665	26%	305	370	280	35%	150	110	355	24%	145	215
- Apprenticeship or trades certificate or diploma	1,080	10%	790	300	495	10%	380	125	280	11%	200	80	105	13%	85	10	110	8%	95	35
- College, CEGEP or other non-university certificate or diploma	1,695	16%	575	1,115	625	13%	180	450	305	12%	90	220	150	19%	55	90	170	12%	35	140
- University certificate or diploma below bachelor level	165	2%	35	135	125	3%	20	105	45	2%	0	45	10	1%	0	0	70	5%	20	60
• Bachelor's degree or higher	850	8%	240	605	220	5%	15	155	130	5%	0	105	50	6%	15	30	40	3%	0	20

Notes:  
<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.  
<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.  
<sup>3</sup> Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.

2021 ‘Total Population’ and ‘Indigenous Population’ data from 2021 Census of the Population – Census Profile.

Values shown in “Total” columns are the sum of men+ and women+ CSD subsets taken from Statistics Canada’s 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.

Source: Statistics Canada 2022



### **13.1.4 Labour Force**

Labour force indicators for the LAA and the other communities in the RAA are summarized in Table 13.5.

In 2021, the total size of the LAA labour force was 20,650 (44% women+, 56% men+) and the labour force for the other communities in the RAA (i.e. Fort St. John and Prince George) was 53,875 (47% women+, 53% men+) (Statistics Canada 2022). When considering the Indigenous population, the total size of the LAA Indigenous labour force was 2,900 (47% women+, 53% men+) and the Indigenous labour force for the additional communities in the RAA was 6,610 (50% women+, 50% men+) (Statistics Canada 2022).

In 2021, participation rates, employment rates and unemployment rates for the total population in the LAA and other communities in the RAA were high relative to provincial averages. The participation rates in the LAA (65.0%) and RAA (68.3%) were greater than the provincial average of 63.3%. The employment rate in the LAA (59.2%) and other communities in the RAA (62.0%) were greater than the provincial average of 57.9%. The unemployment rate in the LAA (8.9%) and other communities in the RAA (9.3%) were high relative to the provincial average of 8.4%.

For the Indigenous population, participation rates (57.6% in LAA, 64.1% in other communities in RAA) and employment rates (49.3% in LAA, 53.8% in other communities in RAA) were lower than for the total population. The unemployment rate for the Indigenous population was higher than the total population for both the LAA (14.3% compared to 8.9%) and the other communities in the RAA (16.0% compared to 9.3%).

There were some variations in the labour force participation rates observed between men+ and women+ within the LAA and the other communities in the RAA, and overall men+ had a higher participation rate for both the total population and Indigenous population. Unemployment rates were generally higher for men+ in the LAA and other communities in the RAA, with the exception of the Indigenous population in the LAA where unemployment rates were higher for women+.



Table 13.5 Labour Force Indicators, Total and Indigenous Population, 2021

Topic	Other RAA Total (i.e., Fort St. John and Prince George)			LAA Total			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley Nechako Sub-region		
	Total	Men+	Women+	Total	Men+	Women+	Total	Men+	Women+	Total	Men+	Women+	Total	Men+	Women+
Total Population															
Population aged 15+ (no. people)	78,885	39,205	39,680	31,770	16,665	15,105	18,915	9,900	9,015	6,955	3,685	3,275	5,900	3,080	2,835
In the labour force (no. people)	53,875	28,595	25,280	20,650	11,635	9,015	12,645	7,235	5,410	4,530	2,495	2,045	3,475	1,905	1,585
Employed (no. people)	48,875	25,855	23,020	18,815	10,440	8,375	11,675	6,610	5,065	4,105	2,220	1,875	3,035	1,610	1,415
Unemployed (no. people)	5,010	2,735	2,275	1,840	1,170	670	950	605	345	440	275	165	450	290	170
Employment rate (%)	62.0%	65.9%	58.0%	59.2%	62.6%	55.4%	61.7%	66.8%	56.2%	59.0%	60.2%	57.3%	51.4%	52.3%	49.9%
Participation rate (%)	68.3%	72.9%	63.7%	65.0%	69.8%	59.7%	66.9%	73.1%	60.0%	65.1%	67.7%	62.4%	58.9%	61.9%	55.9%
Unemployment rate (%)	9.3%	9.6%	9.0%	8.9%	10.1%	7.4%	7.5%	8.4%	6.4%	9.7%	11.0%	8.1%	12.9%	15.2%	10.7%
Indigenous Population															
Population aged 15+ (no. people)	10,305	4,845	5,460	5,035	2,515	2,520	2,845	1,415	1,430	715	380	325	1,475	720	770
In the labour force (no. people)	6,610	3,295	3,305	2,900	1,525	1,375	1,705	915	790	455	250	200	740	360	385
Employed (no. people)	5,540	2,740	2,795	2,480	1,300	1,180	1,455	795	660	395	190	185	630	315	325
Unemployed (no. people)	1,055	550	510	415	195	220	245	120	125	65	35	15	105	40	45
Employment rate (%)	53.8%	56.6%	51.2%	49.3%	51.7%	46.8%	51.1%	56.2%	46.2%	55.2%	50.0%	56.9%	42.7%	43.8%	42.2%
Participation rate (%)	64.1%	68.0%	60.5%	57.6%	60.6%	54.6%	59.9%	64.7%	55.2%	63.6%	65.8%	61.5%	50.2%	50.0%	50.0%
Unemployment rate (%)	16.0%	16.7%	15.4%	14.3%	12.8%	16.0%	14.4%	13.1%	15.8%	14.3%	14.0%	7.5%	14.2%	11.1%	11.7%

Notes:

<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.

<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.

<sup>3</sup> Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.

2021 ‘Total Population’ and ‘Indigenous Population’ data from 2021 Census of the Population – Census Profile.

Values shown in “Total” columns are the sum of men+ and women+ CSD subsets taken from Statistics Canada’s 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.

Source: Statistics Canada 2022



### **13.1.5 Employment by Industry**

Table 13.6 and Table 13.7 present employment by North American Industry Classification System industries for the total and Indigenous populations in the LAA and the RAA. Industries that are most likely to provide employment to the Project include construction; mining, quarrying, and oil and gas extraction; manufacturing; transportation and warehousing; and professional, scientific, and technical services.

For the total population, the industries in the LAA with the greatest number of employees were agriculture, forestry, fishing and hunting (2,750 employees), construction (2,125 employees) and manufacturing (1,770 employees). For the other communities in the RAA, the industries with the greatest number of employees for the total population were health care and social assistance (7,215 employees), retail trade (6,425 employees), and construction (5,055 employees).

For the Indigenous population, the industries in the LAA with the greatest number of employees were construction (260 employees), public administration (255 employees) and health care and social assistance and agriculture, forestry, fishing and hunting (both 250 employees). For the other communities in the RAA, the industries with the greatest number of employees for the Indigenous population were health care and social assistance (900 employees), retail trade (720 employees), and construction (690 employees).



Table 13.6 Industries by Employment, Total Population, 2021

Employment by Industry	Other RAA Total (i.e., Fort St. John and Prince George)			Total LAA			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley-Nechako Sub-region		
	Total	Men + (%) <sup>1</sup>	Women + (%) <sup>2</sup>	Total	Men + (%)	Women + (%)	Total	Men + (%)	Women + (%)	Total	Men + (%)	Women + (%)	Total	Men+ (%)	Women + (%)
All industries	52,635	53	47	20,425	56	44	12,565	57	43	4,465	55	45	3,395	54	45
Agriculture, forestry, fishing and hunting	1,420	79	21	2,750	65	33	1,500	65	32	550	57	41	700	70	29
Mining, quarrying, and oil and gas extraction	1,800	84	16	1,965	79	21	1,735	80	21	130	81	19	100	65	30
Utilities	555	68	32	320	84	9	235	83	13	35	71	0	50	100	0
Construction	5,055	84	17	2,125	82	17	1,385	81	19	530	84	16	210	88	5
Manufacturing	3,545	83	17	1,770	79	21	710	75	26	655	82	19	405	80	16
Wholesale trade	1,790	79	21	485	65	31	290	66	31	125	68	32	70	57	29
Retail trade	6,425	49	52	1,430	40	59	880	41	57	315	33	62	235	43	64
Transportation and warehousing	3,075	80	19	1,360	76	24	955	74	26	255	90	10	150	67	30
Information and cultural industries	620	47	52	105	10	67	50	20	70	45	0	78	10	0	0
Finance and insurance	1,155	31	69	235	6	89	115	13	91	75	0	80	45	0	100
Real estate and rental and leasing	805	50	49	235	40	47	190	34	58	35	86	0	10	0	0
Professional, scientific and technical services	2,630	52	48	890	44	56	630	43	59	155	42	52	105	52	43
Management of companies and enterprises	55	18	73	0	0	0	0	0	0	0	0	0	0	0	0
Administrative and support, waste management and remediation services	1,720	54	45	640	45	52	460	45	52	95	58	47	85	35	59
Educational services	3,990	28	72	1,290	18	82	675	13	85	275	18	82	340	28	75
Health care and social assistance	7,215	19	81	1,465	9	92	775	8	90	365	8	92	325	9	95
Arts, entertainment and recreation	770	41	60	345	29	62	200	23	73	90	50	56	55	18	36
Accommodation and food services	4,100	43	57	790	37	63	495	40	62	210	31	67	85	29	65
Other services (except public administration)	2,490	51	49	1,030	60	40	685	58	43	200	65	33	145	62	38
Public administration	3,415	47	53	1,065	44	57	555	46	53	290	40	64	220	43	57

Notes:

<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.

<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.

2021 ‘Total Population’ data from 2021 Census of the Population – Census Profile.

Values shown in “Total” columns are the sum of men+ and women+ CSD subsets taken from Statistics Canada’s 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.

Source: Statistics Canada 2022



Table 13.7 Industries by Employment, Indigenous Population, 2021

Employment by Industry	Other RAA Total (i.e., Fort St. John and Prince George)			Total LAA			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley-Nechako Sub-region		
	Total	Men + (%) <sup>1</sup>	Women + (%) <sup>2</sup>	Total	Men + (%)	Women + (%)	Total	Men + (%)	Women + (%)	Total	Men + (%)	Women + (%)	Total	Men+ (%)	Women + (%)
All industries	6,305	50	50	2,795	52	49	1,550	51	50	535	59	42	710	345	380
Agriculture, forestry, fishing and hunting	180	86	17	250	68	24	115	61	22	35	57	29	100	80	25
Mining, quarrying, and oil and gas extraction	290	86	14	240	69	25	180	75	28	10	100	0	50	20	10
Utilities	70	64	43	20	100	50	0	0	0	10	100	0	10	10	10
Construction	690	85	14	260	77	12	155	81	0	60	67	33	45	35	10
Manufacturing	390	78	21	245	82	14	95	84	16	75	100	0	75	45	20
Wholesale trade	220	80	20	15	0	67	15	0	67	0	0	0	0	0	0
Retail trade	720	40	60	210	38	60	110	36	64	55	36	45	45	20	30
Transportation and warehousing	345	84	17	150	73	20	120	71	17	30	83	33	0	0	0
Information and cultural industries	70	36	64	0	0	0	0	0	0	0	0	0	0	0	0
Finance and insurance	85	41	59	10	0	100	0	0	0	10	0	100	0	0	0
Real estate and rental and leasing	90	33	61	30	50	0	30	50	0	0	0	0	0	0	0
Professional, scientific and technical services	215	58	44	65	31	46	55	18	55	10	100	0	0	0	0
Management of companies and enterprises	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative and support, waste management and remediation services	235	45	51	115	17	43	75	13	40	15	0	67	25	10	10
Educational services	375	19	81	175	0	89	110	0	100	15	0	67	50	0	35
Health care and social assistance	900	14	87	250	4	106	135	7	96	65	0	100	50	0	70
Arts, entertainment and recreation	145	31	69	45	0	22	10	0	100	15	0	0	20	0	0
Accommodation and food services	550	45	54	100	10	30	65	15	23	10	0	0	25	0	15
Other services (except public administration)	345	39	61	150	37	30	80	31	31	25	80	0	45	10	20
Public administration	380	33	66	255	47	55	130	50	62	35	57	29	90	35	50

Notes:

<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.

<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.

<sup>3</sup> Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.

2021 'Indigenous Population' data from 2021 Census of the Population – Census Profile.

Values shown in “Total” columns are the sum of men+ and women+ CSD subsets taken from Statistics Canada’s 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.

Source: Statistics Canada 2022





**13.1.6      Employment by Occupation**

Table 13.8 provides a summary of employment (by gender) by Statistic Canada’s National Occupational Classification for the LAA and other communities in the RAA (Statistics Canada 2022).

In 2021, the occupations with the greatest number of employees in the LAA were trades, transport and equipment operators and related occupations (6,040 workers), sales and service occupations (3,300 workers) and business, finance and administration occupations (2,785 workers). In the other communities in the RAA, the occupations with the greatest number of employees were sales and service occupations (13,900 workers), trades, transport and equipment operators and related occupations (11,645 workers) and business, finance and administration occupations (7,640 workers).

For the Indigenous population in the LAA, the occupations with the greatest number of employees were trades, transport and equipment operators and related occupations (810 workers), sales and service occupations (515 workers) and occupations in education, law and social, community and government services (385 workers). For the Indigenous population in the other communities in the RAA, the occupations with the greatest number of employees were sales and service occupations (1,740 workers), trades, transport and equipment operators and related occupations (1,675 workers) and occupations in education, law and social, community and government services (815 workers).



Table 13.8 Occupations by Employment, Total and Indigenous Population, 2021

Employment by Occupation	Other RAA Total (i.e., Fort St. John and Prince George)			LAA Total			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley Nechako Sub-region		
	Total	Men+ (%)	Women+ (%)	Total	Men+ (%)	Women+ (%)	Total	Men+ (%)	Women+ (%)	Total	Men+ (%)	Women+ (%)	Total	Men+ (%)	Women+ (%)
Total Population															
Legislative and senior management occupations	375	68	32	105	38	62	90	44	56	0	0	0	15	0	100
Business, finance and administration occupations	7,640	23	77	2,785	15	85	1,830	16	84	585	15	85	370	8	92
Natural and applied sciences and related occupations	3,495	76	24	965	65	35	550	72	28	315	54	46	100	60	40
Health occupations	4,020	19	81	895	15	85	495	16	84	250	8	92	150	20	80
Occupations in education, law and social, community and government services	6,590	31	69	1,955	22	78	1,055	21	79	410	18	82	490	27	73
Occupations in art, culture, recreation and sport	925	37	63	325	17	83	195	18	82	80	25	75	50	0	100
Sales and service occupations	13,900	42	58	3,300	32	68	1,975	34	66	710	27	73	615	33	67
Trades, transport and equipment operators and related occupations	11,645	92	8	6,040	91	9	3,690	89	11	1,460	94	6	890	92	8
Natural resources, agriculture and related production occupations	1,655	84	16	2,585	75	25	1,805	76	24	315	71	29	465	73	27
Occupations in manufacturing and utilities	2,405	90	10	1,410	87	13	835	87	13	340	78	22	235	98	2
Indigenous Population															
Legislative and senior management occupations	50	60	40	10	0	100	10	44	100	0	0	0	0	0	0
Business, finance and administration occupations	770	18	82	370	11	89	235	16	83	55	0	100	80	0	100
Natural and applied sciences and related occupations	240	77	23	75	27	73	45	72	56	20	0	100	10	0	100
Health occupations	390	6	94	105	0	100	50	16	100	55	0	100	0	0	0
Occupations in education, law and social, community and government services	815	23	77	385	14	86	210	21	90	50	30	70	125	16	84
Occupations in art, culture, recreation and sport	115	35	65	0	0	0	0	18	100	0	0	0	0	0	0
Sales and service occupations	1,740	35	65	515	25	75	265	34	74	100	25	75	150	23	77
Trades, transport and equipment operators and related occupations	1,675	90	10	810	85	15	460	89	20	170	97	3	180	86	14
Natural resources, agriculture and related production occupations	250	90	10	250	74	26	145	76	17	35	29	71	70	79	21
Occupations in manufacturing and utilities	255	86	14	155	94	6	85	87	6	25	60	40	45	100	0

Notes:

<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.

<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.

<sup>3</sup> Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.

2021 'Total Population' and 'Indigenous Population' data from 2021 Census of the Population – Census Profile.

Values shown in "Total" columns are the sum of men+ and women+ CSD subsets taken from Statistics Canada's 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.

Source: Statistics Canada 2022



### 13.1.7 Average Wages for Select Sectors

Table 13.9 provides a summary of average gross hourly wages (in 2023) for BC workers in sectors likely to supply direct labour to the Project. Average annual wages were applied to three scenarios to estimate average annual employment. As calculated, estimated annual wages under scenario one is based on full-time employment and 2,100 person-hours per year (no overtime); scenario two is based on 12-hour workdays and a two-week on / two- week off work schedule (overtime after 40 hours per week); and scenario three is based on 10-hour workdays and a three-week on / one-week off work schedule (overtime after 40 hours per week).

**Table 13.9 Provincial Wages in Select Sectors, Average, 2023**

Industry	Average Hourly Wage	Scenario 1 – Annual Wage (based on 2,100 hrs/year)	Scenario 2 – Annual Wage (based on 12-hour 2x2 work schedule) <sup>1</sup>	Scenario 3 – Annual Wage (based on 10-hour 3x1 work schedule) <sup>1</sup>
Forestry, fishing, mining, quarrying, oil and gas	\$45.24	\$95,004	\$125,024	\$162,178
Construction	\$36.73	\$77,133	\$101,485	\$131,677
Manufacturing	\$35.12	\$73,752	\$97,037	\$125,905
Transportation and Warehousing	\$36.43	\$76,503	\$100,656	\$130,602
Professional, scientific and technical services	\$46.48	\$97,608	\$128,424	\$166,631

Note:

<sup>1</sup> Assumes overtime payments beyond 40 hours per week; rounded down to nearest thousand.

Source: Statistics Canada 2023a

### 13.1.8 Individual Income and Income Inequality

Income information for the LAA and other communities in the RAA is summarized in Table 13.10. Total income is presented for persons aged 15 years and older and is the sum of regular and recurring monetary receipts from part-time and full-time employment income (e.g., wages, tips, and commissions), income from investment sources (e.g., dividends, guaranteed investment certificates, and mutual funds), income from employer and personal pension sources (e.g., private pensions and payments from annuities and registered retirement income funds), other regular cash income (e.g., child support payments and spousal support payments), and income from government sources (e.g., social assistance, Employment Insurance benefits, Old Age Security benefits, and Canada Pension Plan benefits and disability income) (Statistics Canada 2022). Understanding of income levels is necessary for consideration of changes in wage rates (see Section 13.3.2.2) and consideration of disproportionate impacts to sub-population groups (see Appendix Section H.2).



The median total income in 2020 for the total population in the LAA was \$44,893 (\$40,864 among the Indigenous population), which was slightly higher than provincial median (\$40,800). Men+ income was \$60,307 (\$50,058 among Indigenous men+) and women+ income was \$35,573 (\$34,340 among Indigenous women+), demonstrating that women+ income was 41% lower than men+ income (31% lower for Indigenous women+ than for Indigenous men+). The median employment income for the total population (\$46,113) was lower than for the Indigenous population (\$51,983). For the total population, the median employment income for men+ was \$61,648 (\$61,563 among Indigenous men+) and women+ was \$30,893 (\$42,853 among Indigenous women+). The employment income gap among Indigenous men+ and Indigenous women+ was smaller than that for the overall population.

For the additional communities in the RAA, the median total income was \$48,200 (\$41,400 among the Indigenous population), with men+ earning \$61,750 (\$47,000 among Indigenous men+) and women+ \$38,800 (\$37,200 among Indigenous women+). The median employment income was lower for the total population (\$47,800) compared to the Indigenous population (\$51,585), with men+ earning \$62,950 (\$60,425 among Indigenous men+) and women+ earning \$35,400 (\$43,360 among Indigenous women+).

In terms of income equity, median total incomes in the LAA and other communities in the RAA are less for the Indigenous population compared to the total population, and median total incomes were lower for women+ compared to men+. Median employment incomes in the LAA and other communities in the RAA are higher for the Indigenous population compared to the total population, but still greater for men+ than women+.



Table 13.10 Individual Income, Annual Total (Before Tax), 2020

Topic	Other RAA Total (i.e., Fort St. John and Prince George)			LAA Total			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley Nechako Sub-region		
	Total	Men+ <sup>1</sup>	Women+ <sup>2</sup>	Total	Men+	Women+	Total	Men+	Women+	Total	Men+	Women +	Total	Men+	Women+
Total Population															
Median total income in 2020 among recipients (\$)	48,200	61,750	38,800	44,893	60,307	35,573	52,280	75,830	37,660	45,700	57,650	36,700	38,280	47,440	32,360
Median employment income in 2020 among recipients (\$)	47,800	62,950	35,400	46,113	61,648	30,893	52,840	76,770	32,960	50,500	64,275	35,000	33,080	43,900	24,720
Average total income in 2020 among recipients (\$)	59,275	71,850	46,440	50,813	69,073	43,181	66,060	84,470	46,230	42,525	67,800	43,853	47,404	54,950	39,460
Average employment income in 2020 among recipients (\$)	57,050	69,325	42,840	48,069	64,821	38,709	64,162	81,835	42,345	39,113	61,367	40,933	42,916	51,260	32,850
Indigenous Population <sup>3</sup>															
Median total income in 2020 among recipients (\$)	41,400	47,000	37,200	40,864	50,058	34,340	52,540	69,420	38,500	34,933	37,733	34,000	35,120	43,020	30,520
Median employment income in 2020 among recipients (\$)	51,585	60,425	43,360	51,983	61,563	42,853	67,335	85,890	50,680	46,533	50,800	40,500	42,080	48,000	37,380
Average total income in 2020 among recipients (\$)	38,000	49,400	26,900	36,321	52,869	24,233	52,750	77,740	29,680	29,533	43,467	22,400	26,680	37,400	20,620
Average employment income in 2020 among recipients (\$)	48,735	59,800	37,110	47,818	57,927	35,736	64,255	81,200	42,160	42,400	47,800	35,267	36,800	44,780	29,780

Notes:

- <sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.
- <sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.
- <sup>3</sup> Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.

Total income is presented for persons aged 15 years and older and is the sum of regular and recurring monetary receipts from part-time and full-time employment income (e.g., wages, tips, and commissions), income from investment sources (e.g., dividends, guaranteed investment certificates, and mutual funds), income from employer and personal pension sources (e.g., private pensions and payments from annuities and registered retirement income funds), other regular cash income (e.g., child support payments and spousal support payments), and income from government sources (e.g., social assistance, Employment Insurance benefits, Old Age Security benefits, and Canada Pension Plan benefits and disability income).

Employment income is the sum of wages, salaries, tips, commissions, and net income from self-employment.

Values shown in “Total” columns are the sum of men+ and women+ census subdivision subsets taken from Statistics Canada’s 2021 Census. Due to Statistics Canada rounding (Statistics Canada 2019b) totals may not exactly align with those shown on census subdivision Census Profiles and may not sum across tables.

Totals may not sum across tables due to Statistics Canada data suppression.

Source: Statistics Canada (2022)



### **13.1.9 Low Income Status**

Statistics Canada has adapted two standardized measures of low-income, the “low-income measure after tax” (LIM-AT) and “low-income cut-offs after tax” (LICO-AT) (Statistics Canada 2022). The LIM-AT is used to measure the proportion of a population that falls below the after-tax low-income threshold. The LICO-AT is used to identify the proportion of the low-income population that falls below the after-tax income threshold where it is likely that an economic person/household would have to devote a larger share of income than average (specifically 20 percentage points more than average) on basic cost of living expenses (i.e., food, shelter, and clothing).

Table 13.11 presents the proportion of the total population living below LIM-AT and LICO-AT thresholds and prevalence of low-income (based on these measures) within the LAA and other RAA communities. Information is unavailable for the Indigenous population.

Within the LAA, 19.2% of total individuals aged 65 or older have low-income status based on the low-income measure after tax. This is followed by individuals aged 0-17 years (12.3%) and individuals aged 18-64 years (10.1%). The data indicate that women+ and men+ are fairly equally affected throughout these age brackets.

For the other communities in the RAA, 13.5% of total individuals aged 65 or older have low-income status, with a greater proportion of women+ being affected (16.9% compared to 9.6% of men+).



**Table 13.11 Low Income Status, Total Population, 2021**

Age	Other RAA (i.e., Fort St. John and Prince George)			LAA			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley Nechako Sub-region		
	Total	Men+ <sup>1</sup>	Women+ <sup>2</sup>	Total	Men+	Women+	Total	Men+	Women+	Total	Men+	Women+	Total	Men+	Women+
<b>Low-income measure, after tax (LIM-AT) (%)</b>															
0 to 17 years	10.4	10.3	10.4	12.3	11.8	13.0	14.0	13.4	14.9	8.7	6.4	11.1	14.1	15.5	13.1
18 to 64 years	7.1	6.3	8.0	10.1	10.6	9.5	10.0	9.6	10.4	9.3	9.9	8.8	11.0	12.2	9.5
65 years and over	13.5	9.6	16.9	19.2	18.8	19.9	18.8	17.5	20.6	17.8	16.3	19.3	21.1	22.7	19.8
<b>Low-income cut-offs, after tax (LICO-AT) (%)</b>															
0 to 17 years	3.3	3.1	3.4	2.5	3.5	2.8	3.1	3.1	3.3	1.3	x	3.2	3.0	4.0	2.0
18 to 64 years	3.1	2.9	3.3	3.2	4.8	x	3.4	3.5	3.8	x	x	x	3.0	6.0	x
65 years and over	3.6	3.6	3.6	3.1	3.4	2.6	2.9	2.7	2.9	2.7	3.3	2.1	3.6	4.2	2.9

Notes:

<sup>1</sup> This category includes men (and/or boys), as well as some non-binary persons.

<sup>2</sup> This category includes women (and/or girls), as well as some non-binary persons.

x no information available.

Source: Statistics Canada (2022)



### **13.1.10 Worker Mobility**

Information regarding worker mobility is summarized in Table 13.12. The table is categorized by workers who commute within their census subdivision of residence, those who commute to a different census subdivision within their census division (CD), workers who commute outside of their census subdivision and division within their province or territory of residence, and those that commute to a different province or territory.

Within the LAA, more than half total workers (6,470) commute to a different census subdivision within their CD of residence. This is followed by workers commuting within their census subdivision of residence (4,690). These trends are similar for the Indigenous population, with most workers commuting to a different census subdivision (850) compared to workers commuting within their census subdivision of residence (700).

A greater proportion of Indigenous women+ commute greater distances than Indigenous men+, with Indigenous women+ making up 62% of those commuting to a different census subdivision within their CD of residence, 69% of those commuting outside of their census subdivision and CD of residence and 100% of those commuting to a different province or territory.

For the other communities in the RAA, most of the population commute within the census subdivision of residence (32,510), as is for the Indigenous population (3,490). Of the total population, 1,690 people commute to a different census subdivision within the CD of residence, 1,150 people commute to a different census subdivision and division within the province or territory of residence, and 130 people commute to a different province or territory. These trends are broadly similar for the Indigenous population.





**Table 13.12 Worker Mobility, Total and Indigenous Population, 2021**

Topic	Other RAA Total (i.e., Fort St. John and Prince George)			LAA Total			Peace River Sub-region			Fraser-Fort George Sub-region			Bulkley-Nechako Sub-region		
	Total	Ment+ (%)	Women+ (%)	Total	Ment+ (%)	Women+ (%)	Total	Ment+ (%)	Women+ (%)	Total	Ment+ (%)	Women+ (%)	Total	Ment+ (%)	Women+ (%)
<b>Total Population</b>															
Commute within CSD of residence	32,510	48	52	4,690	50	50	2,690	52	48	1,280	47	53	720	47	53
Commute to a different CSD within CD of residence	1,690	71	29	6,470	49	51	3,825	49	51	1,425	50	50	1220	48	52
Commute to a different CSD and CD within province or territory of residence	1,150	65	35	750	56	44	445	52	48	135	81	19	170	47	53
Commute to a different province or territory	130	92	8	60	50	50	35	43	57	25	60	40	0	0	100
<b>Indigenous Population</b>															
Commute within CSD of residence	3,490	43	57	700	50	50	400	56	44	145	48	52	155	35	65
Commute to a different CSD within CD of residence	200	73	28	850	38	62	445	37	63	170	41	59	235	38	62
Commute to a different CSD and CD within province or territory of residence	195	59	41	65	31	69	55	18	82	10	100	0	0	0	0
Commute to a different province or territory	25	100	0	10	0	100	10	0	100	0	0	0	0	0	0

Source: Statistics Canada (2022)



## 13.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, no new interests and concerns related to Employment have been shared by Indigenous Nations. PRGT will continue to engage with Indigenous Nations on the proposed Amendment. As information is shared, PRGT will review the information in the context of the Amendment and associated mitigation.

## 13.3 Amendment Effects Assessment

### 13.3.1 Potential Effects and Mitigation Measures

Employment was selected as a VC in the Application (PRGT 2014a) to assess potential adverse effects of the Project on local and regional employment and labour force capacity. The employment VC in the Application (PRGT 2014a) assessed the adverse impacts to employment, including:

- Change in labour availability
- Change in wage rates
- Change in training requirements
- Change in in-migration and labour force stability

The Amendment focuses on Project impacts to employment during Project construction. As was the case in the Application (PRGT 2014a), change in employment during operation is likely to be minimal for the Amendment. No further assessment is warranted.

Table 13.13 outlines the potential effects, potential effect pathways and measurable parameters for Employment.



**Table 13.13 Potential Effects and Measurable Parameters for Employment**

Potential Effect	Description	Measurable Parameter
Change in labour availability	The Project will lead to increased demand for skilled workers during the construction and operation phases of the project, leading to competing demand for labour with local and regional businesses and employers.	<ul style="list-style-type: none"> <li>• Employment rate</li> <li>• Labour availability by trade or skill</li> <li>• Skill levels (educational attainment)</li> </ul>
Change in wage rates	<p>Measures the value of Project-related earnings relative to average regional incomes and incomes in the provincial construction industry.</p> <p>It is anticipated that the average project-related wage will be higher than the local wages, potentially leading to wage inflation that might affect the viability of other projects and businesses.</p>	<ul style="list-style-type: none"> <li>• Labour wage by skill level</li> </ul>
Change in training requirements	The degree of skilled labour required for the Project may not be readily available, but can be enhanced through training and education, leading to increased demands on training program.	<ul style="list-style-type: none"> <li>• Supply of local and regional training programs related to skills required by the Project</li> </ul>
Change in migration and labour force availability	The Project may require workers from other parts of BC, Canada, and elsewhere, potentially resulting in temporary and permanent population effect.	<ul style="list-style-type: none"> <li>• In- and out-migration rates within the local assessment area and regional assessment area</li> </ul>

Mitigation measures identified in the Application (Table 18-1, PRGT 2014a) and the Socioeconomic Effects Management Plan (SEEMP, PRGT 2016) are expected to be applicable to the Amendment.

PRGT developed the SEEMP to address risks and uncertainties identified in the environmental assessment process regarding Project effects on socio-economic values, including the Project's contribution to cumulative effects (PRGT 2016), as required by condition 34 of the Certificate. The SEEMP refers to the mitigation for employment in the Application and sets out the approach to benefits enhancement, including the proponent's Aboriginal and Local Contracting Strategy and Skills Training and Education approach (PRGT 2016).



## 13.3.2 Residual Effects

### 13.3.2.1 Change in Labour Availability due to Project Demands

#### 13.3.2.1.1 Direct Employment Effects

In the absence of updated Project expenditure information since the Application, estimates of direct employment resulting from the Eastern Route Alternative are based on the employment estimates presented in the 2014 PRGT EAC Application. Adjustments to these employment estimates have been made based on the length of the pipeline and number of compressor stations for the Eastern Route Alternative Amendment.

Estimates of the number of residents in the LAA and RAA who could be directly employed by Project construction have been developed through demand-supply matching. This involves comparing Project requirements with the availability of LAA and RAA residents who would have the appropriate construction skills.

The Application (PRGT 2014a) estimated that the total direct workforce for the entire route to be 8,570 person years (PYs), including 7,100 PYs to construct the land-based pipeline and 1,470 PYs to construct the compressor stations. Based on the composition of capital expenditure, it was estimated that approximately 39% of the total direct labour force for the entire PRGT route would be residents of BC (3,342 PYs), 57% would be residents from elsewhere in Canada (4,885) and 4% would consist of workers from outside Canada (343). Due to limitations in the regional labour supply, and in the context of future project demands, it was estimated that 10% of the Project's direct construction workforce would consist of residents of the LAA and RAA for the Project.

Adjustments to these estimates are made for the Eastern Route Alternative based on the length of pipeline (i.e. 172 km) and number of compressor stations (one) anticipated. Based on these adjustments, construction of the Eastern Route Alternative is estimated to generate 1,995 PYs of direct employment in Canada over the four-year construction period, approximately 499 PYs of direct employment annually (Table 13.14). Of the total direct construction employment, 811 PYs of employment (39%), or 203 PYs annually, is expected to be in BC (Table 13.14).

**Table 13.14 Eastern Route Alternative, Direct Construction Employment**

Geography	Direct Employment (PYs)	
	Total	Annual
Canada	1,995	499
• BC	811	203
• Other Canada	1,185	296
Outside Canada	83	21
<b>Total</b>	<b>2,078</b>	<b>520</b>

Note: may not sum due to rounding

Source: Estimates based on information from PRGT (2014a)



The proportion of direct construction employment in BC that will occur in each sub-region is estimated based on the length of land-based pipeline in each sub-region for the Eastern Route Alternative (Table 13.15).

**Table 13.15 Eastern Route Alternative, Direct Construction Employment by Sub-region**

Sub-region	Pipeline Length (km)	Direct Construction Employment in BC (PYs)	
		Total	Annual
Peace River	64.3	303	76
Fraser-Fort George	82.2	388	97
Bulkley-Nechako	25.3	119	30
<b>Total</b>	<b>171.8</b>	<b>811</b>	<b>203</b>

Note: may not sum due to rounding

Source: Estimates based on information from PRGT (2014a)

Current socio-economic conditions are assessed to determine the proportion of the workforce that could be sourced from residents in the LAA and RAA. The proportion of the construction labour force that will be hired from communities within the LAA and RAA will depend on three factors:

- Project related labour demands in the LAA and RAA
- Number of workers who have construction experience and skills that are directly applicable to pipeline construction.
- Demands of other projects that are underway at the same time.

In 2021, a total of 7,180 workers were employed in the construction industry in the RAA, with 2,125 located in the LAA, and a further 5,055 in the other communities in the RAA (i.e., Prince George and Fort St. John) (see Section 13.1.5). In the same year, 17,685 were employed in trades, transport and equipment operators and related occupations in the RAA, with 6,040 located in the LAA, and a further 11,645 in the other communities in the RAA (see Section 13.1.6).

As of Q2 2023, there are a total of 12 major projects (valued at \$15 million or more) under construction in the RAA, with a total estimated cost of \$19.1 billion (Table 13.16). The largest of these projects would be the Site C Project in Fort St. John, with an estimated cost of \$16 billion.

Based on an average of 4.37 PYs of construction per \$1 million of costs (Statistics Canada 2023d), the construction projects currently underway in the RAA will require 83,615 PYs of employment. While the number of PYs will be distributed over the project construction lifetime for the 12 major projects, the workforce required for the projects would likely exceed the construction labour force in the RAA workers would need to be sourced from outside of the RAA.



A further 26 projects are proposed in the RAA with a total estimated cost of \$14.0 billion, which could require an additional 61,128 PYs of employment. While it is not clear if all of these major projects will be built, or when they will be built, the evidence indicates that there will likely be construction labour shortages in the RAA in the future with major project demand expected to exceed supply.

**Table 13.16 Major Projects Under Construction, Proposed, and On Hold in the LAA and RAA, Q2 2023**

Sub-region	Under Construction		Proposed		On Hold	
	Number	Value (\$ million)	Number	Value (\$ million)	Number	Value (\$ million)
Peace River	9	18,938	15	9,921	5	4,210
Fraser-Fort George	2	38	10	3,967	1	-
Bulkley-Nechako	1	158	1	100	0	-
<b>Total</b>	<b>12</b>	<b>19,134</b>	<b>26</b>	<b>13,988</b>	<b>6</b>	<b>4,210</b>

Note:

Information provided as available. There are numerous information gaps in the Major Projects Inventory.

Source: Government of British Columbia (2023a) BC Major Projects Inventory, Q2 2023

Given the limitations of the labour supply in the LAA and RAA, in the context of future project demands, it is anticipated that a conservative estimate of 10% RAA labour supply for the Project's direct construction workforce is realistic. This would represent 81 PYs over the four-year construction period, or 20 PYs annually, for the Eastern Route Alternative (Table 13.17). Of the 20 annual PYs of direct construction employment, it is anticipated that 8 PYs of employment would be in the Peace River sub-region, 10 PYs of employment in the Fraser-Fort George sub-region and 3 PYs of employment in the Bulkley-Nechako sub-region.

**Table 13.17 Eastern Route Alternative Estimated Direct Construction Labour Force, LAA/RAA Labour**

Sub-region	Direct Construction Employment in BC (PYs)		LAA/RAA Residents Employed in Direct Construction Workforce (PYs)		Non LAA/RAA Residents Employed in Direct Construction Workforce (PYs)	
	Total	Annual	Total	Annual	Total	Annual
Peace River	303	76	30	8	273	68
Fraser-Fort George	388	97	39	10	349	87
Bulkley- Nechako	119	30	12	3	107	27
<b>Total</b>	<b>811</b>	<b>203</b>	<b>81</b>	<b>20</b>	<b>729</b>	<b>182</b>

Note: Totals may not sum due to rounding

Source: Estimates based on information from PRGT (2014a)



The annual number of RAA residents employed in the direct construction workforce (20 PYs annually) would represent approximately 1% of the construction labour force in the LAA in 2021 (2,125 construction workers) and less than 1% of the construction labour force in the RAA (7,180 construction workers) (Table 13.18).

For comparison, estimated local annual direct construction employment demands in the Application represented 5% of the total LAA construction labour force (PRGT 2014a). Growth in the construction workforce for the communities in the LAA between 2011 and 2021, means the construction employment requirements for the PRGT Eastern Route Alternative represent a smaller proportion of the construction labour force in all three sub-regions, compared to the Application (PRGT 2014a).

**Table 13.18 LAA and RAA Residents Estimated Employment in Direct Construction Workforce for Eastern Route Alternative**

Sub-region	LAA/RAA Residents Employed in Direct Construction Workforce (PYs)		Construction Labour Force, 2021		LAA/RAA Residents Employed in Direct Construction Workforce as a Proportion of Construction Labour Force	
	Total	Annual	RAA	LAA	RAA (%)	LAA (%)
Peace River	30	8	7,180	1,385	1%	1%
Fraser-Fort George	39	10		530		2%
Bulkley- Nechako	12	3		210		1%
<b>Total</b>	<b>81</b>	<b>20</b>		<b>2,125</b>		<b>1%</b>

Source: Estimates based on information from PRGT (2014a)

### 13.3.2.1.2 Indirect Employment Effects

Additional employment in supplier industries will result from purchases of the other goods and services needed to construct the Eastern Route Alternative; these are referred to as indirect employment effects. In the absence of new expenditure Project information since the Application, updated indirect employment effects have not been estimated. Indirect employment effects are anticipated to be in the same range as estimated in the Application (PRGT 2014a).

### 13.3.2.1.3 Induced Employment Effects

Direct and indirect Project construction employment will also create induced employment, which occurs when the Project workforce purchases consumer goods and services. In the absence of new Project information since the Application, updated induced employment effects have not been estimated. Induced employment effects are anticipated to be in the same range as estimated in the Application (PRGT 2014a).



#### 13.3.2.1.4 Residual Effects Characterization

The Eastern Route Alternative will not change the residual effects characterization in the EAO Assessment Report (EAO 2014a). The residual adverse effects of Project construction on labour availability can be characterized as moderate in magnitude, will occur continuously over the construction period (short-term) and will be reversible once construction ceases. While the Project will reduce labour availability within the LAA and RAA, this is not anticipated to adversely effect the ability of other potential employers to recruit regional workers for their projects.

#### 13.3.2.2 Change in Wage Rates

Median total individual income in the LAA (\$44,893) and other communities in the RAA (\$48,200) were greater than the provincial median total individual income (\$40,800) in 2021. The same was true for median individual employment income in the LAA (\$46,113) and RAA (\$47,800) compared to the provincial median individual employment income (\$38,000) in 2021 (see Section 13.1.8).

Those working in the construction industry in BC in 2023, typically have annual salaries (\$77,133 to \$131,677 depending on working pattern) greater than median incomes in the LAA and RAA (see Section 13.1.7). With numerous major projects underway in the RAA, high salaries in the construction industry are likely to continue with workers in demand.

While the Eastern Route Alternative is expected to provide some employment opportunities for LAA and RAA residents, there could be concern that the wages being offered by the Project could encourage workers to leave lower paying jobs to work on construction of this Project. This could result in general labour shortages elsewhere in the regional economy and wage rate inflation that could adversely affect businesses throughout the LAA and RAA. Especially when competing with other major projects for workers in the RAA and the wider context of worker shortages in the BC construction industry. A 2022 survey reported 75% of construction businesses were facing worker shortages, especially among skilled trades (Government of Canada 2023b).

With high unemployment rates in the LAA (8.9%) and other communities in the RAA (9.3%) relative to the provincial average (8.4%) (see Section 13.1.4), the effect on labour income for LAA and RAA is anticipated to be relatively small.

The employment expectations of the Project for LAA and RAA residents and the associated labour income are anticipated to be relatively small and, by itself, the Amendment is not expected to change wage rates in the LAA and RAA. The proponent will not engage in competitive hiring practices that might contribute to wage escalation and will rely on labour imported from elsewhere in BC or Canada to fill its employment requirements should labour from the LAA and RAA not be available. Since the wages offered will be based on industrial rates negotiated at a broader scale (i.e. BC wide), the local supply/demand labour balance will not govern the negotiated wage rates.





#### 13.3.2.2.1 Residual Effects Characterization

The Eastern Route Alternative will not change the residual effects characterization in the in the EAO Assessment Report (EAO 2014a). Residual adverse effects of Project construction on changes in wage rates are characterized as low in magnitude, short term and continuous during Project construction, and reversible once construction ceases.

#### 13.3.2.3 Change in Training Requirements

To participate in employment opportunities generated during the construction of the Eastern Route Alternative, some LAA and RAA residents may have to upgrade their skills. Consequently, the Eastern Route Alternative could increase demand for education and training services provided by post-secondary institutions. While contractors will likely hire workers who already possess specialized construction skills and training, there can be opportunities for the proponent to engage residents in the LAA and RAA who are interested in employment opportunities during construction of the Eastern Route Alternative. The potential effects on training institutions will depend on the number of LAA and RAA residents who take part in these training programs. This training will be required prior to the start of work for early construction crews before the start of construction.

Of the total population aged 15 years old in the LAA in 2021, 23% (7,405) had no certificate, diploma or degree, and 35% (11,150) had a high (secondary) school diploma or equivalency certificate as their highest level of educational attainment. For the other communities in the RAA, 17% (13,665) had no certificate, diploma or degree, and 34% (26,805) had a high (secondary) school diploma or equivalency certificate as their highest level of educational attainment. These rates are high relative to provincial averages, where 13.5% of the BC population had no certificate, diploma or degree and 29.5% had a high (secondary) school diploma or equivalency certificate as their highest level of educational attainment (see Section 13.1.3). The relatively low levels of educational attainment in the LAA and RAA, and high levels of unemployment relative to the provincial average (see Section 13.1.4), indicate that there could be interest in residents of the LAA and RAA upgrading their skills to enhance employment prospects to embrace the Project and other major projects in the LAA and RAA.

There is expected to be sufficient capability and capacity for workforce training within the LAA and RAA to meet any demand. There are three post-secondary education institutions with campuses in the LAA and RAA: UNBC, CNC and Northern Lights College NLC. These institutions provide academic and professional training programs as well as training in trades, workplace skills, and safety (see Section 13.1.3).

#### 13.3.2.3.1 Residual Effects Characterization

The Eastern Route Alternative will not change the residual effects characterization in the EAO Assessment Report (EAO 2014a). The residual effects of Project construction on training requirements can be characterized as low in magnitude, short-term, continuous throughout the construction phase, and will be reversible once construction ceases.



#### **13.3.2.4 Change in Migration and Labour Force Activity**

Project effects on labour force stability are related to the supply and availability of the local workforce needed to satisfy Eastern Route Alternative labour demands. The ability of the local labour force to absorb the additional demand is related to the size and availability of appropriately qualified workers (see Section 13.3.2.1). To the extent that the Eastern Route Alternative is able to hire individuals within the LAA and RAA who are currently unemployed, there will be no population effect. However, if unemployed individuals within the LAA and RAA cannot satisfy Eastern Route Alternative employment demands then non-resident workers or currently employed workers may be required.

Since the labour requirements for the construction of the Eastern Route Alternative exceed the capacity of the local labour force, the balance of project requirements will be filled by non-residents. However, non-residents will only affect local populations or labour force stability if they migrate into the area. Those who commute, including those who are working on a fly-in fly-out basis, will not have permanent effects on labour force stability within the LAA or RAA.

Project construction is expected to involve a large number of transient workers coming into the LAA for short periods of time. As noted in Section 13.3.2.1, the Eastern Route Alternative is anticipated to require a direct construction workforce of 2,078 PYs of employment for the four-year construction period, of which 81 PYs of employment (20 PYs annually) is anticipated to go to residents of the LAA/RAA and 1,997 PYs of employment (499 PYs annually) is anticipated to go to non LAA/RAA residents.

The construction process will involve two stages. The first stage will consist of early construction, which involves clearing the footprint and creating access roads. The second stage will consist of pipeline installation. There are several reasons why workers from Canada or other parts of BC might choose not to permanently relocate to the RAA. First, the construction period for the Project is relatively short. Second, the construction camps are generally located at some distance from communities so there will be little interaction with communities. Third, many of the specialized skills required for pipeline construction may not be required in the LAA or RAA once construction has been completed. Thus, construction is not expected to cause any permanent migration of non-resident workers into the LAA or RAA and thereby affect labour force stability.

Project construction will support labour force stability in the short term by providing LAA and RAA residents and businesses with employment and income they might not otherwise have. This could help reverse or slow down recent trends of population decline in the LAA. Between 2016 and 2021, the LAA experienced population decline of 8%, declining from 44,233 people to 40,720 people (see Section 13.1.2). In the absence of new economic development opportunities, this out-migration could continue, leading to more instability in the regional labour force. While the employment opportunities offered by the Project may be small and short term in comparison to other types of major projects like mines, the training and employment opportunities being offered will help residents of the RAA find employment in the region even after Project construction has ended.



#### 13.3.2.4.1 Residual Effects Characterization

The Eastern Route Alternative will not change the residual effects characterization in the EAO Assessment Report (EAO 2014a). Residual adverse effects on migration and labour force stability are expected to be moderate in magnitude, occur continuously over the construction phase, and will be reversible once construction ceases.

### 13.3.3 Changes to Characterization of Residual Effects

The residual effect on employment and labour availability is characterized as follows.



**Table 13.19 Changes to EAO Assessment Report Characterization of Residual Effects – Employment**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Context</i>	<i>Not sensitive/ Somewhat resilient</i>	<i>Except for the Peace River Regional District, the other four regional districts have moderately high unemployment rates and moderate to low labour force participation rates.</i>	No change
<i>Magnitude</i>	<i>Moderate</i>	<i>Characterization of moderate magnitude takes into account implementation of a formalized monitoring and reporting process. A construction workforce of up to 7,200 workers would represent 9% of the total RAA labour force. However, the peak construction period is likely to attract workers from all over BC and elsewhere, particularly given the temporary nature of the construction work, and short peak construction period (approximately ten months) in any pipeline segment. Use of 9 main construction camps should help mitigate adverse effects on local and regional labour force.</i>	No change
<i>Extent</i>	<i>Regional</i>	<i>Any potential adverse effects related to the economic environment would primarily occur in communities and businesses in the five Regional Districts crossed by the proposed Project (Peace River, Fraser-Fort George, Bulkley-Nechako, Kitimat-Stikine and Skeena-Queen Charlotte).</i>	No change
<i>Duration</i>	<i>Short-to medium term</i>	<i>The adverse effects of Project construction on the economic environment at the community level would occur until the cause of the effects ceases with the end of Project construction (i.e., a three- to four-year construction period); in a specific pipeline segment, the highest magnitude effects would be for a shorter duration (i.e. several months in 2016 or 2017).</i>	No change
<i>Reversibility</i>	<i>Reversible</i>	<i>Reversible after construction ceases.</i>	No change
<i>Frequency</i>	<i>Continuous</i>	<i>Would be continuous during construction but with varying magnitude.</i>	No change
<i>Likelihood</i>	<i>The likelihood is high that some degree of adverse effects would occur during Project construction with respect to skilled labour shortages in the RAA economy.</i>		No change
<i>Significance</i>	<i>Considering the above analysis and having regard to the conditions identified in the Table of Contents (TOC) (which would become legally binding as a condition of an EA Certificate), EAO is satisfied that the proposed Project is not likely to have significant adverse residual effects on labour availability.</i>		-
<i>Confidence</i>	<i>Moderate Confidence – Moderate level of confidence in validity of assumptions and analysis and effectiveness of proposed mitigation strategies. This arises from the inherent difficulties in accurately predicting how local labour markets may respond to new events.</i>		No change

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a).



#### **13.3.4 Cumulative Effects Assessment**

As described in the Application (PRGT 2014a) the Project is likely to act cumulatively with other major projects that will employ large workforces. The extent to which these projects will be competing with the Project for labour, goods and services is not known at this time. The exact details of when these projects would be constructed, their cost and employment requirements, and their hiring and procurement strategies are presently unknown and will only be revealed when those projects undergo regulatory review. In response to this uncertainty, a conservative approach has been taken in assessing Project impacts on labour availability such that the Project's residual effects were assessed in the context of all other potential projects that may compete with the Project for the available labour force in the LAA and RAA. As described in the Application, there are several reasons why workers from Canada or other parts of BC might choose not to permanently relocate to the RAA. First, the construction period for the Project is relatively short: four years with most pipeline installation work occurring during a 1.5-year period. Work on any particular pipeline segment will be shorter than this—about 10 months on average—and this will limit the duration of potential interactions between construction workers and communities. As a result, and considering competition from other projects, the proportion of Project workers that were expected to be residents of the LAA and RAA is considered relatively small.

Based on this information, cumulative effects on employment and labour availability are expected to be similar to those presented in the EAO Assessment Report (EAO 2014a). The EAO Assessment Report recognized that there are considerable uncertainties relating to the location and timing of the effects given the lack of quantifiable data about the precise location, footprint, schedule and design of many of the reasonably foreseeable future developments.

EAO included Condition #34 for PRGT to develop and implement a SEEMP to address risks and uncertainties identified in the environmental assessment process regarding Project effects on socio-economic values including the Project's contribution to cumulative effects. .

With the application of mitigation measures, including implementation of the SEEMP, it is anticipated that predicted cumulative effects would remain unchanged from the EAO Assessment Report (EAO 2014a), which concluded that the Project is not likely to have significant cumulative adverse residual effects in employment and labour availability. therefore, no further assessment is warranted.

#### **13.3.5 Risks and Data Uncertainty**

There is a moderate level of uncertainty for predicted Project residual effects and cumulative effects on employment. This uncertainty is driven by a lack of Eastern Route Alternative specific information, the broader understanding of other major projects and activities in the region, and the current and future application of government initiatives to manage effects of the Project.

The risk level associated with the assessment of employment is low given the understanding of Project effects and the use of standard mitigation measures.



## 14 Community Infrastructure and Services

Community infrastructure and services was selected as a valued component in the Application (PRGT 2014a) because of the potential effects of the Project and its associated labour force on the ability of nearby communities to deliver infrastructure and services.

The community infrastructure and services valued component is guided by the approach taken in the Application (PRGT 2014a), as well as consideration of section 25(2) matters of the British Columbia *Environmental Assessment Act* (BCEAA). Section 25(2) of the BCEAA requires consideration of “positive and negative direct and indirect effects of the reviewable project, including environmental, economic, social, cultural and health effects and adverse cumulative effects”, “disproportionate effects on distinct human populations, including populations identified by gender” and “effects on current and future generations”.

Positive effects were previously considered as part of the Project Overview in the Application (PRGT 2014a). Specifically, the assessment presented in the Application anticipated positive effects on local communities through revenue associated with user fees for community recreation and leisure facilities, water use fees, and disposal and tipping fees for wastewater and solid waste. The contribution of user fees would promote the sustainability of these services and the use of recreation facilities by the workforce could result in longer hours of operation, which would also benefit local residents. For completeness, and to meet section 25(2) requirements, positive effects related to community infrastructure and services are considered in this section.

Section 25(2) of the BCEAA requires “disproportionate effects on distinct human population, including populations identified by gender” to be considered in every assessment. To meet this requirement, baseline conditions have incorporated disaggregated data, where available, to identify different sub-groups of population who may experience disproportionate effects.

The spatial boundaries for the Infrastructure and Services VC include the Project footprint, LAA and RAA. The Project footprint consists of the area that will be directly disturbed by construction and operation activities, including the construction of the ROW, a metering station, a compressor station, and associated temporary ancillary infrastructure. The LAA for community infrastructure and services in the Application (PRGT 2014a) included urban centres and Indigenous communities located in six sub-regions that were intersected by the Project. These sub-regions were: Bulkley-Nechako, Fraser-Fort George, Kitimat-Stikine, Nisga’a lands, Peace River, and Skeena-Queen Charlotte. Of the six Sub-regions, the Eastern Route Alternative interacts with three sub-regions: Bulkley-Nechako, Peace River, and Fraser-Fort George. Skeena-Queen Charlotte, Kitimat-Stikine, and Nisga’a Lands are excluded from the community infrastructure and services LAA for the Amendment as they do not interact with the Eastern Route Alternative.

The LAA for the Amendment includes a 200 km distance centred on the pipeline centreline (i.e., 100 km on each side) that fully encompasses the Project footprint and includes all CSD populated within that distance that fall within the Regional Districts that are intersected by the Project footprint: Peace River,



Fraser-Fort George, and Bulkley-Nechako (refer to Table 13.1 in Section 13). These communities are the closest communities to the Eastern Amendment Route and are more likely to provide infrastructure and services to the Project and be the primary places of residence of the Project workforce.

The RAA for community infrastructure and services in the Application (PRGT 2014a) included the sub-regions in the LAA, as well as communities outside of the LAA that may serve as staging communities or services hubs to the Project by providing some of the labour, goods, and services needed for project construction and operation. The City of Prince George and the City of Fort St John, as the closest large communities to the Eastern Route Alternative, are anticipated to act as staging communities and service centres. Therefore, the RAA for the Amendment includes all LAA communities and the cities of Prince George and Fort St. John, which will likely serve as staging communities, or service hubs to the Eastern Route Alternative.

## **14.1 Baseline Conditions**

Baseline data collection focused on compiling information required to describe current and anticipated conditions on infrastructure and services within communities most likely to experience socio-community impacts related to the Eastern Route Alternative. Information on current baseline conditions for community infrastructure and services is based on existing information collected as part of the Application (PRGT 2014a) and existing secondary baseline data sources. Secondary data sources include documents produced by Statistics Canada, Canada Mortgage and Housing Association, Northern Health, and relevant municipal and other government websites. News articles have also been cited to update existing community infrastructure conditions in LAA and RAA communities.

### **14.1.1 Housing and Temporary Accommodations**

#### **14.1.1.1 Housing Market**

##### **Peace River**

Throughout the Peace River sub-region, home ownership was more common than renting. Approximately 80% of homes in the sub-region were owned and 20% were rented (Statistics Canada 2022). Among the Peace River sub-region communities, Fort St. John had the greatest number of private occupied dwellings.

In 2021, Fort St. John had 8,775 private dwellings that were occupied by permanent residents (Statistics Canada 2022). Of these, 58% were owned by the residents while 42% were rented. The average monthly cost for those who owned their dwellings was \$1,660 in 2021 while renters paid an average of \$1,239 each month (Statistics Canada 2022). Between 2019 and 2023, the average residential home price increased from \$375,775 to \$406,015 (British Columbia Northern Real Estate Board [BCNREB] 2024). There have been substantial fluctuations in the vacancy rate in the primary rental housing market in Fort St. John over time. Results for the 2020 City of Fort St. John Housing Needs Assessment Report (City of Fort St. John 2020), indicated that the City was experiencing high vacancy rates at 12.6%. Between October 2020 and October 2023, the number of rental units rose from 1,750 to 1,946 (CMHC



2023a). The rental vacancy rate fell to 5.6% by October 2023 (Canadian Mortgage and Housing Corporation [CMHC] 2023a).

In 2021, Chetwynd had 990 occupied private dwellings of which 64% were owned and 36% were rented (Statistics Canada 2022). The average monthly cost for those who owned their dwellings was \$1,128 in 2021 versus \$1,239 for renters (Statistics Canada 2022). While there are no available rental data for Chetwynd, there are indications that, due to high rents in the community, a common housing option is to live in recreational vehicles which may be parked on rented spaces in recreational vehicle (RV) parks or on private properties (Peace River Regional District and District of Chetwynd 2021).

Hudson's Hope had 375 occupied private dwellings in 2021 of which 80% were owned by the residents (Statistics Canada 2022). The average monthly rent in 2021 was \$1,200 and homeowners paid an average of \$775 each month (Statistics Canada 2022).

### **Fraser-Fort George**

Similar to the Peace River sub-region, most homes in the Fraser-Fort George sub-region were owned rather than rented in 2021. The City of Prince George had the greatest number of dwellings of the communities in the Fraser-Fort George sub-region. Prince George had 31,795 occupied private dwellings in 2021, of which approximately 68% were owned and 32% were rented (Statistics Canada 2022). The CMHC Fall Survey indicates that Prince George's rental vacancy rate in 2023 was 2.8% and its average rental cost was \$1,159 (CMHC 2023b). Between 2005 and 2021, average rent increased 79% (City of Prince George 2022).

Mackenzie District Municipality (DM) had 1,585 occupied private dwellings in 2021. Approximately 81% of these homes were owned by residents. In McLeod Lake 1, all 45 occupied private dwellings were band housing (Statistics Canada 2022).

As of December 2022, the average residential housing cost was \$524,639 in Prince George (a 14.4% increase from 2021) and was \$183,404 in District of Mackenzie (a 3.2% increase from the previous year). Between 2006 and 2021, the average residential house price increased 169% (City of Prince George 2022). The high average house price in Prince George makes it difficult for youth and low-income earners to enter the housing market (MNP and NDIT 2022).

The City of Prince George (2022) Housing Need and Demand Study revealed that there is a need for smaller housing units that are accessible and located close to services and shopping areas and housing for older seniors to support the aging population in Prince George. As per the City of Prince George Housing Needs Report (2022), the senior population (i.e., individuals 65+) of Prince George is forecasted to reach 16,632 seniors by the year 2031 with a need of additional 300 senior supported housing units in the next 10 years.

The Age-Friendly Housing and Health Care Action Plan also identified that while homes within the District of Mackenzie are affordable compared to other small communities in BC, the median monthly cost for rent is higher in the District of Mackenzie than comparable communities and is higher than the monthly cost of home ownership (District of Mackenzie 2017). The Plan also identified a need for accessible housing, senior housing, and affordable rental housing.





## **Bulkley-Nechako**

Among the LAA and RAA communities within the Bulkley-Nechako sub-region, Bulkley-Nechako Electoral Area F had the greatest number of occupied private dwellings at 1,335 in 2021, followed by Fort St. James with 590 occupied private dwellings. Of the occupied dwellings in Fort St. James, 67.0% were owned (Statistics Canada 2022), whereas in Bulkley-Nechako Electoral Area F the rate of ownership was higher at 87.3%.

The number of occupied private dwellings in Indigenous communities in the Bulkley-Nechako sub-region for which data are available ranged from 35 to 205. The majority of homes in Indigenous communities were band housing with the exception of Binche 2 where 50% of homes were owned by residents (Statistics Canada 2022).

The average value of dwellings in Fort St. James is well below that for the province, and the value of homes in Fort St. James has increased at a much slower rate than the average value of dwellings province-wide. Between 2019 and 2023, the average cost of a residential home in Fort St. James increased from \$234,929 to \$284,750 (BCNREB 2024).

Shelter costs for renters in Fort St. James have been increasing at a faster rate than costs for homeowners. Monthly costs for homeowners increased by 11% between 2001 and 2021 while rent increased by 40% during the same period.

The lack of rental housing in Fort St. James was identified as a critical housing challenge in the District of Fort St. James Housing Strategy (Urbanics Consultants Ltd. 2018). Lack of availability, poor condition, and high cost were the primary issues identified in the rental housing market. Lack of rental housing is an issue across all incomes and household sizes. The District has significant unmet need for housing of temporary or seasonal employees (Urbanics Consultants Ltd. 2018). The lack of housing for seniors was also identified as a critical issue. However, the community has since received funding from BC Housing for the construction of an independent living seniors rental housing complex, adjacent to the Stuart Lake Hospital (Government of British Columbia 2023).

### **14.1.1.2 Core Housing Need**

CMHC determines that a household is experiencing 'core housing need' if the household is living in dwellings considered unsuitable, inadequate or unaffordable and that the household income level is such that they would have to spend 30% or more of their total before-tax income to pay the median rent of alternative local housing that is acceptable (CMHC 2019). Core housing need is used to determine who needs housing assistance and focuses on vulnerable populations and assesses households living in private residences (CMHC 2019).

Core housing need characteristics for communities in the LAA and RAA are presented in Table 14.1.



**Table 14.1 Households in Core Housing Need, 2021**

<b>Census Subdivisions in LAA and RAA</b>	<b>Core Housing Need (%)</b>	<b>Suitability (Crowding) (%)</b>	<b>Adequacy (Repair) (%)</b>	<b>Affordability Standard (%)</b>
<b>Peace River</b>				
Fort St. John, CY	6.0	4.6	7.5	16.4
Chetwynd, DM	7.1	2.0	9.6	11.6
East Moberly Lake 169, IRI	0.0	0.0	30.8	0.0
Halfway River 168, IRI	-	20.0	20.0	-
Hudson's Hope, DM	4.0	0.0	5.3	5.3
Peace River B, RDA	5.9	6.2	6.2	8.9
Peace River C, RDA	3.3	2.0	8.6	14.8
Peace River D, RDA	11.0	2.0	8.5	11.5
Peace River E, RDA	8.3	1.8	10.1	9.6
Tumbler Ridge, DM	6.4	0.0	4.1	6.4
West Moberly Lake 168A, IRI	-	0.0	0.0	-
<b>Fraser-Fort George</b>				
Prince George, CY	7.0	3.5	6.5	15.7
Fraser-Fort George A, RDA	2.2	4.5	6.0	10.4
Fraser-Fort George F, RDA	7.3	5.5	12.7	10.9
Fraser-Fort George G, RDA	-	0.0	9.5	-
Mackenzie, DM	7.3	1.3	7.3	11.4
McLeod Lake 1, IRI	-	0.0	0.0	-
<b>Bulkley-Nechako</b>				
Fort St. James, DM	11.9	4.2	11.9	11.9
Binche 2, IRI	-	20.0	40.0	-
Bulkley-Nechako C, RDA	12.1	3.5	8.6	10.3
Bulkley-Nechako F, RDA	9.7	5.2	9.7	8.2
Dzitline Lee 9, IRI	-	-	-	-
Mission Lands 17, IRI	-	-	-	-
Nak'azdli, IRI	0.0	7.3	39.0	0.0
Sowchea 3, IRI	-	-	-	-
Tache 1	0.0	16.00	44.0	0.0
Williams Prairie Meadow 1A, IRI	-	-	-	-
Ye Koo Che 3, IRI	-	28.6	57.1	-

Note:

“-“ indicates data are not available

CY = City; DM = District Municipality; IRI = Indian Reserve; RDA = Regional District Area

Source: Statistics Canada 2022



Peace River

In the Peace River sub-region, the community with the highest percentage of households in core housing need in 2021 was Peace River D, Regional District Area (RDA) at 11.0%. In Fort St. John, 6.0% of the population was considered to be in core housing need in 2021 (Statistics Canada 2022). In Chetwynd in 2021, 7.1% of households were in core housing need and in Hudson’s Hope and Tumbler Ridge, the rate of core housing need was 4.0% and 6.4%, respectively (Statistics Canada 2022).

Fraser-Fort George

In the Fraser-Fort George sub-region in 2021, Fraser-Fort George A, RDA had the lowest percentage of households in core housing need at 2.2%. The remaining communities for which data are available had rates of core housing need at or just above 7.0% (Statistics Canada 2022).

Bulkley-Nechako

In 2021, the community with the highest incidence of core housing need in the Bulkley-Nechako sub-region was Bulkley-Nechako C, RDA at 12.1%. This was followed by Fort St. James with 11.9% of households experiencing core housing need (Statistics Canada 2022).

14.1.1.3 Commercial Accommodations

Commercial accommodations (i.e., hotels, motels, inns, RV sites, and work camps) are available in the LAA and RAA. Table 14.2 provides information about commercial accommodations in the municipalities where workers will most likely stay, based on proximity to the various Project work sites. There are more than 5,800 rooms and camping/RV sites in LAA and RAA communities (Chetwynd n.d. a; District of Mackenzie 2024; City of Fort St. John n.d.b.; Hudson’s Hope n.d.a.; Tourism Prince George 2024; TripAdvisor n.d. a, b)

Northern BC’s average occupancy rate for commercial accommodations was 63% in 2023. This compares to the province’s average rate 69% (Destination British Columbia 2024).

Table 14.2 Commercial Accommodations in the LAA and RAA, 2024

Community	Accommodation Type	Number of Accommodation Type	Number of Rooms/Sites
Peace River			
Fort St. John (includes Taylor)	Hotels and motels	18	1,509
	Camping and RV sites (regional)	8	361
Sub-Total		26	1,870
Hudson’s Hope	Inns	3	144
	Camping and RV sites	1	20
Sub-Total		4	164



Community	Accommodation Type	Number of Accommodation Type	Number of Rooms/Sites
Chetwynd	Hotels, motels, inn	6	300
	Camping and RV sites, trailer parks	7	147
<b>Sub-Total</b>		<b>13</b>	<b>447</b>
<b>Total</b>		<b>43</b>	<b>2,481</b>
<b>Fraser-Fort George</b>			
Prince George	Hotels and motels	30	2524
	Bed and breakfasts	12	25
	RV and campsites	8	373
<b>Sub-Total</b>		<b>50</b>	<b>2,922</b>
Mackenzie	Hotels and motels	3	169
	RV and campsites	2	40
	Hostels	1	35
<b>Sub-Total</b>		<b>6</b>	<b>244</b>
<b>Total</b>		<b>56</b>	<b>3,166</b>
<b>Bulkley-Nechako</b>			
Fort St. James	Hotels and motels	2	95
	RV and campsites	3	55
	Lodges	3	24
<b>Total</b>		<b>8</b>	<b>174</b>

Sources: Chetwynd n.d. a., Fort St. John Info n.d., Hudson's Hope n.d.a., Tourism Prince George 2024, District of Mackenzie 2024, Trip Advisor n.d.a., n.d.b., Rogers Paradise Lodge, n.d., RV Life Campgrounds, n.d., Camping RV BC, n.d.

## Peace River

Fort St. John is the major centre in the region and provides a wide range of accommodations with 1,509 rooms in 18 hotels and motels and 361 RV sites (with camping) in eight RV site locations (Trip Advisor n.d.a., Fort St. John Info n.d.). Hudson's Hope has 144 rooms in three inns and one RV/camp site that has 20 sites. Chetwynd has approximately 300 rooms across six hotels, motels and inns and a total of 147 RV sites in seven trailer parks.

## Fraser-Fort George

There are about 50 temporary accommodation sites available within the LAA and RAA communities in the Fraser-Fort George sub-region. These include a mixture of hotels, motels, bed and breakfasts, and RV and campsites. Temporary accommodation in Prince George includes approximately 2,500 hotel and motel rooms (Tourism Prince George 2024). There are also 373 sites at eight RV parks and campgrounds. Mackenzie offers 169 rooms at three hotels and motels, as well as 40 sites at RV parks and campgrounds (Trip Advisor n.d.c.).



## **Bulkley-Nechako**

There are two hotel and motel options in Fort St. James which provide 95 rooms. There are also 55 RV and campsites in the area (Trip Advisor n.d.a).

### **14.1.2 Emergency and Protective Services**

#### **14.1.2.1 Police Services**

##### **Peace River**

The Fort St. John RCMP Detachment serves the communities of Fort St. John, Taylor, Charlie Lake, Wonowon, Pink Mountain, Blueberry River First Nations Reserve, Doig River First Nation Reserve, and Halfway River First Nation Reserve. The Fort St. John RCMP Detachment has 65 police officers from both municipally and provincially funded units and are supported by 25 federal and municipal civilian staff, one reserve constable, one auxiliary constable and two staff in the Victim Services Unit (Fort St. John n.d.c.). In 2022, the Fort St. John municipal detachment had an authorized strength of 38 officers. This represents the number of fully-sworn police officer positions that the police department was allowed to fill during the calendar or fiscal year, whether or not that number of officers was hired (Ministry of Public Safety and Solicitor General 2023).

RCMP officers respond to approximately 14,000 calls for service each year (City of Fort St. John n.d.c.). In 2022, the Fort St. John detachment had a crime rate (the number of criminal code offences reported for every 1,000 persons) of 42 and a case load, or the number of Criminal Code offences (excluding drugs and traffic offences) per officer, of 61. On average, in the province, the case load was 59 for each RCMP jurisdiction (Ministry of Public Safety and Solicitor General 2023).

The Hudson's Hope RCMP detachment serves Hudson's Hope and is a small detachment with three-members (a corporal and two constables) and reports low crime levels (Hudson's Hope n.d.b. ). In 2022, the Hudson's Hope RCMP detachment officers had a case load of 47 and a crime rate of 157 in 2022 (Ministry of Public Safety and Solicitor General 2023).

Chetwynd RCMP detachment provides services in Chetwynd and the surrounding area, including Moberly Lake (RCMP 2020). The authorized strength of the detachment has remained consistent at 10 officers between 2013 and 2022. The detachment is fully staffed. The Chetwynd detachment had a crime rate of 109 and a case load of 60 per officer in 2022 (Ministry of Public Safety and Solicitor General 2023).

##### **Fraser-Fort George**

RCMP detachments are located in Prince George and Mackenzie. In Prince George, the RCMP are contracted to be the municipal police force and serve the community of Prince George and surrounding rural area (RCMP 2023). In 2023, the Prince George detachment had 151 officers, up from 147 in 2022. The case load was 105 per officer in 2022, a decrease from 120 in 2021, but much higher than the provincial average of 59. A news article from 2022 stated that Prince George RCMP officers carry 84% more caseloads than the average RCMP officers in the province and that Prince George RCMP have little



capacity to do anything but respond to calls (Williams 2022). The article also stated that the detachment is under-resourced and needs 19 additional uniformed officers and additional support and administrative staff (Williams 2022).

The ratio of police officers per 100,000 population was 183.9 in 2023, up from 179.0 in 2022. The crime severity index (CSI), which measures the severity level of police-reported crime remained consistent at 207.1 in 2023 and 2022, down from 227.5 in 2021. In 2023, the CSI for the province was 93 (Ministry of Public Safety and Solicitor General, Policing and Security Branch 2023; Statistics Canada 2024).

The Mackenzie RCMP detachment had an authorized strength of 10 officers, as was the case for the previous nine years, and a caseload of 52 in 2022, up from 26 in 2021 (Ministry of Public Safety and Solicitor General 2023).

### **Bulkley-Nechako**

The Fort St. James Area provincial RCMP detachment serves Fort St. James and surrounding areas including Mason Creek, Germanson Landing, Tachie, Yehooche, Binchie, and Middle River, as well as Nak'azdli First Nation and Tl'azt'en First Nation. The Fort St. James Detachment includes one Sergeant in-charge, two Corporals, seven general duty Constables, and four First Nation police, including a Corporal in Yekooche, two constables in Tl'azt'en, and a constable in Nak'azdli (Stuart Nechako Regional Site, n.d.a.). In 2022, the Fort St. James detachment had a crime rate of 284 and a caseload of 87 per officer (Ministry of Public Safety and Solicitor General 2023).

The Takla Landing Area has a small provincial detachment serving Talka Lake First Nation Reserve 7A. In 2022, the detachment had an authorized strength of two members. The caseload per officer was 44 and the crime rate for the detachment was 424 (Ministry of Public Safety and Solicitor General 2023).

## **14.1.2.2 Fire Protection**

### **Peace River**

PRRD fire response teams are located at Charlie Lake Volunteer Fire Department (with one full time fire chief and about 30 volunteers) and Moberly Lake Volunteer Fire Department (with two fire engines and one command unit) (PRRD n.d.a). PRRD has contracts with Fort St. John, Dawson Creek, Pouce Coupe, Chetwynd, and Hudson's Hope to support their fire response services (PRRD n.d.a.).

Fort St. John has one station with 30 members (24 suppression fire fighters, two fire prevention educators, four fire fighting training officers), one fire chief and two deputy fire chiefs. Fort St John Fire Department has 12 vehicles (City of Fort St. John n.d.d) and carries out fire suppression, fire inspections, fire investigations and provides public safety and education. The Fort St. John Fire Department also provides municipal support for emergency and disaster preparedness. Firefighters respond to an average of 2,000 incidents every year including fire suppression, medical response, vehicle incidents and road rescues, hazardous material incidents (City of Fort St. John n.d.d.).



The Hudson's Hope Fire and Rescue Service is comprised of a full-time Chief, two Deputy Chiefs, three Captains, one safety officer and 19 firefighters for a total complement of 26 members. The department operates two stations, with each department having two firetrucks, one pumper/tanker and one rescue engine. Since 2018, Hudson's Hope's fire response team has been trained to respond to emergency situations with ambulance responders to provide high-quality pre-hospital care for the public. Fire responders will not transport people to the hospital (District of Hudson's Hope n.d.).

The Chetwynd Volunteer Fire Department is comprised of a fulltime Fire Chief and 30 active volunteers. The department responds to approximately 170 calls per year including: structure, grass, and vehicle fires; motor vehicle rescues; and ambulance assists within Chetwynd and the PRRD Fire Protection Area. The department responds to motor vehicle accidents within the designated highway rescue response area. The fire department is seeking more volunteers (District of Chetwynd n.d.).

### **Fraser-Fort George**

Fire protection in the City of Prince George includes fire suppression and protection, first responder medical services and emergency rescue, and fire dispatch within the City and Regional District (Prince George 2023). The Prince George Fire Department has four fire halls. In October 2022, the fire dispatchers officially moved into their permanent home in Fire Hall 1, Prince George's newest fire hall. The new Fire Operations Communications Centre and Dispatch houses up to 14 staff who ensure rapid and timely responses by Prince George's Fire and Rescue Service (City of Prince George 2023).

The District of Mackenzie Fire Rescue Department provides fire protection within the District boundaries and consists of a Fire Chief, Deputy Fire Chief, and thirty-six volunteers, which consists of two Assistant Chiefs, a Training Officer, and Assistant Training Officer, and four companies (i.e., a Captain, Lieutenant, Engineer and eight Firefighters) (District of Mackenzie 2023). The District of Mackenzie Fire Rescue Department provides fire prevention and education, vehicle extrication, fire suppression, fire inspection, burning permits, emergency planning, public safety education, emergency operations centre, and fire training (District of Mackenzie 2023).

### **Bulkley-Nechako**

Within the Regional District of Bulkley-Nechako (RDBN), there are both municipal and rural fire departments which are dispatched through the Fire Operations Communication Centre as part of the 911 Emergency Service in Bulkley-Nechako. There are 13 rural fire protection areas within the district which provide fire protection services including structural firefighting, public fire safety education, fire prevention, medical first response, road rescue, and volunteer fire fighting training (RDBN 2019a).

Two fire halls are operated by the District of Fort St. James, which provide road rescue, fire suppression, volunteer firefighter training, and public fire safety education services. The protection area covers the District of Fort St. James, Nak'azdli Reserves No. 1 and 2, and a large portion of Regional District of Bulkley Nechako Rural Area C. The Department is managed by a full time Fire Chief, with fire protection and suppression provided by 23 paid on-call fire fighters (Fort St. James 2024a).



### **14.1.2.3 Ambulance**

#### **Peace River**

British Columbia Emergency Health Services (BCEHS) provides pre-hospital care and inter-facility patient transfers throughout the province. The British Columbia Ambulance Service (BCAS) provides public ambulance service in British Columbia under the authority of BCEHS. Ambulance emergency response services are located in Fort St. John, Chetwynd, and Hudson's Hope. In 2023, the Fort St. John service had 32 full-time staff and Chetwynd and Hudson's Hope had 20 and 10 full-time staff, respectively (BCEHS 2023).

Between 2020 and 2023, the call volume in Fort St. John increased from 2,303 to 2,900 and in Chetwynd the call volume increased from 247 to 350 between 2020 and 2023 (BCEHS 2023).

#### **Fraser-Fort George**

The BCAS Northern Region Administrative Office is in Prince George and serves 24 ambulance stations across northern BC (City of Prince George 2023). In the BCAS North Central Region, there is one station located on the Prince George Hart Highway (Station 535) and one station located on the Prince George Edmonton Highway (Station 531). In the BCAS Northeast, there is one station located in Bear Lake (Station 503) and one station located in Mackenzie (Station 532).

BCEHS call volumes have generally followed an upward trend between 2020 and 2023 in Mackenzie (198 to 298) and Prince George (10,681 to 13,525) (BCEHS 2023).

#### **Bulkley-Nechako**

Fort St. James is serviced by a 24-hour ambulance provided by BCAS with 10 staff. The station in Fort St. James has two ambulance units which are staffed 24 hours a day. All calls made for Fort St. James are directed through the Kamloops dispatch for response by fire, police and or ambulance (Fort St. James 2024a; Stuart Nechako Regional Site, n.d.b.). Communities in Nak'azdli are serviced by the Nak'azdli Whut'en Emergency Operations Center, which manages emergency response efforts in collaboration with other local first responders and agencies, in particular the Fort St. James Rescue team (Nak'azdli Whut'en n.d.a.). Residents of Tl'azt'en Nation are serviced through Tl'azt'en's Emergency Response Management Program. Currently, the community receives emergency support through Tl'azt'en Nation's volunteer fire department and First Responder program and are also supported through the Fort St. James Rescue team (Tl'azt'en First Nation, n.d.).

Emergency call volumes in Fort St. James increased from 557 in 2020 to 704 in 2023 (BCEHS 2023).





### **14.1.3 Health Care Services**

#### **Peace River**

The Northern Health Authority (NHA) is responsible for the delivery of healthcare across northern BC. Northern Health has indicated that there is an acute shortage of medical personnel and not enough health care practitioners to serve the existing population (Cedar LNG 2022; Hall 2022). Health care (including mental and public health) is generally at capacity across the Northern Health region and that Northern Health is resourced to provide services to the resident population only (Cedar LNG 2022; Hall 2022). Hospitals in the north regions remain open for emergency room visits, however, patients are typically flown from northern regions to Prince George or Vancouver (Cedar LNG 2022; Hall 2022).

The Fort St. John Hospital has 44 acute-care beds, residential care beds, surgery suites, ambulatory clinics, an intensive care unit with three beds and a birthing center (Northern Health 2023). Fort St. John has a health unit that provides public health services, home care nursing, home support, community rehabilitation, nutrition and social worker services, environmental health services, audiology, and dental health (Northern Health 2023).

Hudson's Hope health center provides one emergency room bed, a doctor's office, and a pharmacy (Northern Health 2023).

Chetwynd has a hospital and primary care clinic. The hospital has an emergency department, seven long-term beds and five acute-care beds. The hospital offers inpatient services, palliative care, primary care nursing and home support and respiratory therapy (Northern Health 2023). The primary clinic provides mental health and substance use services, community care, public health, occupational therapy, respiratory care therapy and a dietician (Northern Health 2023).

#### **Fraser-Fort George**

Prince George is located within the Northern Interior Health Service Delivery Area (NIHSDA) and provides a ranges of health services and infrastructure including assisted living and long-term care residences, hospice services, health units and specialized clinics (Northern Health 2023). Prince George is home to the region's largest hospital, the UHNBC (Northern Health 2023). UHNBC, formerly known as the Prince George Regional Hospital, was built in 1958 and currently has a bed count of 268. The hospital provides ambulatory care, laboratory and medical imaging services, outpatient services, surgery and visiting clinics (Northern Health 2023).

The NHA has approved a new patient care tower, which is expected to be complete in 2030 and will add 99 beds and a cardiac care unit. This will increase the hospital's capacity and help support the needs of a growing and aging regional population (Northern Health 2023). Since 2001, UHNBC has undergone \$100 million in expansions including patient care addition with an expanded emergency room, maternal childcare centre, and magnetic resonance imaging unit, cancer centre that provided a wide range of treatments including radiation therapy and facilities to accommodate undergraduate physician training (Northern Health 2023).



Prince George is also equipped with an Urgent and Primary Care Centre which provides after-hours care to people with urgent (but not emergency) medical needs and for people who do not have a regular family doctor or nurse practitioner (Northern Health 2023).

The Mackenzie and District Hospital and Health Centre has nine beds (four acute, four longer-term and one respite/palliate care), medical and emergency services, medical imaging, a laboratory, mental health and substance use services and a medical clinic (District of Mackenzie 2023; Northern Health 2023b). The District of Mackenzie Age-Friendly Housing and Health Care Action Plan (2017) identified that due to the lack of medical specialists and support groups in the District of Mackenzie many senior citizens have to regularly travel to other centres such as Prince George or move out of the community permanently to receive health care services.

McLeod Lake Indian Band's health and social services department employs 12 individuals who deliver healthcare programs and services to members on- and off-reserve, including community health care, home care, social work and counselling, infant and family development, youth services, licensed daycare, and Head Start program (MLIB 2024b). McLeod Lake Indian Band is constructing a new \$18-million health and community wellness centre, anticipated to be operational in 2024 (Petersen 2022). The new facility will offer a large gymnasium for community gatherings and activities, a community kitchen, private and secure offices for health and social services staff, and enhanced technology to allow family members that live outside of McLeod Lake to participate in appointments virtually (Petersen 2022).

West Moberly First Nations support its members physical, mental, cultural, social, and spiritual wellbeing with the following services: mental health and addiction support, children and youth services, health promotion and disease prevention, health protection, environmental health and research, primary care, medical transportation, health benefits, Pacific Blue Cross benefit support, social development, health programming, and recreational programming (West Moberly First Nations 2023).

Lheidli T'enneh Health Department provides programming and services to promote healthy lifestyles, disease prevention, and self-care and personal management of wellness of its members (Lheidli T'enneh 2023). The Health Department staff consists of a manager, fulltime nurse, healthcare assistant, part-time community care worker, and a receptionist (Lheidli T'enneh 2023).

### **Bulkley-Nechako**

A new hospital is being constructed to replace the old Stuart Lake Hospital building in Fort St. James. The new building will be approximately 6,300 square feet (three times larger than the existing facility) and will have 18 community care and nine acute care beds. It will include an emergency department with two treatment rooms, a primary care centre, expanded laboratory and diagnostic imaging, as well as palliative care, and spiritual and gathering spaces (Northern Health 2024). The new hospital will have labour and delivery space to accommodate emergency and unexpected births. Patients with planned births will still be expected to travel to Vanderhoof and Prince George. Construction of the new hospital began in summer 2022. The hospital is expected to be operational in early 2025 (Northern Health 2024).

There are two other medical clinics in Fort St. James: Fort St. James Medical Clinic and Nak'azdli Health Centre.



The Fort St. James Health Centre offers programs and services for the area of Fort St. James, including preventative medicine, chronic illness care, and treatment for acute or other serious issues. The Emergency Department is located at the Stuart Lake Hospital, and includes a 12-bed facility, emergency room service, acute health care, and diagnostic services. The Stuart Lake Hospital offers pharmaceutical support, however, most health services for Fort St. James are shared with the community of Vanderhoof and the University Hospital in Northern BC (located in Prince George) (Fort St. James Health Centre n.d.).

Health services available for the community of Nak'azdli Whut'en include the Nak'azdli Health Centre, which offers several programs for local residents including (Nak'azdli Whut'en n.d.b.), maternal child health program, well baby clinic, community wellness program, home care nurses, and children's oral health initiative.

Tl'azten Nation offers child and youth care services, health care and health care services to the communities of Tl'azten Nation, including the following Family Health, Community Health, and Mental Health and Addiction Support programs (Tl'azten Nation 2024a). Community members in Tl'azt'en Nation also have access to a 24-hour Crisis Line, and various health and mental health support programs and services to support families, including Sum Yaz Daycare (Tl'atz'en Nation 2024b).

#### **14.1.4 Community Recreation and Leisure Services**

##### **Peace River**

Outdoor recreation opportunities in the LAA and RAA are described in detail in Section 16 of the Amendment.

Fort St. John has many outdoor and indoor recreational facilities, including the Pomeroy Sports Centre, North Peace Hockey Arena, and the North Peace Cultural Centre. Chetwynd has a recreational complex with an ice arena, curling rink, sports courts, climbing wall, leisure pool, hot tub, sauna, waterslide, gym, athletic programs, hall rentals, and food services. Hudson's Hope's main recreational facilities include an outdoor swimming pool, tennis courts, basketball courts, and Hudson's Hope Museum.

##### **Fraser-Fort George**

There are four recreational facilities located in Prince George: CN Centre, Elksentre Arena, Kin Centre Arenas, Kopar Memorial Arena (City of Prince George 2023b). The CN Centre is Prince George's premier entertainment spot for sporting events (City of Prince George 2023). The Elksentre Arena is an indoor rink that is open seasonally generally from July to May (City of Prince George 2023). The Kin Centre Arenas consist of a three-arena complex that hosts hockey clubs, figure skating, lacrosse, in-line hockey, ball hockey, and tournaments and trade shows (City of Prince George 2023). The Kopar Memorial Arena accommodates sports such as ice hockey, lacrosse, roller hockey, ringette, and speed skating (City of Prince George 2023).



The District of Mackenzie operates the Mackenzie Recreation Centre, which contains an aquatic centre, climbing wall, fitness centre (with a cardio and weight room), ice arena, children's play area, and the Mackenzie Public Library (District of Mackenzie 2023b). The Mackenzie Recreation Centre also has a multi-sport court available to provide individuals with the option to play sports such as volleyball, squash, soccer, floor hockey, and basketball (District of Mackenzie 2023b).

McLeod Lake Indian Band has a recreation centre (McLeod Lake Indian Band 2013). The Health and Community Wellness Centre, which is anticipated to be operational in 2024, will feature a larger gymnasium for the community (Petersen 2022).

### **Bulkley-Nechako**

The Fort St. James Community Centre hosts multiple community events annually and is also home to the Fort St. James Curling Club. The Forum Arena in Fort St James supports local hockey leagues and figure skating, as well as public skating during the winter and pickleball during the summer (Fort St. James 2024b).

Within the community of Nak'azdli Whut'en, a youth centre and recreation facility for all local youth offers drop programs and year-round youth programs and sports including basketball, baseball, skiing, hiking, swimming, hockey, and gym access. The Nak'azdli Recreation Centre aims to support youth and assists with fund raising. The Ernie Sam Memorial Arena is also located in the Community of Nak'azdli Whut'en (Nak'azdli Whut'en n.d.c).

## **14.1.5 Utilities**

### **Peace River**

There are three solid waste management facilities (landfills) in the Peace River sub-region: North Peace Regional Landfill (life span of 17 years); Chetwynd Landfill (lifespan of eight years); and Bessborough Landfill (lifespan of 46 years). There are also numerous transfer stations throughout the region (PRRD n.d.b).

The PRRD manages potable water stations that provide the public and industry access to water filling stations via accounts that track water use. Fort St. John operates and maintains the City's water treatment and pumping facilities and a water treatment facility that has a 19 million m<sup>3</sup> capacity per day with an average flow of 9,000 m<sup>3</sup> per day. Fort St. John's water storage is via two treated water reservoirs that provide the City with extra water during peak usage times (a 6.8-million-liter reservoir and a 36.4-million-liter reservoir) (Fort St. John n.d. a). Fort St. John gathers liquid sanitary waste in treatment lagoons. The City built a new water recovery facility but the system has experienced problems with removing phosphorous, oil, and radioactive substances from treated water, prior to discharging into the rivers (City of Fort St. John n.d. a).



In 2021, a new water treatment plant was commissioned in Hudson's Hope. However, shortly after implementation, the well water quality started deteriorating, causing system failures and maintenance requirements. To address the water treatment plant failure, the District constructed a temporary water treatment plant and returned to the Peace River as the water source. The District is now planning to construct a permanent water treatment plant and identifying options to secure funding for construction in 2025 (Hudson's Hope 2024). Hudson's Hope has three filtration lagoons for sewer and wastewater, with underground sewer pipes to service residences and businesses.

Chetwynd's water source is the Pine River. Water is pumped into raw water settling ponds and once settled, pumped into the water filtration system where it passes through strainers, membrane filtration and chlorination (District of Chetwynd 2023). The raw water ponds are comprised of three cells providing a total storage capacity of 44 million gallons which accounts for approximately 80 days of water supply for Chetwynd (Chetwynd n.d. b). Chetwynd has a wastewater lagoon treatment facility that was upgraded in 2015 with grants from the federal government.

### **Fraser-Fort George**

The Regional District of Fraser-Fort George includes 18 transfer stations, three landfills, and the Foothills Boulevard Regional Landfill which manages approximately 98% of the region's waste. It is estimated that the remaining airspace for Cell One (the current fill area) is approximately 466,001 m<sup>3</sup>, as of May 11, 2023. Based on the information currently available, the lifespan of Cell One will likely extend beyond 2027 and there is a plan to develop Cell Two in an expansion of the Foothills Boulevard Regional Landfill (Regional District of Fraser-Fort George n.d.a).

The City of Prince George supplies, pumps, treats, stores, and distributes an average of 189 million litres of water daily to residents. Water is distributed through nearly 2,000 km of underground water pipes and 815 km of overground water pipes (City of Prince George 2023). There are 550 km of distribution pipes, 10 pump stations, 15 reservoirs, and six wells (City of Prince George 2023).

The District of Mackenzie draws its drinking water from three shallow wells, west of the townsite adjacent to Morfee Lake (District of Mackenzie 2022). In 2021, the total water distributed to the District of Mackenzie distribution system was 38,487 m<sup>3</sup>. The average daily flow and average daily per/capita flow was 1,513 m<sup>3</sup> and 439 L/day/person, respectively (L&M Engineering Limited 2022).

Wastewater within the Regional District of Fraser-Fort George is handled and processed by five separate community sewer systems. Each community is responsible for the construction, cost, maintenance, and operation of community wastewater treatment facilities (Regional District of Fraser-Fort George n.d.b.). The City of Prince George's Landsdowne Road Wastewater Treatment Centre includes two wetland areas and two lagoon areas; biosolids are returned to the land. It has capacity for growth in the short-to medium-term (City of Prince George 2020).



## **Bulkley-Nechako**

There are two regional landfills in the Regional District of Bulkley Nechako: the Knockholt landfill and the Clearview landfill. There are also eight transfer stations in the District. The Clearview landfill serves Fort St. James, Fraser Lake, Fort Fraser, and Vanderhoof and receives about half of the waste produced in the Bulkley Nechako Regional District. Construction of this landfill was completed in 2007 and it was designed with a lifespan of 100 years (Tetra Tech Canada Inc. 2018).

The Fort St. James water and sewer systems serve homes and businesses within Fort St. James and the Nak'azdli Reserve. The water in the region comes from artesian wells near Stuart Lake. In total, there are 11 wells in the District of Fort St. James (Fort St. James 2024b). The reservoir provides sufficient storage for fire protection and peak use periods (District of Fort St. James n.d).

A new wastewater treatment plant has been proposed to serve Nak'azdli Whut'en and Fort St. James. The plant will replace the existing lagoon system which has outlived its purpose (Government of British Columbia 2021).

## **14.2 Influence of Engagement and Consultation**

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, no new interests and concerns related to Community Infrastructure and Services VC have been shared by Indigenous Nations. PRGT will continue to engage with Indigenous Nations on the proposed Amendment. As information is shared, PRGT will review the information in the context of the Amendment and associated mitigation.

## **14.3 Amendment Effects Assessment**

### **14.3.1 Potential Effects and Mitigation Measures**

The Application considered six potential effects on community infrastructure and services, these effects and their measurable parameters are listed in Table 14.3. Potential effects and measurable parameters for community infrastructure and services used in the Amendment have not changed from those used in the Application (PRGT 2014a).



**Table 14.3 Potential Effects and Measurable Parameters for Community Infrastructure and Services**

Potential Effect	Description	Measurable Parameter
Change in demand for accommodations	Project activity and labour force may place demands on existing accommodations that exceed the available capacity	Availability of housing, commercial accommodation, campsites, and RV sites
Increased demand on emergency and protection services	Project activity and labour force may place demands on existing emergency and protection services that exceed the available capacity	Emergency and protection services capacity (ambulance, police, fire, marine emergency response, search and rescue)
Increased demand on health care services	Project activity and labour force may place demands on existing health care services that exceed the available capacity	Health care services capacity
Change in demand for workforce training services	Project labour force may place demands on existing training services that exceed the available capacity (addressed in Section 13)	Training institution capacity
Increased demands on community recreation and leisure facilities	Project activity and labour force may place demands on existing recreation and leisure facilities that exceed the available capacity	Capacity of recreation and leisure facilities
Change in demand for water and waste management	Project activity and labour force may place demands on existing utilities that exceed the available capacity	Local and regional water and waste management facilities capacity and use (m <sup>3</sup> and t)

The assessment of community infrastructure and services in the Amendment broadly follows the same criteria for characterization of residual effects as in the Application (PRGT 2014a). Additional consideration is given to direction of effect (i.e. positive or adverse) and affected subpopulations (i.e. disproportionate impacts to subpopulations) in accordance with EAO Guidelines (EAO 2020) and Section 25(2) of the BCEAA. For instance, low-income households, elderly persons, members of Indigenous groups, and young people may disproportionately experience reduced access to affordable housing should the Project workforce affect the supply of housing or housing options. For the Amendment, disproportionate effects have been considered for Indigenous Persons, females, low-income households, and youth/seniors.

Mitigation measures identified in the Application (Table 24-1, PRGT 2014a) and the SEEMP (PRGT 2016) are expected to be applicable to the Amendment. As part of the SEEMP, the Proponent will communicate with local, regional, and provincial governments in planning for capacity to infrastructure and services and implement adaptive management to mitigation, if necessary. As part of the 5-year extension of the EAC granted by the EAO in 2019, PRGT committed to developing a health and medical services plan as a mitigation of the SEEMP.



## **14.3.2 Residual Effects**

No new residual effects are expected as a result of the changes to the Project proposed in this Amendment. Residual effects on community infrastructure and services relate primarily to the influx of out-of-area workers during construction. Residual effects on community infrastructure and services during operations will be similar to those assessed in the Application (PRGT 2014). Residual effects during operations are anticipated to be negligible following implementation of the mitigation measures identified in Section 14.3.1.

### **14.3.2.1 Change in Demand for Accommodations**

The Project is expected to result in a change in demand for accommodations during construction. Since construction workers do not tend to move permanently to an area for temporary work, the Project is not expected to increase demands on permanent housing, including privately owned and rental accommodations. As was described in the Application (PRGT 2014a), the Project is likely to increase demand for temporary accommodations including hotels, motels, campgrounds, and RV parks, as well as short-term rentals.

Non-local construction workers will be lodged in temporary construction camps located along the main spread. Construction camps for pipeline construction will each accommodate up to 1,100 workers. Early construction camps will be built to house up to 400 workers, however, early construction workers may require lodging in temporary accommodations while these early camps are being constructed. The largest change in demand for temporary accommodations will occur during early construction during the three to six-month period that will be required to establish early construction camps.

As described in Section 13.3.2.1 of the Amendment, it is estimated that Amendment direct construction will total 1,995 PYs of employment in Canada over the four-year construction period, or 499 PYs annually. Of total direct construction employment, 811 PYs (203 PYs annually) will be in BC, and 1,185 PYs (296 PYs annually) will be elsewhere in Canada (Appendix J). Given the limitations of the labour supply in the LAA and RAA, in the context of future project demands, it is anticipated that a conservative estimate of 10% RAA labour supply for the Project's direct construction workforce is realistic. Therefore, 81 PYs (20 PYs annually) of employment is expected to go to residents of the RAA (Appendix J).

There are more than 5,800 rooms and camping/RV sites in LAA and RAA communities. Of these, 54% are in the Fraser-Fort George Regional District, 43% are in the Peace River Regional District, and 3% are in the Bulkley-Nechako Regional District. Hotels, motels, RV, and camping sites in the communities of Hudson's Hope, Chetwynd, and Fort St. John, Mackenzie, which are located along the more easterly portion of the route, are in good supply to accommodate early work crews.

Potential adverse residual effects on demand for accommodation are expected to remain unchanged from the characterization in the EAO Assessment Report (EAO 2014).





#### **14.3.2.2 Increased Demand on Emergency and Protection Services**

Construction-related employment has the potential to increase demand on local emergency and protection services through accidents and injuries, search and rescue activities, and public safety.

Accidents and injuries may be incurred at the worksite, on the road, in camp, and in surrounding communities and areas where workers are located. Such events may place Project-related demand on BC Ambulance, local fire departments, and RCMP personnel able to perform paramedic, first responder, emergency transport, auto extrication, fire control, spill response, and traffic control services.

As per the Application (PRGT 2014a), the risk of such interactions is low because most workers will be lodged in remote and self-contained construction camps away from local residents. The risk of public safety to local communities is expected to be limited by the work schedule consisting of 12-hour workdays and a six-day on, one-day off schedule. Any conflicts occurring between construction workers at the worksite or camp would likely be dealt with by the contractor. In addition, an on-site paramedic and security will be provided which will reduce Project-related demands on local emergency and protection services.

The Project's demand on local emergency services will be limited through project planning and management strategies, including incorporating design mitigation measures and planning for safety and environmental management in accordance with applicable requirements and industry best practices. With the application of mitigation, incremental demands from the Project are not expected to exceed the capacity of emergency and protection services in the LAA or RAA. The characterization in the EAO assessment report (EAO 2014) remains unchanged.

#### **14.3.2.3 Increased Demand on Health Services**

Increased demand on health care services related to the Project will be associated with the needs of workers during construction. Given the transient and temporary nature of construction work, construction workers are not anticipated to relocate to the RAA permanently, nor are they likely to move their families to the area. Workers will likely continue to use physicians in their home communities during construction for routine health check-ups, specialist diagnosis, or follow-up for chronic conditions and schedule such visits for their return home. Workers are also unlikely to place additional demand on other social services in local communities as they are most likely to use social services in the communities where they reside.

Increased demands for health care services are most likely to arise in response to primary and more serious acute-care needs, such as infections, injuries, and accidents. Most of these needs will be met by local hospitals and clinics. In extreme cases of trauma, workers will have to be transported to specialist care at hospitals in Prince George or Vancouver. In the case of trauma, workers would likely be transported back to their home community to receive long-term acute care. PRGT also will develop a health and medical services plan, which will include procedures to address health needs of the camp, as well as infectious diseases, as per current Northern Health guidelines for industrial camps.



As indicated by the updated baseline information, health care services in many northern communities in the LAA and RAA have limited capacity, in terms of their services and staff, to respond to current demand. This remains similar to the case when the Application (PRGT 2014a) was prepared. Since 2014, with the development of several new projects in the region, Northern Health facilities have been experiencing increased utilization and are working beyond their capacity (Hall 2022). Emergency room services are particularly challenged.

The main hospital in the Fraser Fort George Regional District has undergone upgrades in recent years and is constructing a new patient tower which will increase the hospital's surgical infrastructure and improve mental health/addictions treatment facilities. A new Health and Community Wellness Centre is also being constructed in McLeod Lake which is expected to be in operation in 2024. In addition, a new hospital is being constructed in Fort St. James, which will replace the existing facility in the community and will offer additional services to patients. These improvements and additions to the area will improve the infrastructure of the local health care system for LAA and RAA residents.

Even with the application of mitigation, including the implementation of a health and medical services plan, due to the challenges currently being experienced by Northern Health to meet the current demand for health services, magnitude of residual adverse effects are expected to change from low in the EAO assessment report (EAO 2014) to moderate.

#### **14.3.2.4 Increased Demands on Community Recreation and Leisure Facilities**

Project-related increases in demand on and use of community recreation and leisure facilities will result from the recreation needs of workers on their time off during the construction period. Most of the construction workers will live in remote, self-contained camps. The remoteness of most of the camps, workday schedule, and shift structure should discourage the use of community facilities. In addition, recreation and leisure facilities will be available at the camps.

As was described in the Application (PRGT 2014a), current baseline data suggest community recreation and leisure facilities in most communities are highly resilient and would be able to absorb the residual effects on increased demands. With planned mitigation, residual effects are expected to remain unchanged.

#### **14.3.2.5 Change in Demand for Water and Waste Management**

Project-related change in demand on waste management systems during construction is related to waste generation at the worksite and accommodation camps. Demand related to construction wastes generated at the worksite will mainly affect municipal and regional landfill sites. Amounts of solid waste produced by the Project is expected to remain the same as estimates provided in the Application (PRGT 2014a).

Regional landfills in the RAA appear to have sufficient capacity to accommodate Project-related demand for waste disposal. Where solid waste management facilities are nearing capacity, plans are in place for expansion to increase capacity, as is the case for the Foothills Boulevard Regional Landfill (Regional District of Fraser-Fort George 2023). Privately-owned waste processing and disposal facilities may also be used by PRGT, such as those operated by Secure Energy.



Demand for potable water and wastewater treatment will be generated by the Project workforce that is housed in construction camps. Demands are expected to be similar to that proposed in the Application (PRGT 2014a). Demand for potable water in construction camps will be met through local suppliers, including local communities, regional districts, or private water suppliers. Wastewater will be collected by qualified contractors and disposed of at appropriate facilities with available capacity. Demand from workers housed in existing temporary accommodations in local communities will be negligible since the capacity of the infrastructure serving existing temporary accommodations will already be designed to accommodate demand from such establishments.

With the application of mitigation measures, such as collaborating with local service providers to avoid overburdening existing systems and reducing solid waste volumes through the use of the Project Waste Management Plan, the residual effects on increased demand for water and waste is expected to remain unchanged.

### **14.3.3 Changes to Characterization of Residual Effects**

The characterization of effects as determined in the EAO Assessment Report (EAO 2014), and changes to the characterization based on the assessment of the proposed Amendment Route Alternative are presented in Table 14.4.

Potential adverse residual effects on community infrastructure and services for the proposed route are largely unchanged from the characterization in the EAO Assessment Report (EAO 2014). However, the magnitude of effects on health care services has been changed from low to moderate due to increasing pressures on Northern Health.



**Table 14.4 Changes to EAO Assessment Report Characterization of Residual Effects – Community Infrastructure and Services**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Context</i>	<i>Low to Moderate resiliency and moderate to high sensitivity</i>	<i>With the possible exception of the pipeline segment in the Peace River RD and the marine RDSQC segment, the remoteness of the proposed pipeline route and proximity to smaller communities (e.g., Fort Babine, Kispiox/ Hazelton, Nisga'a Villages, etc.) result in a context of low resiliency and high sensitivity for many of the LAA communities.</i>	No change
<i>Magnitude</i>	<b>Community infrastructure and services:</b> <i>Low to Moderate overall</i>	<b>Community infrastructure and services overall:</b> <i>The magnitude of potential effects on community infrastructure and services is expected to be of low to moderate magnitude overall, after mitigation strategies, monitoring and adaptive management.</i>	No change
	<b>Accommodation:</b> <i>Moderate</i>	<b>Accommodation:</b> <i>Effects on temporary accommodation in nearby communities likely to be of moderate magnitude given existing accommodation units inventory and size of Project (e.g., demand from construction workers in transit, non-camp workers, indirect and induced effects).</i>	No change
	<b>Emergency and protection services:</b> <i>Moderate</i>	<b>Emergency and protection services:</b> <i>Main camps are largely self-contained, but remoteness of proposed pipeline route and proximity to relatively small communities such as Chetwynd, Hudson's Hope, Mackenzie, Fort St. James, Kispiox/Hazelton and the Nisga'a Villages) could create challenges in providing emergency and protection services to camp residents; also, camp proximity to small communities could result in adverse effects of moderate magnitude on social conditions and protection services for vulnerable communities that may be more challenged to meet increased demands</i>	No change
	<b>Health care services:</b> <i>Low</i>	<b>Health care services:</b> <i>Based on TransCanada's historical injury rates and estimates of off-site related accidents, the requirements for off-site health care services appear low after implementation of mitigation, monitoring and adaptive management.</i>	Moderate considering the existing capacity of Northern Health and increasing demands on health infrastructure and services

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



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Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Magnitude (cont'd)</i>	<b>Water and waste management facilities:</b> Moderate	<b>Water and waste management facilities:</b> Project-related demand for water and waste management facilities during construction from nine main camps is considered of moderate magnitude, when compared to existing waste management capacity.	No change
<i>Extent</i>	Community and regional	The effects to community infrastructure and services would be primarily within local community population centres, but would also be experienced at the regional level.	No change
<i>Duration</i>	Short to medium-term	Effects on the social environment at the community level would cease once Project construction is completed. The duration of construction and effects of construction is medium term (e.g., three- to four-year construction period), but in a specific pipeline segment, peak activity and effects of construction are expected to be limited to several months.	No change
<i>Reversibility</i>	Reversible	Reversible once Project construction is completed.	No change
<i>Frequency</i>	Continuous	Continuous during construction, but with varying magnitude.	No change
<i>Likelihood</i>	The likelihood is high that some degree of adverse effects would occur during Project construction with respect to community infrastructure and services in the LAA and RAA.		No change
<i>Significance</i>	Considering the above analysis and having regard to the conditions identified in the TOC (which would become legally binding as a condition of an EA Certificate), EAO is satisfied that the proposed Project is not likely to have significant adverse residual effects on community infrastructure and services.		-
<i>Confidence</i>	Moderate Confidence – Moderate level of confidence in validity of assumptions and analysis and effectiveness of proposed mitigation strategies, particularly in consideration of the requirements for on-going monitoring and adaptive management.		No change



#### **14.3.3.1 Positive Effects**

The presence of industrial projects and their workers may have positive effects through the generation of revenue for local communities, which can increase the capacity for investment in local infrastructure and services, such as recreation, which will create positive effects for LAA and RAA residents.

#### **14.3.3.2 Disproportionate Effects**

As described in the introduction to Section 14, some populations subgroups (Indigenous persons, females, low-income households, and youth/elders) may experience disproportionate effects related to the capacity of local infrastructure and services, including housing, health, safety, and emergency services.

Challenges with respect to housing and accommodations, particularly for the identified vulnerable groups, have been documented in the LAA and RAA (MNP and North Development Interest Trust 2022). Project personnel will be hired from the LAA and RAA, where possible and available, to reduce the Project-related demands on accommodations available locally. As previously stated, the temporary non-local construction workforce is not anticipated to relocate to the LAA and RAA communities. Therefore, additional demand on permanent and rental housing are not expected as a result of construction. The use of construction camps for accommodation of the workforce during construction will reduce effects of the Project and its workforce on the availability of housing, rental accommodations, and commercial accommodations in LAA communities by the Project workforce. By putting a priority on hiring construction and operation workers from the local community and within vulnerable groups, Project-related demands on local housing will be reduced, which will reduce adverse effects on the total population, including members of vulnerable or underserved groups such as low-income families, youth, and seniors.

The presence of the Project workforce and Project activities could result in higher demand for services such as police, fire protection, and ambulance. To manage Project-related demands on police services and to enhance the safety of women in the community and at the Project sites, security will be provided, and several workplace policies implemented, which is expected to limit adverse behaviours at work and in LAA and RAA communities. A worker code of conduct will be developed and implemented, including ethics and respectful workplace training. The Project's demand on local emergency services will be limited through project planning and management strategies, including incorporating design mitigation measures and planning for safety and environmental management in accordance with applicable requirements and industry best practices.

As has been described, Northern Health is challenged to meet the current healthcare needs of all northern BC residents. There are particular sub populations who have been experiencing additional challenges in some LAA and RAA communities. In Mackenzie, for instance, it has been documented that elderly residents lack medical specialists and support groups and often must travel to bigger centres to access these services (District of Mackenzie 2017). Differential effects will be reduced to the extent possible through the implementation of an Emergency Management Plan and health and medical services plan.



Despite mitigation and enhancement measures, members of vulnerable groups may still experience differential effects related to the availability of infrastructure and services. The Project is committed to reducing these differential effects to the extent possible.

#### **14.3.4 Cumulative Effects Assessment**

As described in the Application (PRGT 2014a), the Project is likely to act cumulatively with projects that will employ large workforces and will rely on the same communities for infrastructure and services at the same time as the Project during the construction period. Residual cumulative effects to community infrastructure and services are not anticipated during the Project operation phase.

The extent to which these projects will overlap temporally and spatially with the Project is not known at this time. The exact details of these projects, including when they would be constructed and their employment requirements, will only be revealed when those projects undergo regulatory review. However, it is assumed that the proponents of other projects that do overlap temporally and spatially will implement mitigation measures similar to those proposed by PRGT, to reduce the cumulative adverse effects on infrastructure and services.

Some projects, such as the construction and operation of an onsite sewage treatment and disposal system that will service McLeod Lake Indian Band's new Wellness Centre, will increase the capacity of some infrastructure and services in LAA and RAA communities.

EAO included EAC Schedule B Condition #34 for the PRGT to develop a SEEMP to develop and implement mitigation measures identified in the environmental assessment process regarding Project effects on socio-economic values including the Project's contribution to cumulative effects. As part of the SEEMP, approved in February 2017, PRGT is required to inform local, regional, and provincial governments in planning for capacity adjustments to infrastructure and services and address adaptive management to mitigation, if necessary.

With the application of measures to mitigate potential cumulative effects by the proponent, including the SEEMP and use of accommodation camps, as well as mitigation measures implemented by proponents of other current and future projects, it is anticipated that predicted cumulative effects would remain unchanged from the Application (PRGT 2014a).

#### **14.3.5 Risks and Data Uncertainty**

There is a moderate level of uncertainty with regard to data that are used to describe baseline conditions for infrastructure and services. For instance, the most recent Statistics Canada census data have been collected from the 2021 Census of the Population. For some measurable parameters, these data are the most up-to-date information, but efforts have been made to gather more recent information from other sources, where available.

The risk level associated with the assessment of community infrastructure and services is low given the understanding of Project effects is not dissimilar to those from the Application and the use of mitigation measures whose effectiveness are generally well understood and generally known to be effective.

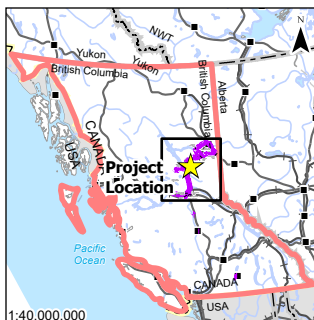
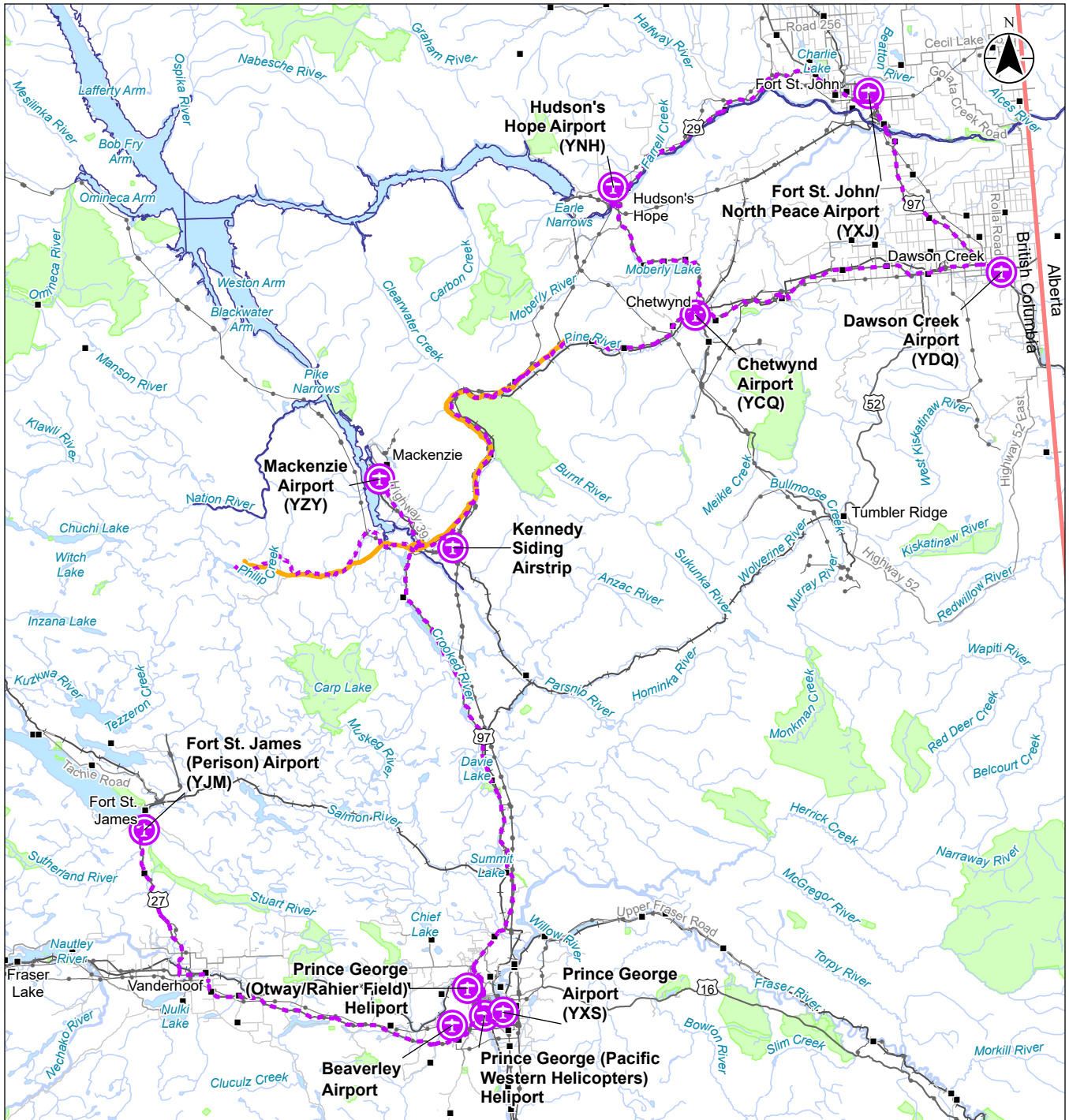


## 15 Transportation

Transportation was identified as a VC in the Application Information Requirements for the Project (PRGT 2014b) because the Project has the potential to cause increased demand on transportation infrastructure and disrupt navigation of waterways. This section describes potential residual and cumulative effects of the Amendment for the transportation VC. Information presented in this section is consistent with the Application (PRGT 2014a) and updated where necessary and relevant. Spatial boundaries for the Amendment follow the same approach used in the Application (PRGT 2014a). The spatial boundaries for the Transportation VC are illustrated in Figure 15.1 and include the Project footprint, LAA and RAA. The Project footprint consists of the area that will be directly disturbed by construction and operation activities. The LAA includes the main transportation routes (i.e., major roads, highways, airports and railways) used to transport workers, goods, and equipment to and from the Project and the navigable waters that have the potential to be disrupted by construction and operation activities. Portions of the LAA overlap with the transportation LAA used in the Application, but the LAA for the Amendment also includes the segments of Highway 97 from Chetwynd to Dawson Creek and from Dawson Creek to Fort St. John and the Finlay and Community Connector Forest Service Roads, located near Mackenzie, that were not previously included. New baseline condition information is provided in Section 15.1 for the segments of Highway 97 that were not previously considered in the Application. The RAA includes the transportation network connecting to the LAA within BC.







**Notes**  
 1. Coordinate System: NAD 1983 BC Environment Albers  
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

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- Highway
- Road
- Local Street
- Railway
- Transmission Line
- Watercourse
- Provincial Park, Ecological Reserve, or Protected Area
- Waterbody
- Ⓜ Airport
- Transportation Local Assessment Area
- ▭ Navigable Water (CNWA)
- ▭ Project Footprint
- ▭ Transportation Regional Assessment Area

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Project Location: British Columbia  
 Client/Project/Report: Prince Rupert Gas Transmission Ltd. Transportation  
 Project Number: 123514386  
 Prepared by LTRUDEL on 20240402  
 Requested by MMACDONALD on 20240402  
 Reviewed by TQUILICHINI on 20240417

Figure No.  
**15.1**

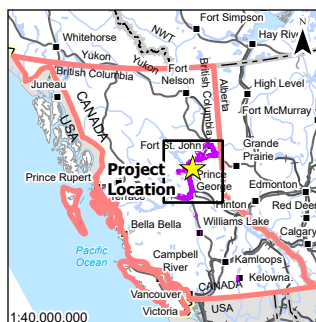
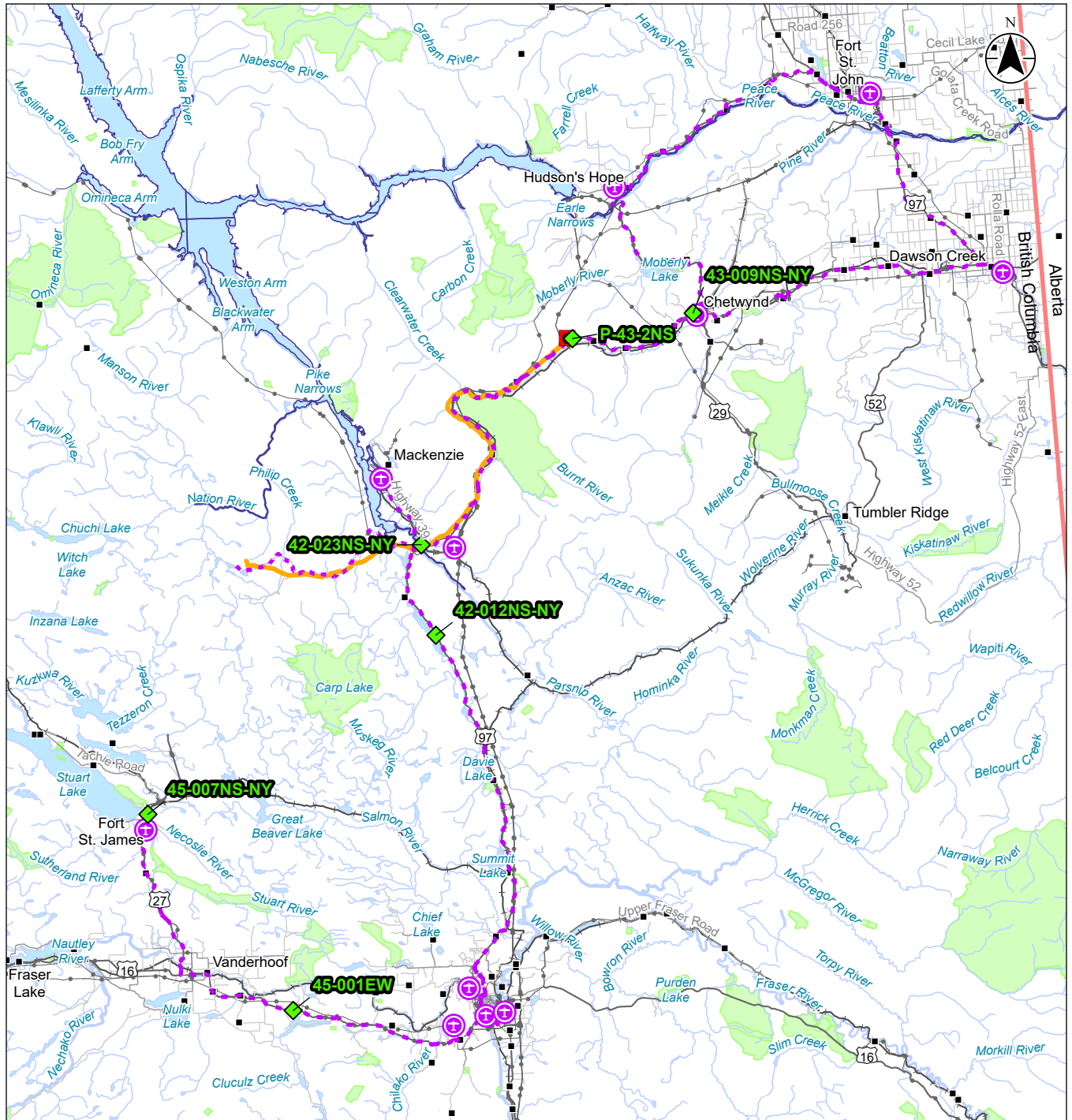
Title  
**TRANSPORTATION ASSESSMENT  
 AREAS FOR THE EASTERN ROUTE  
 ALTERNATIVE AMENDMENT**

## **15.1 Baseline Conditions**

Baseline conditions are presented for main access roads, airports and railways, and main freshwater crossings relevant to the Eastern Route Alternative. Information on current baseline conditions for transportation is based on existing information collected as part of the Application (PRGT 2014a) and the latest available secondary sources. The baseline conditions are consistent with those presented in the Application. No new major roads, railways, or airports were constructed between 2013 and 2023. Between 2013 and 2023, there were no changes to navigable fresh waterways or use of navigable fresh waterways. Data from the BC Ministry of Transportation and Infrastructure (MOTI) Traffic Data Program (MOTI 2024) were used to characterize the existing conditions for traffic volume and heavy vehicle demand. Traffic estimates for provincial forest service roads were not publicly available. Information on railways and airports was obtained from existing and/or publicly available secondary sources. Detailed information on railway's current use and capacity was not publicly available.

Primary modes of transportation in the LAA and RAA include road, rail, and air. Figure 15.2 illustrates the main road and highways, airports, railways and navigable waters along the Eastern Route Alternative.





- Highway
- Road
- Local Street
- Railway
- Transmission Line
- Watercourse
- Provincial Park, Ecological Reserve, or Protected Area
- Waterbody
- ⊕ Airport
- ⬢ Compressor Station
- ⬢ Traffic Counter Station
- ⬢ Transportation Local Assessment Area
- ⬢ Navigable Water (CNWA)
- ⬢ Project Footprint
- ⬢ Transportation Regional Assessment Area

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1:1,750,000 (at original document size of 8.5x11)



Project Location: British Columbia  
Client/Project/Report: Prince Rupert Gas Transmission Ltd.  
Transportation  
Figure No. 15.2  
Title: ROAD, RAIL, AND AIR TRANSPORTATION INFRASTRUCTURE AND NAVIGABLE WATERWAYS

Notes  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

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Project Number: 123514386  
Prepared by LTRUDEL on 20240402  
Requested by MMACDONALD on 20240402  
Reviewed by TQUILICHINI on 20240417

Prince Rupert Gas Transmission Ltd.  
Transportation

Figure No.

15.2

Title

ROAD, RAIL, AND AIR TRANSPORTATION  
INFRASTRUCTURE AND NAVIGABLE  
WATERWAYS

## 15.1.1 Major Roads and Highway Infrastructure

The proposed route is predominantly located along Highway 97, north of the Pine River, with some deviations from existing linear ROW on the east and west ends of the route (Figure 15.2). Aside from Highway 97, the main roads used to transport workers, goods, and equipment to and from the Project may include Highways 16, 27, 29, and 39. The Amendment includes the segments of Highway 97 from Chetwynd to Dawson Creek and from Dawson Creek to Fort St. John that were not previously included in the Application (PRGT 2014a). Recent data from the segments of the highways previously assessed and new data from the segments of the highways not previously assessed have been included in Table 15.1 and Table 15.2 to provide an overview of current traffic volume and heavy vehicle demand.

The road transportation system in the LAA is used by many users, including residents, tourists, and industrial users. Traffic volume data for main highways were obtained from the BC MOTI's Traffic Data Program, where data is available.

Table 15.1 provides an overview of the traffic volume and heavy vehicle demand from two permanent count stations. The first (Location ID P-43-2NS-NY) is located on Highway 97, east of Pine Le Moray Provincial Park and west of Chetwynd (Figure 15.2) and the second (Location ID P-42-2EW) is located on Highway 16, east of Vanderhoof and west of Prince George (Figure 15.2). The Application included two permanent count station locations, located outside of the LAA (PRGT 2014a). No comparable data from the Application is available for the two permanent count station locations in the LAA.

**Table 15.1 Average Annual Daily Traffic and Heavy Vehicle Demand**

Year	Highway 97 (0.3 km south of Westcoast Energy Pump Station 2)		Highway 16 (49.4 km west of the Junction of Highway 16 and 97, at the east entrance to Bednesti Resort, west of Prince George)	
	Volume (AADT <sup>1</sup> )	Heavy Vehicle <sup>2</sup> (%)	Volume (AADT <sup>1</sup> )	Heavy Vehicle <sup>2</sup> (%)
2013	-	-	3,998	17.3
2014	-	-	4,085	17.9
2015	-	-	4,065	17.7
2016	1,160	9.3	4,190	18.1
2017	1,442	9.5	4,133	17.8
2018	-	-	4,132	18.1
2019	-	-	4,126	-
2020	1,379	10.4	4,180	-
2021	1,389	9.6	4,118	-



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Year	Highway 97 (0.3 km south of Westcoast Energy Pump Station 2)		Highway 16 (49.4 km west of the Junction of Highway 16 and 97, at the east entrance to Bednesti Resort, west of Prince George)	
	Volume (AADT <sup>1</sup> )	Heavy Vehicle <sup>2</sup> (%)	Volume (AADT <sup>1</sup> )	Heavy Vehicle <sup>2</sup> (%)
2022	1,477	10.9	4,440	-
2023	1,507	10.3	4,239	-

Notes:

<sup>1</sup> AADT = Average Annual Daily Traffic

<sup>2</sup> Heavy Vehicle = The percentage of the traffic volume that are heavy vehicles (i.e., B-trains (Class 8, 9, 10), five axle multi-trailer truck (Class 11), five axle single trailer truck (Class 9), six or more axle single trailer truck (Class 10), multi-trailer (Class 13))

- = Data not available

Source: MOTI 2024

The average annual daily traffic (AADT) at the first permanent count station has increased 29.9% between 2016 and 2023 from 1,160 to 1,507 (Table 15.1). Heavy vehicle traffic remained steady between 2016 and 2023, making up an average of 10% of the total traffic (Table 15.1). The AADT at the second permanent count station has increased 6.0% between 2013 and 2023 from 3,998 to 4,239 (Table 15.1). Heavy vehicle traffic remained steady between 2013 and 2018, making up an average of 17.8% of the total traffic (Table 15.1). The total population in the Peace River sub-region, which includes Chetwynd, is 24,965 individuals as of 2021, which is relatively low when compared to the population of Prince George (76,710) (Statistics Canada 2022). The difference in populations between the Peace River sub-region and Prince George is reflected in the difference in AADT at the first and second permanent count station locations, where the AADT at the first permanent count station is lower than the AADT at the second permanent count station.

Table 15.2 provides an overview of traffic volume from various short count stations in the LAA for the years where data is available. The short count station locations are depicted in Figure 15.2. Traffic volumes are recorded over a 48-hour period, every three years, at short count stations (MOTI 2024). The AADT decreased 11.4% between 2014 and 2023 at the short count station located on Highway 27, whereas the AADT increased by 45% and 15% between 2014 and 2017 at the short count stations located on Highway 39 and Highway 97, respectively. (Table 15.2).



**Table 15.2 Average Annual Daily Traffic, LAA, 2012-2023**

Area	Location ID	Route Name	Year	Volume (AADT <sup>1</sup> )
Chetwynd	Highway 97 (1.0 km south of Highway 29, Chetwynd)	43-009NS-NY	2014	4,223
Mackenzie Junction	Highway 39 (0.3 km north of Highway 97, north of McLeod Lake)	42-023NS-NY	2014	765
			2017	1,111
Whiskers Point Provincial Park	Highway 97 (3.2 km south of Whiskers Point campsite, south of McLeod Lake)	42-012NS-NY	2014	1,612
			2017	1,851
Necoslie Bridge	Highway 27 (1.3 km north of Necoslie [Stuart Bridge] Bridge, Fort St. John)	45-007NS-NY	2014	3,775
			2017	4,145
			2020	3,343
			2023	3,377

Notes:

<sup>1</sup> AADT = Average Annual Daily Traffic

Source: MOTI 2024

The proposed route primarily follows Highway 97, which is defined as a primary highway<sup>1</sup>. Highway 97 is provincially operated and maintained. Highway 97 road characteristics (e.g., number of lanes, terrain type, shoulder and lane widths) were obtained using Google Street View. The segment of Highway 97 where the proposed route is located is rolling or mountainous terrain, rural, two-lane, and narrow shouldered.

## 15.1.2 Railways

The Canadian National Railway Company (CN Rail) rail system provides the only heavy freight rail service within the LAA (PRGT 2014a). CN Rail's rail corridors align with many of the provincial highway corridors (e.g., Highway 16 and Highway 97 in the LAA) (CN Rail n.d., Figure 15.2). Prince George serves as the main hub for the LAA, connecting routes from Alberta and elsewhere in BC (CN Rail n.d.). As stated in the Application, while the exact capacity along each rail line is not publicly available, it is expected that CN Rail has sufficient capacity along these routes to service the Project requirements (PRGT 2014a). However, this will be confirmed with CN Rail as detailed Project planning proceeds.

<sup>1</sup> Primary highways are defined as a continuous, integrated highway network for long distance international and inter/intra provincial trips between major population centres and other major activity nodes (MOTI 2014). These highways carry substantial heavy vehicle volumes over long distances and are expected to provide for high overall travel speeds, with minimum interference to through movements (MOTI 2014).



### 15.1.3 Airports

The Application identified twelve airports over the whole alignment, of which six provided commercial flight service (PRGT 2014a). The other six were smaller, private airstrips (PRGT 2014a). Eleven airports were identified in the amendment LAA during the baseline conditions' data collection, of which two provide commercial flight service (Figure 15.2, Table 15.3). The two airports that provide commercial flight service (i.e., North Peace Regional and Prince George) were also identified in the Application (PRGT 2014a). Nine of the airports are smaller, private airstrips that may be used by the Project for chartered flight service for its workforce or medevac airlifts and four of the nine smaller airports were identified in the Application (i.e., Chetwynd, Dawson Creek, Hudson's Hope, Mackenzie) (PRGT 2014a). Table 15.3 provides an overview of airport facilities in the LAA.

**Table 15.3 Airport Facilities, LAA**

<b>Airport Name (Air Transportation Association Code)</b>	<b>Runway(s) Length (m)</b>	<b>Operator</b>	<b>Flight Service</b>
<b>Commercial</b>			
North Peace Regional Airport (YXJ) (Multiple Runways)	2,106 2,042	Vantage Airport Group	Domestic flights; Charter flights
Prince George Airport (YXS) (Multiple Runways)	1,768 1,684 1,219	Prince George Airport Authority	Domestic and International flights; Charter flights
<b>Private</b>			
Beaverly Airport	750	Cyr's Recreational Aviation Park	Recreational facility
Chetwynd Airport (YCQ)	1,366	District of Chetwynd	Charter flights
Dawson Creek Airport (YDQ)	1,524	City of Dawson Creek	Charter flights; Helicopters landings; Medevac airlifts
Fort St. James (Perison) Airport (YJM)	1,220	District of Fort St. James	Charter flights
Hudson's Hope (YNH)	1,585	District of Hudson's Hope	Charter flights
Kennedy Siding Airport	N/A	N/A	N/A
Mackenzie Airport (YZY)	1,585	District of Mackenzie	Charter flights; Corporate flights; Helicopter lands; Medevac airlifts
Prince George (Western Helicopters) Heliport	N/A	N/A	Helicopter landings
Prince George (Otway/Rahier Field) Heliport	N/A	N/A	Helicopter landings

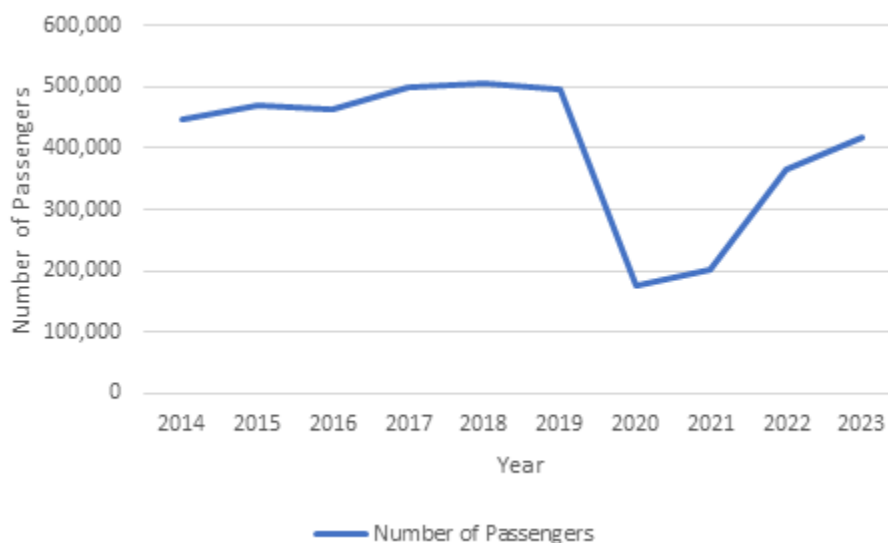




The North Peace Regional Airport (YXJ), which is located near the City of Fort St. John, underwent a substantial expansion and renovation in 2005 (North Peace Regional Airport 2024). This renovation resulted in a larger 2,800 square metre terminal, substantial apron and taxiway rehabilitation, and safety upgrades (North Peace Regional Airport 2024). Air Canada and WestJet offer direct service from Fort St. John to both Vancouver and Calgary (North Peace Regional Airport 2024). In 2019, 278,720 passengers travelled through the North Peace Regional Airport on commercial and charter flights for leisure and business (North Peace Regional Airport 2024). This represents an approximate increase of 51.5% from 184,000 passengers in 2013 (PRGT 2014a).

The Prince George Airport (YXS), which is operated by the Prince George Airport Authority, is located near the City of Prince George. Air Canada and WestJet offer daily direct service from Prince George to both Vancouver and Calgary (Prince George Airport Authority 2024). Central Mountain Air offers flights to Terrace, Kelowna, Fort Nelson, and Edmonton (Prince George Airport Authority 2024). In 2018, 506,486 passengers used the Prince George Airport, a record year for the facility (Figure 15.3). The Prince George Airport's passenger numbers were affected by the COVID-19-related travel restrictions and reductions in travel from 2020 to 2022 (Figure 15.3). In 2023, the number of passengers that travelled through the Prince George Airport increased to 417,848 (Figure 15.3). This represents a 0.5% decrease from approximately 420,000 passengers in 2013 and a 17.5% decrease from the peak of 506,486 passengers in 2018 (PRGT 2014a, Figure 15.3).

**Figure 15.3 Prince George Airport, Passenger Numbers, 2014-2023**



Source: Prince George Airport Authority 2024





#### 15.1.4 Navigable Waterways, Rivers, and Lakes

Table 15.4 provides an overview of the major freshwater watercourses with potential crossings. Major rivers in which there are anticipated crossings include the Pine River, Parsnip River, and Pack River. These rivers are used for recreational activities such as freshwater fishing and recreational boating (see Section 16 Land and Resource Use for more information on freshwater recreational and tourism use and Section 20 Indigenous Interests for more information on traditional use).

**Table 15.4 Major Freshwater Watercourses with Potential Crossings**

Stream Name	Maximum Channel Width at Potential Crossings (m)
Pine River	50
Bijoux Creek	10
Rolston Creek	15
Parship River	250
Pack River	120

### 15.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, no new interests and concerns related to transportation have been shared by Indigenous Nations. PRGT will continue to engage with Indigenous Nations on the proposed Amendment. As information is shared, PRGT will review the information in the context of the Amendment and associated mitigation.

### 15.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, mitigation measures, anticipated residual effects, changes to the EAO Assessment Report (EAO 2014a) effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessments. The assessment of potential effects on transportation for this Amendment is consistent with the approach used in the Application (PRGT 2014a).



### 15.3.1 Potential Effects and Mitigation Measures

The Application (PRGT 2014a) considered three potential effects on transportation:

- Increased demand on major road and highway infrastructure
- Increased demand on railways and airports
- Decreased navigability of marine waterways, rivers, and lakes

The Application (PRGT 2014a) and the EAO Assessment Report (EAO 2014a) assessed potential project effects on transportation using the measurable parameters that are listed in Table 15.5.

The Amendment evaluates the same potential effects and measurable parameters as the Application (PRGT 2014a), except that marine waterways are not included, as marine watercourse crossings are not present in the Eastern Route Alternative (Table 15.5).

**Table 15.5 Potential Effects on Transportation**

Potential Effects	Description	Measurable Parameters
Increased demand on major roads and highway infrastructure	Additional traffic volumes due to transporting workers, materials, and equipment to and from the Project may create congestion on roads highways. The construction phase will have the highest associated traffic volumes, as part of this phase; the movement of heavy or oversized loads has the potential to accelerate wear-and-tear on road surfaces and bridges.	Traffic volumes along highways and major roads Heavy or oversized vehicle demands
Increased demand on railways and airports	Heavy rail will primarily be used to transport pipe. This increased demand may result in congestion, especially if the demand nears or exceeds the available capacity of the railways. A fly-in fly-out workforce, particularly during construction, will create increased demands on local airports and commercial airlines.	Capacity of existing rail and airport infrastructure
Decreased navigability of waterways, rivers, and lakes	Fresh watercourse crossing construction activities have the potential to restrict or interfere with navigation by partially or fully blocking the watercourse, depending on the crossing method. In addition, aerial crossings have the potential to impede navigation throughout the operation phase, reducing clearance above the water surface	Interruption of and change in access to navigable fresh waterways

Several mitigation and enhancement measures and best practices to reduce disruptions to navigation and transportation were proposed in the Application (PRGT 2014a). Mitigation measures identified in the Application (PRGT 2014a) and the Transportation Management Plan (PRGT 2014a) are expected to be applicable to the Amendment. No additional mitigation measures are proposed for this Amendment.



### **15.3.1.1 Increased Demand on Major Roads and Highway Infrastructure**

The construction phase will have the highest contribution to traffic volumes and will require the movement of heavy or oversized loads, which has the potential to accelerate wear-and-tear on road surfaces. Workers will also generate trips to and from their homes, workforce accommodations (i.e., lodges), airports, and the Project construction sites. The estimated traffic volume during construction is anticipated to remain unchanged from what was presented in the Application (PRGT 2014a).

Based on a desktop review of up-to-date information available on major roads and highway infrastructure (MOTI 2024) for the Amendment LAA, the Project demands are not expected to exceed the available capacity of major roads and highway infrastructure. Major highways anticipated to be used include Highways 97, 16, 27, 29, and 39. These highways were previously assessed in the Application (PRGT 2014a). The Amendment also includes the segments of Highway 97 from Chetwynd to Dawson Creek and from Dawson Creek to Fort St. John and the Finlay and Community Connector Forest Service Roads, located near Mackenzie. Existing AADT varies in the LAA from approximately 1,111 vehicles on Highway 39 (north of Highway 97) to approximately 4,223 on Highway 97 (south of Highway 29). Some of the highways in the LAA have experienced an increase in AADT from 2012 to 2023, including Highways 39 and 97. The addition of proposed Project-related vehicles would temporarily increase current traffic levels, including heavy vehicle traffic levels, especially along Highway 97. The Project will also use the Finlay and Community Connector Forest Service Roads and will negotiate road agreements for forestry or resources roads such that maintenance costs directly resulting from construction will be shared with the Project. The Project will also work with road and highway authorities to optimize timing and routing of Project-related vehicles.

The operations phase is not expected to involve the movement of heavy or oversized loads or the construction workforce; therefore, is not anticipated to substantially increase traffic on major roads and highway infrastructure.

Potential increased demand on major roadways and highway infrastructure during construction will be managed through implementation of the Transportation Management Plan (PRGT 2014a).

### **15.3.1.2 Increased Demand on Railways and Airports**

Existing railway networks will be used to transport equipment and supplies to temporary stockpile sites, where it will then be trucked to the Project site. The increased demand may result in congestion, especially if the demand nears or exceeds the available capacity of the railways. It is expected that CN Rail will be able to accommodate the Project demands for transportation of equipment and supplies.



A fly-in fly-out workforce, particularly during the construction phase, will create increased demand on local airports and commercial airlines. Using a conservative approach, it is estimated that each worker will use the airport twice per month and that all workers will be fly-in fly-out. The estimated number of workers is based on the numbers provided in Table 13.17. Based on this estimate, there will be up to 203 workers utilizing airports twice per month, twelve months per year. Airport facilities identified in the LAA will be used during the construction phase to transport the workforce on a fly-in fly-out basis. It is anticipated that mostly major airports with scheduled flight service will be used during the construction phase. Smaller airport facilities may be used by the Project for chartered flight service for its workforce or medevac airlifts. The effects of the additional fly-in fly-out workforce are characterized for the two airports in the LAA with scheduled flight service:

- North Peace Regional Airport (YXJ): Based on 2019 numbers (latest available data), the North Peace Regional Airport could experience up to a 1.7% increase in air passenger traffic throughout the construction phase (North Peace Regional Airport 2024). Based on a desktop review of available data, it is expected that the airport has the capacity to handle this growth.
- Prince George Airport (YXS): Based on 2023 numbers (latest available data), the Prince George Airport could experience up to a 1.2% increase in air passenger traffic throughout the construction phase (Prince George Airport Authority 2024). It is expected that the airport has the capacity to handle this growth because, with the increase in passenger traffic, total traffic will continue to be below the passenger numbers seen pre-2019, when the airport operated at a higher capacity (See Figure 15.3).

These are conservative estimates because not all workers will utilize the airports, as some workers will be local hires that do not require flights to and from their home communities. These estimates also assume that all workers will use either the North Peace Regional Airport or the Prince George Airport. However, both may be used, decreasing demand on any single airport. Charter flights may also be used, making use of a wider variety of airports.

Potential increased demand on railways and airports will be managed via the existing management plans (e.g., Access Management Plan (PRGT 2014a), Transportation Management Plan (PRGT 2014a)).

### **15.3.1.3 Decreased Navigability of Waterways, Rivers, and Lakes**

The proposed route crosses watercourses used for recreational activities, such as freshwater fishing and recreational boating, and traditional uses. Based on a desktop review of new information on watercourse crossings for the Amendment components, the proposed route crosses 197 mapped watercourses in the Peace River watershed. Most of the freshwater watercourse crossings are over small, non-navigable waterways or can be considered minor works under the *Canadian Navigable Waters Act* (1985). Approximately 410 watercourse crossings that were considered in the Application (PRGT 2014a) are no longer included as there is no interaction with those waterways, including watercourse crossings for Peace River and Williston Lake. Effects to navigability are expected to occur at a slightly lesser extent as the Amendment includes a proposed route that is approximately 60 km shorter in length and has fewer freshwater watercourse crossings than the approved alignment.



Trenchless crossings are often used for large or exceptionally environmentally sensitive watercourses, where geotechnical and hydrological conditions allow (PRGT 2014a). Trenchless crossings are expected to be used, and locations confirmed once additional studies are complete and as engagement continues with Indigenous Nations and stakeholders. The Project will apply mitigation measures, such as the Access Management Plan and the Transportation Management Plan, to reduce interference between trenchless crossings and navigable waterways users.

Aerial crossings are not considered a minor work under the *Canadian Navigable Waters Act* (1985) as they are not buried under the bed of the navigable water. Aerial crossings are expected to be used, and locations confirmed once additional studies are complete. There are two existing pipeline structures that cross the Pine River near Highway 97, where there is sufficient clearance needed for navigable waterway users to navigate below (Figure 16.23). Any aerial crossings built by the Project will have sufficient clearance such that they will not interfere with the navigability of the waterway.

The Project will communicate with and notify specific waterway users regarding planned construction activities. Existing management plans (e.g., SEEMP, Access Management Plan, Transportation Management Plan) will be used to manage potential decreased navigability of waterways, rivers, and lakes.

### **15.3.2 Residual Effects**

No new residual effects on transportation are expected as a result of the changes proposed in this Amendment. Residual effects include increased demand on major roads and highway infrastructure; increased demand on railways and airports; and decreased navigability of waterways, rivers, and lakes due to the construction, operation, and decommissioning of the Amendment and associated infrastructure.

Residual effects on transportation will be managed with the application of existing management plans (e.g., SEEMP, Access Management Plan, Transportation Management Plan). The residual effects of the increased demand on major roads and highway infrastructure from traffic volumes are negligible to moderate in magnitude, with no change from the characterization presented in the Application (PRGT 2014a). The residual effects of the increased demand on railways are of negligible magnitude, with no change to demand on railways from the characterization presented in the Application (PRGT 2014a). Residual effects of the increased demand on airports are of moderate magnitude, with no change from the characterization presented in the Application (PRGT 2014a). However, the unused current capacity of the airports also provides a high resilience context. Residual effects to navigability of waterways are expected to be negligible in magnitude for trenchless crossings, and low for aerial crossings, with no change from the characterization presented in the Application (PRGT 2014a).

In consideration of the predicted effects on transportation, the conclusions presented in the EAO Assessment Report (EAO 2014a) remain valid with the Amendment's proposed changes. The residual adverse effects are expected to occur at a slightly lesser magnitude as the Amendment includes a proposed route that is approximately 60 km shorter in length and has fewer freshwater watercourse crossings than the approved alignment.



### 15.3.3 Changes to Characterization of Residual Effects

Based on a desktop review of new information on transportation for the Eastern Route Alternative and mitigation described in the applicable management plans (e.g., SEEMP (PRGT 2016), Access Management Plan (PRGT 2014a), Transportation Management Plan (PRGT 2014a)), a change to the characterization of residual effects on the EAO Assessment Report (EAO 2014a) is not expected to be necessary.

In consideration of the predicted effects on transportation, the conclusions presented in the EAO Assessment Report (EAO 2014a) remain valid with the proposed changes. Table 15.6 presents a comparison between the EAO Assessment Report (EAO 2014a) and the changes to the residual effects characterization that are included in this Amendment.

**Table 15.6 Changes to EAO Assessment Report Characterization of Residual Effects – Transportation**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>2</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Context</i>	<i>Moderate to High Resilience</i>	<b><i>Freshwater Navigability:</i></b> <i>Freshwater navigability likely to be of moderate to high resilience.</i> <b><i>Transportation:</i></b> <i>Project construction would rely primarily on the existing road and transportation infrastructure systems to deliver materials and labour to the proposed pipeline ROW. While there are some concerns about traffic congestion at certain points on major roads, most have sufficient capacity to accommodate increased traffic.</i>	No change
<i>Magnitude</i>	<b><i>Freshwater Navigability:</i></b> <i>Low</i> <b><i>Transportation:</i></b> <i>Negligible to Moderate</i>	<b><i>Freshwater Navigability:</i></b> <i>Disruptions to freshwater navigability for recreational users likely to constitute a temporary inconvenience or nuisance.</i> <b><i>Transportation:</i></b> <i>The magnitude of potential Project effects on vehicle traffic is likely to be negligible to moderate in magnitude relative to existing traffic, as a result of Project related demands on highways as well as secondary and Forest Service Roads.</i>	No change
<i>Extent</i>	<i>Local</i>	<i>Navigation and transportation impacts would be on specific routes or locations.</i>	No change

<sup>2</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>2</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Duration</i>	<i>Short to Medium-Term</i>	<i>Navigation impacts at any one location would typically last days but may last for a couple of weeks to months at landfalls. Transportation effects would generally continue for six to 12 months. These effects would occur again during the construction of the second pipeline.</i>	No change
<i>Reversibility</i>	<i>Reversible</i>	<i>Would reverse immediately after the activity ceases.</i>	No change
<i>Frequency</i>	<i>Once to Continuous</i>	<i>Navigation effects would generally occur twice at any one location, while landfall effects would be continuous for a period. Transportation effects would be occasional or continuous at any location.</i>	No change
<i>Likelihood</i>	<i>The likelihood is high that some degree of adverse effects would occur during Project construction with respect to transportation infrastructure and services in the LAA/RAA.</i>		No change
<i>Significance</i>	<i>Considering the above analysis and having regard to the conditions identified in the TOC (which would become legally binding as a condition of an EA Certificate), EAO is satisfied that the proposed Project is not likely to have significant adverse residual effects on transportation.</i>		-
<i>Confidence</i>	<i>Moderate Confidence – Moderate level of confidence in validity of assumptions and analysis and effectiveness of proposed mitigation strategies, particularly in consideration of the requirements for on-going monitoring and adaptive management.</i>		No change

### 15.3.4 Cumulative Effects Assessment

Cumulative effects on transportation from changes proposed in this Amendment are expected to be similar to or less than those presented in the Application (PRGT 2014a) and the Assessment Report (EAO 2014a), given that the Eastern Route Alternative is approximately 60 km shorter than the section of approved route it would replace and given the mitigation identified in Sections 15.3.1.1 and 15.3.1.2. The Assessment Report (EAO 2014a) concluded that the potential adverse effects of the Project are not likely to interact cumulatively with residual effects of other past, present, or future projects and activities that affect transportation or navigation of fresh watercourses. No change is anticipated to this conclusion as a result of the Amendment, given its shorter overall route length and implementation of mitigation measures. Given this, a detailed cumulative effects assessment is not warranted.



### **15.3.5 Risks and Data Uncertainty**

The level of confidence in the assumptions and predictions of residual effects and effectiveness of proposed mitigation measures for transportation is moderate. The prediction confidence is based on the information collected as part of the baseline conditions' data collection and understanding of current baseline conditions. As the uncertainty in this prediction is not high, no additional risk analysis is necessary.





## **16 Land and Resource Use**

Land and resource use was identified as a VC in the Application Information Requirements (PRGT 2014b) for the Application (PRGT 2014a) due to anticipated Project interactions with land and resource use activities (e.g., oil and gas, forestry, guiding, trapping and fishing, camping, off-road vehicle operation). Land and resource use is included in the Amendment due to the anticipated interactions between the Eastern Route Alternative and other commercial and non-commercial land use activities. Visual Quality was also included as a stand-alone VC in the Application (PRGT 2014a). Given the linkages between visual resources and other land and resource uses, change in visual quality is included as an effect in the Amendment and is considered as part of the Land and Resource Use VC.

The Amendment includes an updated description of existing conditions based on data collected since the Application (PRGT 2014a) was submitted and includes spatial boundaries that reflect the spatial extent of the proposed Project changes. The Project footprint is a 100 m wide ROW to conservatively estimate potential effects of clearing and ground disturbance. The land and resource use LAA and RAA are the same as defined in the Application (PRGT 2014a). The LAA is a 2 km band that encompasses the land-based portion of the Project footprint and associated ancillary facilities (i.e., camp sites, stockpile/storage areas, log decks, contractor yards/laydown areas, borrow sites, water withdrawal sites, new access roads, watercourse crossing upgrades, metering station, and a compressor station). The RAA is a 50 km wide band along the Project footprint. It encompasses the land-based portion of the Project footprint and includes visual sensitivity units that could present views of the Project. The extents of the Project footprint, LAA and RAA for the Amendment are shown in Appendix I, Figure I.1.

### **16.1 Baseline Conditions**

Information on current baseline conditions for land and resource use (including visual quality) is based on existing information collected as part of the Application (PRGT 2014a) and existing secondary baseline data sources, including relevant spatial data obtained from Data BC (2024).

The proposed Eastern Route Alternative i.e., Project footprint) is predominantly routed along Highway 97 west of Chetwynd to Parsnip River, and then extends westward to a point approximately 45 km west of Mackenzie. The Eastern Route Alternative crosses through an area characterized by existing linear developments (e.g., roads, rail lines, power lines, natural gas and oil pipeline rights-of-way), settlements, Crown tenure areas, water rights licences, parks and recreational trails and facilities, agricultural and range land areas, forest tenure, harvesting authority areas, cut blocks within tree farm licence/ timber supply areas, mining tenures (i.e., mineral, coal), guiding/outfitting and trapping areas, and visual landscapes. Property parcel fabric along the Eastern Route Alternative consists of private lands, Crown Provincial, Crown Agency, and untitled Provincial lands. Two Land and Resource Management Plans (LRMPs; Government of British Columbia 1999, 2000) and two Official Community Plans (OCPs; Peace River Regional District 2011; Regional District of Fraser-Fort George 2007) apply to the Eastern Route Alternative.



Primary land uses in the LAA and RAA are agriculture, rangeland, forestry, mineral exploration, petroleum transmission and facilities operation, guiding/hunting, trapping, and recreation. Figures are presented in Appendix I, depicting the location and identifying information on land and resource uses overlapping with the Eastern Route Alternative.

### **16.1.1 Land Ownership and Land Use Planning**

The Project footprint crosses a mixture of the following property parcel types: Private (39 parcels), Crown Provincial (101 parcels), Crown Agency (7 parcels), untitled Provincial (51 parcels), and unclassified (2 parcels) (Appendix I, Figure I.2). The Project footprint overlaps 12.6 ha of private lands. The Project footprint overlaps 286 ha of Crown provincial and agency lands, and 29 ha of untitled provincial land. The Project footprint overlaps with one First Nation Reserve (Parsnips 5), encompassing 0.1 ha of the Project footprint; 34 ha of First Nation Reserve land (Parsnips 5) is overlapped in the LAA (0.1%). The Eastern Route Alternative is located entirely within Treaty 8, signed in 1899 (Indian and Northern Affairs 1986). No First Nation Treaty land parcels are overlapped by the Project.

Two LRMPs are applicable to the Eastern Route Alternative: the Dawson Creek LRMP and the Mackenzie LRMP (Government of British Columbia 1999, 2000), as listed in Table 16.1 and shown on Appendix I, Figure I.3.

The Project footprint overlaps 632 ha of the Dawson Creek LRMP and 1,082 ha of the Mackenzie LRMP (Table 16.1). The Project footprint overlaps with the Pine/Murray/Sukunka Special Rivers Corridor (riparian management zones [RMZs] 3A, 3B, 3C) of the Dawson Creek LRMP. The river corridors provide important routes for pipelines and access. The management prescription within these RMZs is for land and resources within the river corridors to be carefully managed to ensure that resource exploration and development is minimized, and where possible, eliminate, negative impacts to important resource values (e.g., recreation and views). The Project footprint also overlaps with the East Slopes RMZ, specifically Carbon Creek 10I. This RMZ has been designated General Resource Management where there is recognized potential for future development of oil and gas. Objectives under General Management Direction includes providing for opportunities and access for oil and gas exploration, development, and transportation.

The Project footprint overlaps several RMZs of the Mackenzie LRMP, specifically RMZ #40 Misinchinka and RMZ #42 Philip – Enhanced RMZs. The objective of these enhanced RMZs is to maintain opportunities and access for oil and gas exploration, development, and transportation. General Management Direction applies to the other General RMZs (i.e., Tudyah B, Tudyah D, Williston Lake) overlapped by the Project footprint. In these zones the objective is to maintain opportunities and access for oil and gas exploration, development, and transportation while having due regard to impacts on other resource values.

The Project footprint also overlaps the Mackenzie Sustainable Resource Management Plan Agricultural Development Areas and Settlement Reserves Areas within the Mackenzie Forest District. Within that, the Project footprint overlaps the Windy Point Agriculture/Settlement Area RMZ #48. The Project footprint also overlaps 18 ha of the Burnt Pine Caribou Augmentation Planning Area, which has a total Plan Area



of 171,090 ha (Table 16.1). The northwesternmost block of the Burnt Pine Resource Review Area (RAA) is located at low elevation adjacent to Highway 97 (Cichowski et al. 2012).

**Table 16.1 Land and Resource Management Plan Areas and Assessment Areas**

Plan Area	Total	Project Footprint		LAA		RAA	
	Plan Area (ha)	Plan Area (ha)	Overlap (%)	Plan Area (ha)	Overlap (%)	Plan Area (ha)	Overlap (%)
Dawson Creek LRMP	2,989,836	632	0.02	13,396	0.4	330,953	11.0
Mackenzie LRMP	6,410,665	1,082	0.02	21,924	0.3	452,200	7.0
Burnt Pine Caribou Augmentation Plan Range Area	171,090	18	0.01	2,282	1.3	123,862	72.4

The RAA also overlaps with portions of the Fort St. James LRMP and the Prince George LRMP.

The Project footprint overlaps with two Regional District OCPs – Peace River Regional District [Electoral Area E], Rural OCP By-law No. 1940, 2011 (Peace River Regional District 2011) and the Fraser-Fort George Regional District [Electoral Area G], Crooked River-Parsnip, OCP By-law No. 2425 (Regional District of Fraser-Fort George 2007). There are three supporting zoning by-laws in place that have established land use regulations and land use zones to implement the objectives and policies of the OCPs - Chetwynd Rural Area Zoning Bylaw No 506, 1986 (Peace River Regional District 1987), Peace River-Liard Regional District Zoning Bylaw No. 85 (Peace River Regional District 1976), and Regional District of Fraser-Fort George Zoning Bylaw No. 2892 (Regional District of Fraser-Fort George 2014).

Under the Peace River Regional District Rural OCP By-law No. 1940, 2011, the Project footprint is designated as “Ag-Rural – Agricultural Rural”. There are two parcels of land designated as “Heavy Industrial” along the existing railway immediately southwest of the District of Chetwynd. One of the parcels is adjacent to Highway 97 and the Project footprint. At Lemoray, on the northwest side of Highway 97, there are three parcels of land designated as “Residential” and “Light Industrial” on the opposite side of the Project footprint (Peace River Regional District 2011). The Peace River Regional District Rural OCP By-law No 1940, 2011 includes several policies related to petroleum pipelines, oil and gas production facilities, and rights-of-way. Policy 18 recognizes working with provincial governments to encourage multiple-use and sharing facilities, pipelines, rights-of-way, and access to minimize cumulative impacts of development while utilizing the least amount of land. Policy 20 states that oil and gas production facilities, as defined in the bylaw, may be considered within the Agricultural-Rural designation. Policy 23 recognizes that pipeline rights-of-way traverse through the Plan area that may impact adjacent land use or alter development plans subject to provincial or federal regulations.

Under the Fraser-Fort George Regional District, Crooked River Parsnip OCP By-law No 2425, the Project footprint is designated as “AG/RES – Agriculture/Resource”. The policies guiding the primary uses of land within this designation include other resource extraction uses (i.e., uses related to operation of pipelines).



A segment of the Project footprint and LAA extends into the Regional District of Bulkley-Nechako and is subject to the Fort St. James Rural Official Community Plan Bylaw No. 1578 (Regional District of Bulkley-Nechako 2010). However, lands in the area are not officially designated under the Plan for specified land uses (e.g., Agriculture or Resource).

### **16.1.2 Parks and Protected Areas**

The Project footprint as defined for this Amendment overlaps with Bijoux Falls Provincial Park for 0.7 ha (<0.1%) as identified in Appendix I, Figure I.4. No other protected areas, ecological reserves, conservation areas, national parks, or local and regional greenspaces are overlapped by the Project footprint or LAA. Approximately 4% (1,558 ha) of the LAA overlaps with two provincial parks, Bijoux Falls and Pine Le Moray (BC Parks 2024a, b). The LAA also overlaps with the recently expanded Klinse-Za / Twin Sisters Provincial Park. The park expansion was announced on June 14, 2024.

Other provincial parks or ecological reserves in the RAA are Carp Lake Provincial Park, Pine Le May Provincial Park, Tudyah Lake Provincial Park, Whiskers Point Provincial Park, and MacKinnon Esker Ecological Reserve (Appendix I, Figure I.4).

Wildlife management areas (WMAs) are areas of land designated under Section 4(2) of the *Wildlife Act* for the benefit of regionally to internationally significant fish and wildlife species or their habitats. The Regional Manager for the Ministry of Forests (FOR) may establish orders that prohibit or restrict certain activities that have impacts on wildlife or habitat, and government or the Minister may make regulations respecting use or occupation of a WMA. New activities that involve use of land or resources in a WMA also require written permission from the Regional Manager. There are no WMAs overlapped by the Project, LAA, or RAA.

### **16.1.3 Crown Tenures, Reserves and Notations**

There are 854 Crown tenures in the LAA and 207 Crown tenures overlapped by the Project footprint. Tenure types include development agreements, inventory, leases, licence, reserves/notations, and right-of-way. Tenure purposes include alpine skiing, commercial, industrial, institutional, residential, quarrying, utility, communication, transportation, environment, conservation, and recreation, and wind power. There are 69 Crown Reserves and Notations overlapped by the Project footprint. Forest Recreation Areas and Forest Tenure Special Use Permits are amongst the Crown tenures (Appendix I, Figure I.5). See Section 16.1.7 for further details.

### **16.1.4 Water Licence Tenure**

Under the *Water Sustainability Act*, a water licence is required to divert, use, or store surface water from a stream, and to construct the works. A water licence specifies the water source, purpose, maximum quantity, and works associated with the water use, and where the water can be used. There may be restrictions to water use during certain times of the year.



Proposed works on Crown land require an authorization for the use of the Crown land, in the form of a Permit over Crown Land, or a more formal tenure under the *Land Act*. Tenure under the *Land Act* is typically required for larger projects (e.g., waterpower or waterworks). Water Policies have been developed to guide the management of BC's water resource. Policies are in place to guide water allocation that specify how and when to issue water licences and approvals, how the water may be used, and when a licence or approval may be refused or amended.

The Project footprint overlaps with water resources and features related to bedrock/sand and gravel aquifers, water wells (i.e., water supply), water licensed works (i.e., conduits), and active water rights licences. There are two water rights licences in the Project footprint. There are 25 water rights licenses in the LAA and 122 in the RAA. There is one registered water supply well in the Project footprint and 36 in the LAA. The Project footprint overlaps four water licence works (i.e., lines); 47 licensed works are in the LAA (Appendix I, Figure I.6).

### **16.1.5 Mining, Oil and Gas, and Electrical Tenure**

The Project footprint, LAA and RAA overlap with petroleum titles, pipeline permits, associated ancillary permits, transmission pipelines, segment road permits, a facility location, and mining tenures (e.g., mineral, coal). Private industry can develop these resources by entering into tenure agreements, including those related to the exploration, development, and transportation of minerals and petroleum resources. In addition to provincial tenure agreements, specific approval to carry out work for oil and gas activities must be given by the BCER. The acquisition, exploration and development of mineral, placer mineral, and coal rights in the province is governed under the *Mineral Tenure Act*, *Coal Act*, and associated regulations.

The Project footprint overlaps with 69 mineral tenures (i.e., mineral and coal) for a total area of 1,071 ha. The LAA overlaps 130 mineral tenures (i.e., mineral, coal) for a total area of 21,767 ha. The Mount Milligan Mine and associated mining lease are located within the RAA. The Project footprint overlaps with 2,526 ha of petroleum title. The LAA overlaps 52,562 ha of petroleum title (Appendix I, Figure I.7). Permitted pipeline rights-of-way overlaps 0.3 ha of the Project footprint and 12 ha of the LAA. There are 0.02 km of permitted road segments (i.e., long-term all-weather) in the Project footprint and 0.4 km in the LAA; these permits are held by PRGT. One transmission pipeline segment is overlapped by the Project footprint, for 0.2 km (Appendix I, Figure I.7). One transmission pipeline is in the LAA, for approximately 4.8 km. Ancillary facilities consisting of a storage area, workspace, and clearing overlap 7.4 ha of the Project footprint and 180 ha of the LAA. One facility location (Plateau Willow Flats STN 2) is located within the LAA.

Electrical transmission lines cross through the RAA, LAA and along the Project footprint (Appendix I, Figure I.7). The Project footprint crosses through and parallels the GMS – GM Shrum-WSN – Williston (5L001/5L002) transmission lines and the PCN Peace Canyon-KYD – Kennedy Capacitor STN (5L003) transmission line along the Highway 97 corridor for approximately 137 km. Approximately 43 km of the KYD – Kennedy-MFE – Morfee transmission line (1L373) crosses through the RAA in the Tudyah Lake/Parsnip River area to Mackenzie east of Williston Lake. An unnamed transmission line crosses through the RAA south and west of Williston Lake for approximately 49 km (iMapBC 2024).



### 16.1.6 Agriculture Land Reserve and Range Tenure

Agriculture Land Reserve is regulated by the *Agricultural Land Commission Act* and the Agricultural Land Reserve Use, Subdivision and Procedure Regulation. Crown range lands are managed for the allocation of hay cutting and grazing agreements and leases under the *Land Act*. The Project footprint overlaps with 510 ha of active range tenures while the LAA overlaps with 9,912 ha. There is one range development (i.e., infrastructure) within the LAA (22 ha). There are no Agricultural Land Reserve lands within the Project footprint. The LAA overlaps 4.1 ha of Agricultural Land Reserve lands (Appendix I, Figure I.8).

### 16.1.7 Forestry Resource/Tenure

The Project footprint, LAA and RAA overlap two forest regions: Northeast Natural Resource Region and Omineca Natural Resource Region. Licenses to cut timber are issued for harvesting in specific areas over a short period of time. The Project footprint overlaps 18 ha of one Tree Farm Licence (TFL; TFL 48) held by Canfor Corporation. The Annual Allowable Cut (AAC) for TFL #48 (Canadian Forest Products Ltd.) is 900,000 m<sup>3</sup>/year. The areal extent of TFL 48 is 643,239 ha. The 18 ha of TFL overlapped by the Project footprint is less than 0.1% of the TFLs total areal extent. Sections of two timber supply areas (TSAs) are overlapped by the Project footprint – Dawson Creek #41 (1,247 ha) and MacKenzie #16 (2,163 ha) TSAs (Appendix I, Figure I.9). The Dawson Creek TSA covers 2.3 million ha. The AAC is 1,841,124 m<sup>3</sup>/year. The Mackenzie TSA covers 6.4 million ha. The corresponding AAC is 2.39 million m<sup>3</sup>/year. The Project footprint and LAA overlap 0.1% and 0.9% of the TSAs, respectively.

The Project footprint overlaps portions of 29 Forest Cover Reserves, totalling 22 ha. Forest Cover Reserves cannot be harvested unless relocated or modified by the licensee associated with the reserve. The Project footprint overlaps with 68 ha of five managed licences. The Project footprint overlaps portions of 307 harvest authority areas (1,644 ha) and 159 cut blocks (519 ha). There are 1,185 (27,688 ha) of harvest authority areas and 765 cut blocks (7,360 ha) in the LAA (Appendix I, Figure I.10).

The Project footprint overlaps portions of six legal OGMA totalling 83 ha, while the LAA overlaps twenty non-legal OGMAs covering 2,267 ha. The Project footprint does not overlap any non-legal OGMAs. The *Forest Range and Practices Act* (FRPA) has orders that include targets for old growth retention. Retention requirements vary depending on the type of order in place in each area. Legal OGMAs are included in licensees' forest stewardship plans and are protected under the order.

The Project footprint overlaps 11 ha of six active/pending special use permit areas (i.e., gravel pit, logging camp, research, road right-of-way). The LAA overlaps 102 ha of 41 active/pending special use permit areas. The Project footprint and LAA do not overlap any FOR permanent sample plots (i.e., research sites).



### **16.1.8 Guiding/Outfitting and Trapping Tenure**

Wildlife Management Units (WMUs) are areas within administrative regions established for the purposes of efficient game management. WMUs have regulations for hunting several species including mule deer, moose, elk, mountain goat, black bear, wolf, cougar, coyote, lynx, snowshoe hare, spruce and ruffed grouse, sharp-tailed grouse, and ptarmigan. Wildlife permits are addressed at the regional level. Three game management zones encompass the Project footprint and LAA – Mcleod Lake (7Oc), Omineca (7Od), and South Peace (7Pa). The Project footprint overlaps with eight WMUs – 7-16, 7-22, 7-23, 7-24, 7-28, 7-29, 7-30, and 7-31 within these game management zones (Appendix I, Figure I.11). The Project footprint overlaps four tenured guide/outfitter areas totalling 1,396 ha. The Project footprint overlaps nine trapline areas totalling 1,714 ha. The LAA overlaps 13 guide/outfitter areas for a total of 29,062 ha and 28 trapline areas for a total of 35,320 ha in the Omineca Region (Appendix I, Figures I.12 and I.13).

### **16.1.9 Recreation Use**

There are numerous outdoor recreation opportunities available in the Hart Ranges of the Rocky Mountains where the Project is located. Existing operators include licensed fishing guides, licensed guide-outfitters, destination lodges, recreation facilities, and cultural attractions and sites. Outdoor activities available to visitors in this region includes swimming, visiting beaches, hiking, camping, biking, hunting, visiting parks, horseback riding and canoeing (District of Mackenzie 2024; BC Parks 2024a, b). Recreational activities available in the winter are also numerous, including cross-country skiing, downhill skiing, snowshoeing, and snowmobiling. Located within the RAA, the District of Mackenzie offers several recreation and cultural sites including the Mackenzie Golf & Country Club, Mackenzie Alpine Riders Horse Club, Little Mac Ski Hill, tennis courts, baseball diamonds, and Mackenzie Arts Centre & Museum (District of Mackenzie 2024). Powder King Mountain Resort, a popular ski, snowboard, snowshoe, and snowmobile destination, is also located within the RAA (Powder King Mountain Resort n.d.).

The Project footprint overlaps with Bijoux Falls Provincial Park, a day use park which offers hiking, picnic areas and wildlife viewing (BC Parks 2024a). There are several provincial parks and outdoor recreation areas within the RAA as well, including: Pine Le Moray Park, Carp Lake Park, Tudyah Lake Park, Whiskers Point Park, John Dahl Regional Park, and Klinsee-Za/Twin Sisters Park. The largest park in the LAA is Pine Le Moray Park, known for its scenic location and available recreational activities including camping, hiking, fishing, canoeing, cycling and horseback riding (BC Parks 2024b). There are numerous trails available for hiking and biking in the Project corridor including Pine Le Moray Trail, Powder King (Mischinsinlika) Trail, Murray Range Trail, and Heart Lake Trail (iMapBC 2024). The District of Mackenzie offers trails suitable for mountain biking, trail running, hiking, snowshoeing and cross-country skiing such as Azan Tunneh Trail, Deet Trail and Morfee Lake Trail (District of Mackenzie 2024).

Opportunities to participate in winter recreational activities are abundant with snowmobile trails such as Silver Sands Snowmobile Trail, Morfee Mountain Azuetta Snowmobile Trail and the Pipeline Trail at Powder King Mountain Resort scattered across the Project corridor (iMapBC 2024; Powder King Mountain Resort n.d.). The District of Mackenzie has over 30 km of groomed Nordiques ski trails ranging from beginner to advanced, along with a Nordiques Clubhouse (Mackenzie Nordiques 2019).



### **16.1.9.1 Recreation Areas/Sites and Trails**

The Project footprint overlaps two recreational trails, sections of the Silver Sands snowmobile trail, at Chetwynd for approximately 0.2 km. The LAA overlaps several recreational trails for snowmobiling, hiking and climbing (Appendix I, Figure I.14), including the Silver Sands snowmobile trail for approximately 5.4 km, the Callazon Snow Trail for approximately 1.4 km, the Pine Le Moray Trail for approximately 0.8 km, and the Ezekiel Rock Climb for approximately 0.6 km.

The Project footprint overlaps one active recreational site, the Robinson Lake recreation site, for a total of <0.1 ha. The LAA overlaps nine active recreation sites, including forest recreation sites, seven recreation reserves, and two interpretive forests (Appendix I, Figure I.14). The LAA overlaps a total of approximately 180 ha of recreational sites, recreational reserves, and interpretive forest sites.

Recreational sites in the LAA are:

- Tudyah Lake – 2.6 ha
- Robinson Lake – 52.5 ha (also in Project footprint)
- Windy Point Lake – 31.4 ha
- Beaver Creek South (parking area) – 2.7 ha
- Beaver Creek North (parking area) – 0.7 ha
- Silversands (parking) – 0.8 ha

Recreation reserves in the LAA are:

- Twin Lakes – 6.7 ha
- Misichinka River – 2.3 ha
- Parsnip Bridge – 1.3 ha
- Bruce Lake – 74.7 ha
- Bijoux Falls (snowmobile parking) – 1.1 ha

Interpretive Forests are:

- Demonstration Forest Site 1 – 0.4 ha
- Demonstration Forest Site 2 – 2.7 ha

There are 60 active recreation sites (24), recreation reserves (28), and interpretive forests (8) in the RAA, including Butternut Lake, Gataiga Lake, Kennedy Lake, Pack River, Philip Creek, Phillips Lake, Sabai Lake, and Turner Lake. Recreation sites and recreation reserves include cabins, parking areas, snowmobile trails (e.g., Morfee Mountain-Azuetta) and a rock climb area (i.e., Ezekiel). The interpretive forests consist of demonstration forest sites.





### **16.1.9.2 Recreational Values**

Crown lands within the Province of BC (excluding parks) are assigned recreational values based on various natural and human features with respect to the pursuit and enjoyment of outdoor recreation and tourism. These values are recorded as part of a Recreation Features Inventory and reflect each feature's potential to provide for and/or support recreational opportunities and sensitivity to alteration.

Recreation feature polygons are assigned a significance rating of low, moderate, high, or very high to indicate the relative value of the polygon to recreation. Recreation feature polygons are also assigned a sensitivity ranking of low, moderate, or high to indicate the relative vulnerability of the recreation features to potential modifications caused by resource development.

In the Project footprint, there are 42 recreation features which have values recorded, totaling 1,714 ha. These features range from low to very high significance and from low to high sensitivity. There are 204 recreation features in the LAA, totaling 35,320 ha. These are classified as having low to very high significance and low to high sensitivity. Table 16.2 summarizes the significance and sensitivity ratings for recreation features in the assessment areas (Appendix I, Figure I.14).

Some of the recreation features in the Project footprint and LAA recorded as having high or very high significance are as follows:

- South of Highway 97 corridor near Mountain Creek
- Pine River/Highway 97 corridor on west side of Pine Le Moray Provincial Park
- Azu Ski Village along Highway 97 corridor
- Bijoux Falls Provincial Park along Highway 97 corridor
- Windy Point Lake at junction of Highways 39 and 97
- Tudyah Lake and vicinity
- Grayling Lake and vicinity
- Phillips Creek and Robinson Creek confluence (iMapBC 2024).

### **16.1.9.3 Recreational Hunting and Angling**

The Project footprint overlaps with eight WMUs. The Project footprint overlaps three game management zones: South Peace, Omineca, and Mcleod Lake (see Appendix I, Figure I.11). The Project footprint and LAA overlap one nesting zone - #22; the RAA overlaps three nesting zones (i.e., #2, #21, and #22). The Project footprint is located within Region 7A – Omineca and Region 7B – Peace. General open seasons in the Omineca Region 7A are available for numerous big game and mammal species – mule deer, white-tailed deer, moose, elk, mountain goat, black bear, wolf, cougar, coyote, lynx, snowshoe hare, and Columbian ground squirrel, subject to season date restrictions and bag limits (FLNRORD 2022). General open seasons for wild game bird species including dusky (blue), spruce and ruffed grouse, ptarmigan, coots/common snipe, ducks, and geese (snow and Ross's, white-fronted, and Canada and cackling), are also subject to their own season restrictions and bag limits (FLNRORD 2022). General open seasons in



the Peace Region 7B are available for numerous big game and mammal species – mule deer, white-tailed deer, elk, black bear, wolf, coyote, wolverine, lynx, and snowshoe hare, subject to season date restrictions and bag limits (FLNRORD 2022). General open seasons for wild game bird species including dusky (blue), spruce and ruffed grouse, ptarmigan, coots/common snipe, ducks, and geese (snow and Ross's, white-fronted, and Canada and cackling), are also subject to their own season restrictions and bag limits (FLNRORD 2022).

The Project footprint, LAA and RAA overlap limited entry hunting zones for moose, elk, and mountain goat. The Project footprint overlaps limited entry hunting zones for moose in all eight WMUs, for elk in WMU 7-20 (Zone A) and WMU 7-24 and for mountain goat in WMU 7-31. The LAA overlaps limited entry hunting zones for moose in all WMUs in the LAA, and for elk and mountain goat in WMU 7-20 (Zone A) and WMU 7-24. The RAA overlaps limited entry hunting zones for moose in WMUs 7-16, 7-22 to 7-25, and 7-28 to 7-31. Zones with limited entry hunting for elk in the RAA are WMU 7-20 (Zone A), 7-24, and 7-25. Limited entry hunting for mountain goat is restricted to WMU 7-31 in the RAA.

The Project footprint, LAA and RAA overlap fishing regions as illustrated on Appendix I, Figure I.15. Waterbodies and watercourses in the RAA support a recreational sport fishery (FLNRORD 2023). The Project footprint overlaps known fish observation points for arctic grayling, bull trout, mountain whitefish, rainbow trout, sculpin (general), and slimy sculpin fish species. Fish species identified in the LAA and RAA consist of arctic grayling, bull trout, burbot, dolly varden, lake chub, lake whitefish, largescale sucker, leopard dace, longnose sucker, mountain whitefish, northern pikeminnow, rainbow smelt, rainbow trout, redeye shiner, slimy sculpin, splake, sucker (general), whitefish (general), and white sucker (DataBC 2005). Waterbodies and watercourses in the RAA where fish species are caught include the Burnt River, Clearwater Creek, Moberly River, Nation River, Philip Creek, Pine River, Salmon River, McLeod Lake, and Williston Lake (FLNRORD 2023).



**Table 16.2 Recreation Features, Significance and Sensitivity in Land and Resource Use Assessment Areas**

Project Footprint						LAA						RAA					
Significance	Sensitivity	Number of Features	Area (ha)	Total Features	Total (ha)	Significance	Sensitivity	Number of Features	Area (ha)	Total Features	Total (ha)	Significance	Sensitivity	Number of Features	Area (ha)	Total Features	Total (ha)
L	L	1	16.5	10	937.2	L	L	20	1,986.5	53	17,660.6	L	L	197	405,091.8	306	692,082.9
	M	9	920.7				M	33	15,674.0				M	107	284,463.5		
													H	2	2,527.6		
M	L	1	4.2	27	665.5	M	L	6	277.2	129	14,795.7	M	L	25	26,307.7	368	186,174.6
	M	26	661.3				M	123	14,518.5				M	341	158,638.1		
													H	2	1,228.7		
H	L	1	1.0	5	53.3	H	L	4	53.5	19	1,729.5	H	L	9	8,879.6	63	47,325.7
	M	2	30.7				M	9	755.2				M	43	35,666.6		
	H	2	21.5				H	6	920.7				H	11	2,779.5		
VH	M	1	58.4	1	58.4	VH	M	3	1,134.4	3	1,134.4	VH	M	4	2,208.2	5	2,691.1
													H	1	482.9		
<b>Total</b>				<b>42</b>	<b>1,714.4</b>	<b>Total</b>				<b>204</b>	<b>35,320.8</b>	<b>Total</b>				<b>742</b>	<b>928,274.3</b>

Notes:

All numbers are approximate and rounded

L – Low; M – Moderate; H – High; VH – Very high

Source: Data BC Recreation Features Inventory 2015



### 16.1.10 Visual Quality

The Province of British Columbia's Visual Landscape Inventory (VLI) mapping database identifies the most visible and sensitive landscapes within the province. The Project footprint overlaps with visual landscape inventory areas and visual sensitivity units identified as per British Columbia's VLI. The VLI maps the visible topography from public-use areas (i.e., communities, recreational areas, highways, and waterways).

Visual resources on Crown land are managed under the overarching FRPA. The FRPA identifies visual quality as one of the objectives set by government to be managed when carrying out industrial activity on provincial forest land. The Forest Planning and Practices Regulation specifies categories of visually altered landscape that are commensurate with visual quality objectives (Table 16.3). Additionally, visually sensitive classes are defined to further qualify the sensitivity of these units (Table 16.4).

**Table 16.3 Categories and Descriptions of Visually Altered Forest Landscapes**

Category	Description
Preservation (P)	Alteration, when assessed from a significant public viewpoint, is (i) very small in scale, and (ii) not easily distinguishable from the pre-development landscape (e.g., 0% alteration).
Retention (R)	Alteration, when assessed from a significant public viewpoint is (i) difficult to see, (ii) small in scale, and (iii) natural in appearance (e.g., 0 – 1.5% alteration).
Partial Retention (PR)	Alteration, when assessed from a significant public viewpoint, is (i) easy to see, (ii) small to medium in scale, and (iii) natural and not rectilinear or geometric in shape (e.g., 1.6 – 7% alteration).
Modification (M)	Alteration, when assessed from a significant public viewpoint, (i) is very easy to see, and (ii) is (A) large in scale and natural in its appearance, or (B) small to medium in scale but with some angular characteristics (e.g., 7.1 – 18% alteration).
Maximum Modification (MM)	Alteration, when assessed from a significant public viewpoint, (i) is very easy to see, and (ii) (A) very large in scale, (B) rectilinear and geometric in shape, or (C) both (e.g., 18.1 – 30% alteration).

Source: BC MOF 2013

**Table 16.4 Categories and Descriptions of Visual Sensitivity Units**

Visual Sensitivity Class	Visually Altered Forest Landscape Category	Description
One	P or R	Very high sensitivity to human-made visual alteration. The area is extremely important to viewers. There is a very high probability that the public would be concerned if the Visual Sensitivity Units (VSU) was visually altered in any way or to any scale.
Two	R or PR	High sensitivity to human-made visual alteration. The area is very important to viewers. There is a high probability that the public would be concerned if the VSU was visually altered



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Visual Sensitivity Class	Visually Altered Forest Landscape Category	Description
Three	PR or M	Moderate sensitivity to human-made visual alteration. The area is important to viewers. There is a probability that the public would be concerned if the VSU was visually altered
Four	PR or M	Low sensitivity to human-made visual alteration. The area is moderately important to viewers. There is a risk that the public would be concerned if the VSU was visually altered
Five	M or MM	Very low sensitivity to human-made visual alteration. The area may be somewhat important to viewers. There is a small risk that the public would be concerned if the VSU was visually altered.

Source: BC MOF 1997; Forest Planning and Practices Regulation

The LAA and RAA contain a wide range of topography, elevation, and ecological variability moving west to east. With a few exceptions (e.g., areas within Pine le Moray and Gwilliam Lakes provincial parks which are scenic areas with little or no resource development), the majority of the LAA and RAA display some form of disturbance. Few areas could be specifically characterized as “pristine wilderness”, as past forestry and other industrial activities are evident. In addition, extensive areas have been affected by the Mountain Pine Beetle infestation, leaving expanses of standing dead pine forest.

Appendix I, Figure I.16 illustrates the viewshed of the Project footprint and identifies recreational sites from which Project components may be visible. The Project could potentially be visible from a 35,320 ha area within the LAA and a 934,189 ha area within the RAA. However, since the viewshed analysis is based on topographical features only, and does not incorporate vegetation screening effects, and considering that most Project components are buried and will revegetate over time, it is anticipated that area of visibility of Project components is far lower than indicated by the viewshed analysis. Based on the viewshed analysis three of the 11 recreational sites lie within the viewshed of Project components (Table 16.5).

**Table 16.5 Recreational Sites near the Eastern Route Alternative**

Recreation Site	Within Project Viewshed
Azouzetta Lake Lodge & Campground	No
Bijoux Falls Provincial Park	Yes
Kennedy Lake Recreation Site	Yes
Pack River Recreation Site	No
Philip Creek Recreation Site	No
Powder King Mountain Resort	No
Robinson Lake Recreation Site	Yes
Sabai Lake Recreation Site	No
Tudyah Lake Provincial Park	No
Tudyah Lake Recreation Site	No
Windy Point Lake Recreation Site	No



The provincial visual landscape inventory was reviewed to identify all visual sensitivity units within the LAA that had the potential to intersect with the Project footprint. Appendix I, Figure I.17 illustrates the distribution of VLI polygons located within the LAA and RAA of the Project.

Out of a total of 139 visual sensitivity units in the LAA, 58 are overlapped by the Project footprint. Of these, 16 have an established visual quality objective (EVQO) of “modification,” 22 have an EVQO of “partial retention,” and 13 have an EVQO of “retention” (Table 16.6). The Project footprint will transect a total of 20,144 ha of VSUs rated as either “modification”, “partial retention”, or “retention.”

**Table 16.6      Overlap of VSU polygons with Project Footprint and LAA**

EVQO	Project Footprint				LAA		
	# VSUs transected	Transected area (ha)	Total area of VSU that are transected	% of total VSU area transected by Project	# VSUs	Total area of VSUs	% of total VSU area transected by Project
Not rated	7	837	5,377,414	0.0%	26	5,383,202	0.0%
Modification	16	322	6,407	5.0%	41	10,532	3.1%
Partial Retention	22	351	8,249	4.3%	46	24,754	1.4%
Retention	13	204	5,488	3.7%	26	10,038	2.0%

Notes:

EVQO – Established Visual Quality Objective

VSU – Visual Sensitivity Unit

## 16.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to land and resource use. This feedback has been considered and summarized in Table 16.7 and has been integrated into the assessment.



**Table 16.7 Summary of Engagement Feedback Related to Land and Resource Use**

Comment	Sources	PRGT Response
Nak'azdli Whut'en reported that the reroute crosses the Philip Lake Trapline.	April 2024 engagement	<p>Mitigation in the Application (PRGT 2014a) will be applied to this trapline, including:</p> <ul style="list-style-type: none"> <li>• PRGT will communicate project activities, locations, and timing to local communities and interest groups.</li> <li>• PRGT will engage with trappers and guide outfitters operating near the Project.</li> <li>• If construction directly disrupts trapping activities to result in an economic loss, affected trappers will be compensated according to PRGT's Trapper Compensation &amp; Engagement Program, which meets or exceeds the requirements of the BC Industry Agreement (BC OGC 2006).</li> </ul> <p>PRGT will continue to engage with Nak'azdli Whut'en in relation to their feedback about potential impacts to this trapline.</p>

## 16.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, additional mitigation measures (to the 2014 EAC), anticipated residual effects, changes to the EAO Assessment Report (EAO 2014a) effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment. The Amendment effects assessment generally follows the same methods and approach for Land and Resource Use as applied in the Application (PRGT 2014a), following the effects considered by EAO in their Assessment Report (EAO 2014a).

Potential issues and concerns related to the proposed Eastern Route Alternative were identified based on knowledge of the proposed Amendment, including the activities and physical works, knowledge of baseline conditions, requirements of the *Environmental Assessment Act*, issues and concerns raised during the Indigenous and regulatory engagement process, previous issues and concerns raised related to this Amendment, and professional judgement. The Application (PRGT 2014a) was reviewed by provincial and local government representatives with the responsibility to oversee land use in the RAA. As summarized in the EAO Assessment Report (EAO 2014a), these reviewers made comments or raised issues related to potential for park boundary adjustment process, access management, reduction in the timber harvesting land base, and use of separate multiple pipeline corridors.



### 16.3.1 Potential Effects and Mitigation Measures

The Application (PRGT 2014a) considered nine potential effects on land and resource use and one potential effect on visual quality. Based on the content of the Application (PRGT 2014a) and the information gathered during Application review, the EAO Assessment Report (EAO 2014a) considered potential effects within the CPC. As summarized in Table 16.8, the Amendment will assess eight of the ten effects included in the EAO Assessment Report, including change in visual quality under land and resource use. Change in commercial fishing activity is not assessed, given the Amendment does not interact with the marine environment. Project activities most likely to interact with tourism activities, including recreational hunting and fishing, are discussed under change in tourism and outdoor recreation use in the Amendment rather than as a standalone effect. The Amendment effects assessment will generally rely on the measurable parameters used in the Application (PRGT 2014a). No new land and resource use effects were identified in the revised alignment.

The Amendment route is approximately 172 km long and would replace approximately 223 km of the approved eastern end of the Project (see Section 2). Project activities and physical works that are anticipated to be undertaken for the Amendment and have potential to affect land and resource use and visual quality are unchanged from those presented in the Application (PRGT 2014a) and will include construction activities such as site preparation of the pipeline footprint and land-based pipeline placement, and operation activities including project presence and vegetation management.

**Table 16.8 Potential Effects on Land and Resource Use (including Visual Quality)**

Potential Effects	Measurable Parameters
Change in parks and protected areas	Area of lands (ha) requiring park boundary adjustments and amendments
Change in land use plans and other designated areas	Compatibility with local and regional land use plans and land use objectives; area (ha) affected within plan areas
Change in tourism and outdoor recreation use	Areas (ha) of current recreational use (e.g., fishing, hunting, hiking, skiing, boating, all-terrain vehicle riding, and snowmobiling) that would be restricted. Total length (m) of trails affected, number of recreation features
Change in forestry activity	Loss of timber area land base (ha), % AAC of timber harvested (forestry)
Change in other industrial land uses including mining, oil and gas activities	Area (ha) of overlapping industrial land use affected (mining, oil and gas)
Change in guide outfitting and commercial trapping activities	Loss of area (ha) of trapline tenure holders and guide outfitter areas
Change in agriculture and range land use	Area (ha) of overlapping land use affected (Agriculture Land Reserve and range tenure)
<i>Change in visual quality*</i>	<i>Visual resources (qualitative description, in consideration of provincial landscape inventory and visual quality class definitions)</i>

Note:

\* Previously assessed as a stand-alone valued component





Mitigation measures identified in the Application (Sections 22.5 and 23.5 in PRGT 2014a) to address potential effects on land and resource use and visual quality and associated management plans (i.e., Construction Environmental Management Plan, Invasive Species and Vegetation Management Plan, Access Management Plan, and Traffic Management Plan [PRGT 2024a]) that are applicable to change in land and resource use and change in visual quality are expected to be applicable to the Amendment. No change in mitigation measures is proposed for the Amendment.

#### **16.3.1.1 Change in Parks and Protected Areas**

The Project footprint (100 m wide ROW) overlaps 0.7 ha (2.3%) of Bijoux Falls Provincial Park, which has a total area of 30 ha. A park boundary adjustment and amendment and a park use permit is required with BC Parks for land use and/or occupancy of parks for private or industrial use (i.e., access roads, utility right of ways). PRGT will evaluate whether the final alignment can avoid Bijoux Falls Provincial Park. If the final alignment overlaps a provincial park, PRGT will engage with BC Parks regarding park boundary adjustment. No other protected areas, ecological reserves, conservation areas, national parks, or local and regional greenspaces are overlapped by the Project footprint.

#### **16.3.1.2 Change in Land Use Plans and Other Designated Areas**

Portions of the Project footprint will overlap with four land use plan boundaries, including two LRMP areas (Dawson Creek and Mackenzie) and associated RMZs. The Project footprint overlaps 632 ha of the Dawson Creek LRMP and 1,082 ha of the Mackenzie LRMP. No conflict between the proposed Project and planning objectives related to pipeline development in the applicable RMZs is anticipated. The Regional District of Peace River OCP states that oil and gas production facilities may be considered in Ag-Rural lands and recognizes that pipeline rights-of-way traverse through the Plan area. Within the Regional District of Fraser-Fort George OCP, the policies guiding the primary uses of land within the AG/RES – Agricultural/Resource designation include other resource extraction uses (i.e., uses related to operation of pipelines). PRGT will work with the Regional Districts to develop the Project in a manner that is consistent with these policies.

Construction and operation of the Eastern Route Alternative is expected to affect tenured land and resource use tenure areas (Table 16.9). The Project footprint will affect approximately 923 ha of Provincial Crown tenure land. The compressor station will be constructed in a manner that limits possible disturbance and annoyance effects (e.g., noise, other emissions, changes to visual quality) over the short-term construction period. The cleared portion of the Project footprint will be limited to what is necessary for construction, and will revegetate during operations.



**Table 16.9 Tenure Areas Overlapped by the Eastern Route Alternative**

<b>Tenure Area</b>	<b>Project Footprint (ha)</b>	<b>LAA (ha)</b>	<b>RAA (ha)</b>
Crown Tenures, Reserves, and Notations	923	12,288	609,003
Parks and Protected Areas	0.7	1,558	69,286
Mining, Oil and Gas	1,071	21,767	707,131
Petroleum Title	2,526	52,562	1,351,467
Agriculture Land Reserves	n/a	4	6,279
Range Tenures	510	9,912	225,275
Consolidated Cutblocks	519	7,360	156,798
Harvest Authority Areas	1,644	27,688	594,966
Guiding/Outfitting	1,396	29,062	755,648
Trapping	1,714	35,320	934,188
Forest Recreation Sites	<0.1	180	2,508
Special Use Permits	11	102	633

### **16.3.1.3 Change in Tourism and Outdoor Recreation Use**

The Project footprint overlaps one recreation site (Robinson Lake) for less than 0.1 ha. Two trails used for hiking, snowmobiling and other activities are within the Project footprint, totalling 0.2 km in length. The Project footprint will overlap approximately 2.3% of the combined total length of these trails. Access to these trails will be restricted by project activities during construction by the nature of the work undertaken for safety reasons. PRGT will evaluate whether the final alignment can avoid the Robinson Lake recreation site.

The FRPA and Forest Recreation Regulation (FRR) identify when authorization is required for activities that take place in recreation sites, on recreation trails, or within interpretive forest sites. Authorizations under Section 16 under the FRR are required for use of a recreation site, trail, or interpretive forest site for an industrial activity (i.e., utility installation).

The Project footprint overlaps 42 recreation features with a total area of 1,714 ha. Of these, five are of high importance, with two identified as having high sensitivity, two as having medium sensitivity, and one as having low sensitivity. One recreational feature is of very high importance and has moderate sensitivity. The potential interaction with recreational features relates to effects on visual quality from Project presence. The effects of change to visual quality are discussed in Section 16.3.1.8 below.

A total of eight WMUs are partially overlapped by the Project footprint, totalling 0.2% of the total combined area of these WMUs. Big game hunting activities will be restricted in the Project footprint during construction during working hours and the Project-related disruption or disturbance to use within the WMUs is expected to be temporary. Sensory disturbances from Project-related activities will be reduced during operations.



Both residents and visitors to the region are anticipated to participate in outdoor recreational activities in the areas surrounding the Project footprint. Clearing and vegetation management activities will result in habitat alteration that could affect recreation activities and values. During construction, access to the Project footprint for recreational activities such as hunting, fishing, hiking and snowmobiling may be disrupted.

The presence of the Project footprint could increase access to the area. The access could be considered either a positive or negative effect. Noise and other emissions from construction activities will occur within the Project footprint and may extend into the LAA. The presence of vehicles and equipment in the LAA will generate noise and dust. This may detract from the recreational experience causing recreational users and tourists to reduce or stop their use of areas near Project work sites during periods of construction activity. Recreational users could be disturbed; however, these disturbances will stop once construction activities cease. Noise emissions will be limited during operations and would be associated with maintenance activities along the Project footprint.

Adverse changes in the access to and availability of recreational areas are expected from construction of the pipeline. Direct effects would occur in the Project footprint where access may be restricted, resulting in a reduction in the area available for recreating. For safety and security reasons, informal recreation activities may be restricted during the period of construction. Indirect effects associated with the restriction of access could occur within the LAA to recreational users who have used the area along the Project footprint as access to get to waterbodies outside of the LAA.

Construction of the proposed infrastructure could alter outdoor recreational experiences in the LAA. Sensory and visual disturbance from construction activities may affect a nearby user's quality of experience. However, the area is characterized by existing --rights-of-way for roads and rail that are already disturbed. In addition, existing public access to recreational/tourism sites will be maintained. Only one Forest Recreation Site is marginally affected by the Project footprint; none in the LAA are affected.

Informal summer and winter recreational use along rivers, creeks and access roads may be temporarily impacted by sensory disturbance during construction. A minor increase in the number of onsite workers is expected which is not anticipated to result in an increased demand for outdoor recreation or result in an affect on the quality of the outdoor recreation experience of others. Workers will be housed within construction camps and policies are in place to enforce no hunting and fishing by personnel on the Project footprint during working hours.

Effects from construction activities have the potential to affect recreational fishery resources along the land-based portion of the route. Recreational fishing activity occurring near watercourse crossings would likely be disturbed during the construction of the crossing. Construction activities may change the quality of experience for sport anglers and the ability to catch target species. These effects will be geographically limited to the river crossing areas. Increased access can lead to an increase in fish harvest from watercourse crossing locations resulting in greater pressure on the resource. Access to other watercourses in the RAA will not be increased because of the Project.



Recreational users may experience sensory disturbances from project presence and maintenance activities during the operation phase. Following construction and throughout operations, the landscape within temporary work areas will revegetate, so sensory disturbance will not continue in temporary work areas during operation. No new areas of ground disturbance are anticipated during operation. Provision of new recreational access along the cleared Project footprint is possible due to the linear access created by the project. Its recreational use will not be promoted by PRGT due to safety concerns.

Project operation has the potential to affect recreational users through permanent changes in visual quality. The presence of aerial pipeline infrastructure could result in some visual disturbance to recreational users. Visual disturbance will be limited to the surrounding environments at individual watercourse crossings. Vegetation is expected to shield most views of the proposed change from nearby roads. There would be a permanent visual change to river/creek areas from the pipeline (i.e., aerial crossings), which anglers/users may find noticeable. The effects of change to visual quality are discussed in Section 16.3.1.8 below. With the mitigation measures, the Project will be constructed to limit possible disturbance and disruption to recreational uses and users.

During the decommissioning phase, the Project footprint may be restored to a condition that could provide opportunities for other land uses, such as recreation. Decommissioning activities may cause disruption (e.g., through sensory and/or nuisance effects) but may ultimately restore access for recreational activities. It is the intent that decommissioning activities will promote the reestablishment of natural vegetation communities (i.e., natural appearance) along the Project footprint.

#### **16.3.1.4 Change in Forestry Activity**

Clearing and construction associated with the Eastern Route Alternative will lead to loss of area for forest harvesting potential associated with consolidated cutblocks and harvesting authority tenure areas (see Table 16.9). The Project footprint would affect 519 ha of consolidated cutblock tenure area, representing 7.0% of the total consolidated cutblock area in the LAA (0.3% in the RAA). The Project footprint will affect 1,644 ha of harvest authority tenure areas, representing 5.9% of the total harvest authority tenure areas (active and pending) in the LAA (0.3% in the RAA).

The Project footprint overlaps 18 ha of TFL #48 (Canadian Forest Products Ltd.), which is less than 0.1% of the TFL's total areal extent of 643,239 ha. The AAC for TFL #48 is 900,000 m<sup>3</sup>/year. The Project footprint overlaps less than 0.1% of two TSAs; it overlaps 1,247 ha of Dawson Creek #41 TSA and 2,163 ha of MacKenzie #16 TSA. The Dawson Creek TSA covers 2.3 million ha. The AAC is 1,841,124 m<sup>3</sup>/year. The Mackenzie TSA covers 6.4 million ha. The corresponding AAC is 2.39 million m<sup>3</sup>/year.

#### **16.3.1.5 Change in Industrial Land Uses**

The Project footprint overlaps with 69 mineral tenures (i.e., mineral and coal) for a total area of 1,071 ha. The LAA contains 130 mineral tenures (i.e., mineral, coal) for 21,767 ha. The Mount Milligan Mine and associated mining lease are located within the RAA. Petroleum title encompassed within the Project footprint totals 2,526 ha. The LAA encompasses 52,562 ha of petroleum title (see Table 16.9). Potentially affected mineral tenure holders will be contacted and engaged with by PRGT.



#### 16.3.1.6 Change in Guide Outfitting and Commercial Trapping Activities

The Eastern Route Alternative will result in the loss of area for hunting/guiding and trapping tenure holders due to vegetation clearing in the Project footprint. The loss of area will vary for each of the affected guiding/outfitting and trapping areas (see Table 16.9). The percentage of guiding/outfitting areas overlapping with the LAA and RAA ranged from 4.8% to 0.2% each. Trapping areas overlapping with the LAA and RAA also ranged from 4.8% to 0.2% respectively. One Forest Recreation Site (<0.1 ha) and 11 Special Use Permit areas (covering 11 ha) are potentially affected by the Project footprint.

The construction phase (i.e., clearing) for the Eastern Route Alternative will result in an incremental change to vegetation and plant communities as compared to the Application (PRGT 2014a) given applicable mitigation measures (see Section 16.3.1). Removal of merchantable timber from the Project footprint will be subject to sorting timber through permitting under the *Forest Act* (1996) with BC Ministry of Forests (FOR) in forest tenure areas.

Clearing and construction activities may result in temporary sensory disturbance (e.g., construction noise) displacing big game or furbearers and reducing harvest success rates in the LAA, and resulting in hunting/trapping pressure on ungulates, bears, and furbearers from new access to ungulate, bear, and furbearer habitats. The experience quality for hunters/outfitters and trappers using a certain area could also be affected by the proposed change. The presence of a construction workforce for a short period of time, in any one location, is not expected to lead to increased competition for resources that are of interest to resource harvesters in the LAA.

During operation, sensory disturbance effects will continue because of the presence of the proposed infrastructure causing continued effects on harvesting areas. Hunters/outfitters, and trappers may experience adverse effects related to the availability of big game or furbearer species of interest in the LAA (e.g., habitat avoidance due to sensory disturbance), and sensory disturbance to land and resource users related to infrastructure presence. Additional access provided by the Project footprint may result in increased trapping success for trappers (see 12.3.1.3 Change in Mortality Risk in the Wildlife VC assessment).

There is potential for an increase in access along the Project footprint associated with the Eastern Route Alternative. Access restrictions are expected to be in place for the period of construction and will extend into the operation phase. Traffic control measures will be in place to address logistics to lessen effects during construction and address effects during operation. An existing Access Management Plan and Traffic Management Plan (PRGT 2014a) will be implemented to address access concerns.

Decommissioning will allow for revegetation of the entire Project footprint with native plant species. Measures outlined in the existing Invasive Species and Vegetation Management Plan will be followed (see Section 16.3.1). In addition, during decommissioning, no new residual effects on areas or access for hunting, outfitting, trapping, or fishing are expected. Decommissioning activities will require a smaller workforce resulting in less pressure on resources.



### **16.3.1.7 Change in Agriculture**

No ALR lands are affected by the Project footprint. Only 4 ha of ALR lands are overlapped by the LAA. Approximately 510 ha of range tenure areas are overlapped by the Project footprint; the LAA overlaps 9,912 ha of range tenure areas. PRGT will work with potentially affected landowners to allow for the removal of hay prior to construction.

### **16.3.1.8 Change in Visual Quality**

Clearing and maintenance of the Project footprint will alter the visual condition in some areas, which may be of concern to viewers. The Project footprint does not overlap with the most sensitive visual quality resources (i.e., VSUs with an EVQO of “Preservation”). However, there will be clearing of 555 ha of VSUs with a Type Two Visual Sensitivity Class (i.e., EVQO of “Retention” and “Partial Retention”). On average, Project clearing will result in a 4% alteration of Type Two VSUs. Most of the VSUs transected by the Eastern Route Alternative occur along the part of the Project footprint that runs adjacent to Highway 97 (see Appendix I, Figure I.17). Along this part of the Project footprint, much of the alignment will run parallel to existing pipeline ROWs, thus while the Project increases the area of disturbance, for much of its length it will not introduce a new type of visual change to the landscape.

Changes to visual quality will be most apparent at locations where the Project footprint crosses roadways, or other publicly used areas. Change will be most visible during and immediately after construction when land clearing from pipeline construction will visually contrast adjacent areas. With time, these areas will revegetate, reducing the visual contrast between the Project footprint and adjacent vegetated areas. In many areas, where the Project alignment runs adjacent to Highway 97, vegetation will screen the Project’s visibility from the highway.

Of the eleven identified viewpoints in the LAA, only three are within the Project’s viewshed: Bijoux Falls Provincial Park, Kennedy Lake Recreation Site, and Robinson Lake Recreation Site (see Appendix I, Figure I.16). At Bijoux Falls Provincial Park, the Project footprint transits along the north side of the park, approximately 400 m from the park’s day use area. Due to topographical and vegetation screening, the Eastern Route Alternative will not be visible from the day use area, which is located near Highway 97. The Kennedy Lake Recreation Site is located within a large, previously logged area. From this viewpoint, the Eastern Route Alternative may be visible as a widening of an existing pipeline ROW that transects a hilly area, located about 2.5 km to the north. From the Robinson Lake Recreation Site, part of the Eastern Route Alternative may be visible as it transects a hilly area to the south of Robinson Lake. However, at this location, the Project footprint passes through a cut-block, and thus it is not adding to the visible alteration of the landscape.

At potential aerial crossings, the Project will add structures that may be visible from nearby roadways, as well as by recreational users of the Pine River at the crossing locations. While these structures visibly contrast with surrounding natural scenery, their visible impact is lessened by their small size, cantilever construction, low height (i.e., low visual prominence), and by vegetation screening.



### **16.3.2 Residual Effects**

No new residual effects to land and resource use are expected due to the changes proposed in this Amendment. Residual effects to land and resource use include a change to parks and protected areas, change to forestry, change to mining, change to other activities, and change to visual quality.

The Eastern Route Alternative is anticipated to interact with land and resource use through changes in access to lands and resources because of construction, operation, and decommissioning of the pipeline and associated infrastructure. The assessment of change in land use plans and other designated areas considered whether proposed changes would be incompatible with land use plans and zoning. Residual effects to land use may result from disturbance and nuisance effects (e.g., construction noise, dust, disruption of access). Decommissioning activities have the potential to disrupt land use but may ultimately result in the restoration of land use. The assessment also considered how activities associated with the Eastern Route Alternative may affect the viability of, restrict access to, or result in a direct loss of resources or result in increased access. Construction and operation could lead to alteration of local resource use areas, as well as disruption to resource activities (i.e., forestry, mining, oil and gas). Disturbance effects on resource use considers the reduction in wildlife harvesting success because of construction activities (e.g., noise) on the resource (e.g., guiding and trapping). Decommissioning activities could also alter local resource use activities. The Eastern Route Alternative may affect the viability of, restrict access to, or cause loss of area used for, recreation. The Eastern Route Alternative may lead to direct loss of, or loss of access to, recreation areas and may disrupt recreational enjoyment due to disturbance (e.g., noise). Decommissioning activities may also disrupt or intrude on recreation activities but may ultimately restore previous use. The assessment of change in visual quality considers whether activities associated with proposed route alternative could potentially disrupt the visual landscape and interfere with scenic views. Activities associated with decommissioning could also disrupt or interfere with the visual landscape/scenic views but may ultimately lead to the restoration of the visual landscape/scenic views.

### **16.3.3 Changes to Characterization of Residual Effects**

The EAO Assessment Report (EAO 2014a) concluded that project effects on land and resource use and visual quality are predicted to be not significant. Residual effects of the Amendment on land and resource use and visual quality are predicted to be of similar magnitude to those of the previously approved alignment, in consideration of construction duration and the operational extent of maintenance activities. Characterization of residual effects for the Eastern Route Amendment remains unchanged from the EAO Assessment Report (EAO 2014a). Changes in characterization of residual effects are summarized in Table 16.10.



**Table 16.10 Changes to EAO Assessment Report Characterization of Residual Effects – Land and Resource Use**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Context	<i>Land and Resource Use - All: Low to moderate sensitivity and resiliency</i>	<i>Many parts of the local and regional study areas have a low level of sensitivity to disturbances to land and resource uses, with a history of resource development activity. There are some localized areas with higher sensitivity including scenic areas, recreation areas, and fishing areas. Most of the land and resource uses in the study areas have a moderate level of resiliency.</i>	No change
	<i>Visual Quality: Moderate Sensitivity</i>	<i>Visual Sensitivity Classes of the visual sensitivity units affected by the Project range between 2 (very important) and 4 (moderately important).</i>	No change
Magnitude	<b>Park:</b> Low to moderate	<i>A Park Boundary Adjustment would be required to remove 12 km from the Park adjacent to the Nisga'a Highway.</i>	No change
	<b>Forestry:</b> Low to moderate	<i>The potential Project effects on alteration of forestry operations in tenured areas during construction are considered to be low to moderate in magnitude due to access constraints and alteration of harvesting plans. The potential long-term effects on timber supply are considered low in magnitude as less than 1% of the timber harvesting land base of each major license is expected to be unavailable for forestry for the duration of the Project. Disturbance to some Permanent Sample Plots is likely, resulting in long term effects of low to moderate magnitude.</i>	
	<b>Mining:</b> Low to moderate	<i>Project construction may disrupt access to aggregate pits, Mt. Milligan Mine and a specific mineral prospect (Decar nickel properties) that is under active development, as well as many other mineral and coal tenures, resulting in effects of low to moderate magnitude.</i>	
	<b>Other Activities:</b> Low to Moderate	<i>During Project construction, disruption of other activities is considered to be moderate in magnitude due to noise, access restrictions and disruptions to visual aesthetics. The potential effects from increased access along the proposed route (mainly during construction but some increased access during operations) are considered to be low in magnitude after mitigation. After compensation for direct disturbances, residual effects from Project operations are expected to be of low magnitude, and related noise and other long-term inconveniences.</i>	

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Assessment Report for the Prince Rupert Gas Transmission Project (EAO 2014a)





**Prince Rupert Gas Transmission Project:**  
**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 16 Land and Resource Use**  
August 2024

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Magnitude (cont'd)</i>	<i>Visual Quality: Moderate</i>	<i>The magnitude of effects on visual quality (change in visual quality) is expected to be moderate as the cleared Project footprint would likely be visible as an unnatural disturbance in many scenic areas, and inconsistent with established VQOs in many of the more visually sensitive areas. However, it is acknowledged that VQOs were established in relation to forestry activity and do not consider the design constraints of oil and gas projects.</i>	No change
<i>Extent</i>	<i>Land and Resource Use: Project footprint to Regional</i>	<i>Extent would range between effects limited to Project footprint (alienation of specific parcel of agricultural land, timber clearing, etc.) and more regional effects where disruptions during construction and the existence of the ROW could affect activity and/or enjoyment of land and resources (e.g., recreational uses, guide outfitting).</i>	
	<i>Visual Quality: Regional</i>	<i>Regional effects are expected where disruptions during construction and the existence of the ROW could affect activity and/or enjoyment of land and resources.</i>	
<i>Duration</i>	<i>All: Short term to long term</i>	<i>Land and Resource Use: The duration of adverse effects from Project construction would generally be short term, but the duration of adverse effects from the existence of the ROW and compressor and metering stations would persist for the life of the Project (e.g., recreational trails, alienation of agricultural lands, alienation of THLB disruptions to designated areas and scenic viewing in Nisga'a Memorial Lava Bed Park).  Visual effects from Project construction would be most pronounced in the short term, diminishing as reclamation/regeneration proceeds on much of the construction footprint. Adverse effects from maintenance of the ROW and compressor station would persist for the life of the Project.</i>	No change
<i>Reversibility</i>	<i>Land and Resource Use: Reversible</i>	<i>Activity disturbance effects are expected to be reversible once construction is complete. Operations impacts would be reversible following decommissioning.</i>	No change
	<i>Visual Quality: Reversible</i>	<i>Some of the effects would be reversible in the medium term though reclamation/regeneration, while the remainder would be reversible following Project decommissioning.</i>	



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**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 16 Land and Resource Use**  
August 2024

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Frequency	<i>Land and Resource Use: Occasional to continuous</i>	<i>The adverse effects during construction range between occasional (e.g., noise-related effects on activity) and/or continuous for the length of the construction period. The adverse effects during operations would be continuous (40 years or more).</i>	No change
	<i>Visual Quality: Continuous</i>	<i>Adverse effects would be continuous for 40 or more years although with varying magnitude.</i>	
Likelihood	<i>The likelihood is moderate to high that the adverse effects on land and resource use discussed above would occur during Project construction and during operations.</i> <i>The likelihood is high for visual quality that some degree of adverse effects on land and resource use would occur during Project construction and during operations.</i>		No change
Significance	<i>Considering the above analysis and having regard to the conditions identified in the TOC (which would become legally binding as a condition of an EA Certificate), EAO is satisfied that the proposed Project is not likely to have significant adverse residual effects on land and resource use or visual quality.</i>		-
Confidence	<i>Land and Resource Use: High Confidence – There is a high level of confidence in the likelihood and significance determination.</i> <i>Visual Quality: Moderate to High Confidence – There is a moderate to high level of confidence in validity of assumptions and analysis and effectiveness of proposed mitigation strategies.</i>		No change



### **16.3.4 Cumulative Effects Assessment**

Cumulative effects for land and resource use are expected to be the same or lower with this Amendment than for the approved Project, particularly given that large portions of the Project footprint parallel existing linear disturbances (e.g., Highway 97). A further assessment of potential cumulative environmental effects to land and resource use, including visual quality, is not conducted as the Eastern Route Alternative does not change the characterization of residual effects presented in the Application (PRGT 2014a) or the EAO Assessment Report (EAO 2014a). Measures to mitigate potential effects will be in place through continued implementation of existing management plans (i.e. CEMP, Invasive Plant Species and Vegetation Management Plan, Access Management Plan (PRGT 2014a), Traffic Management Plan (PRGT 2014a)) and industry standard mitigation measures. Past and present effects of development on land and resource use, including visual quality, were assessed as part of the baseline conditions (refer to Section 16.1.3).

### **16.3.5 Risks and Data Uncertainty**

The level of confidence in the predictions for residual effects on land and resource use, including visual quality, is moderate to high. The prediction confidence is based on the information collected as part of the desktop baseline data and understanding of current baseline conditions, supported by GIS data analyses, understanding of construction and operation activities, the known effectiveness of mitigation measures, and experience of the assessment team. While some desktop data were limited in terms of availability (e.g., intensity of recreational usage) resulting in a moderate to high level of confidence for predictions of effects to visual quality, the effects mechanisms are well-understood. Many of the effects analyzed were supported through quantification. Many of the mitigation measures identified in Section 16.3.1 are standard practice and have been implemented in previous linear pipeline transmission projects.



## 17 Heritage and Archaeological Resources

### 17.1 Baseline Conditions

Heritage and archaeological resources were identified as a VC in the Application Information Requirements (PRGT 2014b) for the 2014 EAC Application (Application; PRGT 2014a) due to anticipated project interactions with heritage and archaeological sites, and in recognition of their cultural, scientific, and public value. This Amendment includes an updated description of existing conditions which includes data that has become available since the original baseline studies were completed, including the results of any other relevant archaeological assessments from other projects.

- The existing conditions for heritage and archaeological resources VC were determined through a desktop review of existing data within the LAA. The heritage and archaeological resources LAA is defined as the Project footprint. A Project-specific archaeological field program is anticipated in 2025. The desktop review included an examination of ortho-imagery, terrain attributes, bedrock geology, and other biophysical data available via ArcGIS Earth, iMapBC (Government of British Columbia 2024a), historic trail maps, geological maps, and the following data sources:
  - A keyword search of British Columbia's Provincial Archaeological Report Library (PARL; Government of British Columbia 2024b), which includes digital reports on previous archaeological work undertaking within and near the LAA.
  - The Remote Access to Archaeological Data (RAAD; Government of British Columbia 2024c) application - a database maintained by the Archaeology Branch that includes recorded archaeological site data and information on the perceived potential of the affected lands to contain previously unrecorded heritage resource sites.
  - Locations of previously recorded fossil sites, as documented in the Fossil Occurrence Database (Government of British Columbia 2024d).
  - Archaeological Overview Assessment (AOA) report (Rohdin et al. 2014) completed for PRGT.
  - Final AIA reports completed for the pre-construction phases of PRGT under *Heritage Conservation Act* (HCA) Heritage Inspection Permits (HIPs) 2013-0258 (Streeter et al. 2015) and 2015-0159 (Hossack and Streeter 2018).
  - Available Indigenous traditional knowledge (TK) considered as part of the Application (PRGT 2014a).
  - Archaeological Information Forms (AIFs) completed for the BCER.

Similar background information was used to prepare the previous desktop AOA which summarized baseline heritage and archaeological resource conditions for the 2014 PRGT footprint (Rohdin et al. 2014). The results of the AOA were supplemented by the results of a Project-specific AIA field program addressing the 2014 to 2017 Project footprint under HCA Heritage Inspection Permits 2013-0258 (Streeter et al. 2015) and 2015-0159 (Hossack and Streeter 2018).



A small portion of the LAA was assessed by the previous AOA and AIA for PRGT between 2013 and 2017. The rest of the LAA has not been subject to previous archaeological study and will be assessed through an AOA and/or an AIA carried out under an HCA HIP.

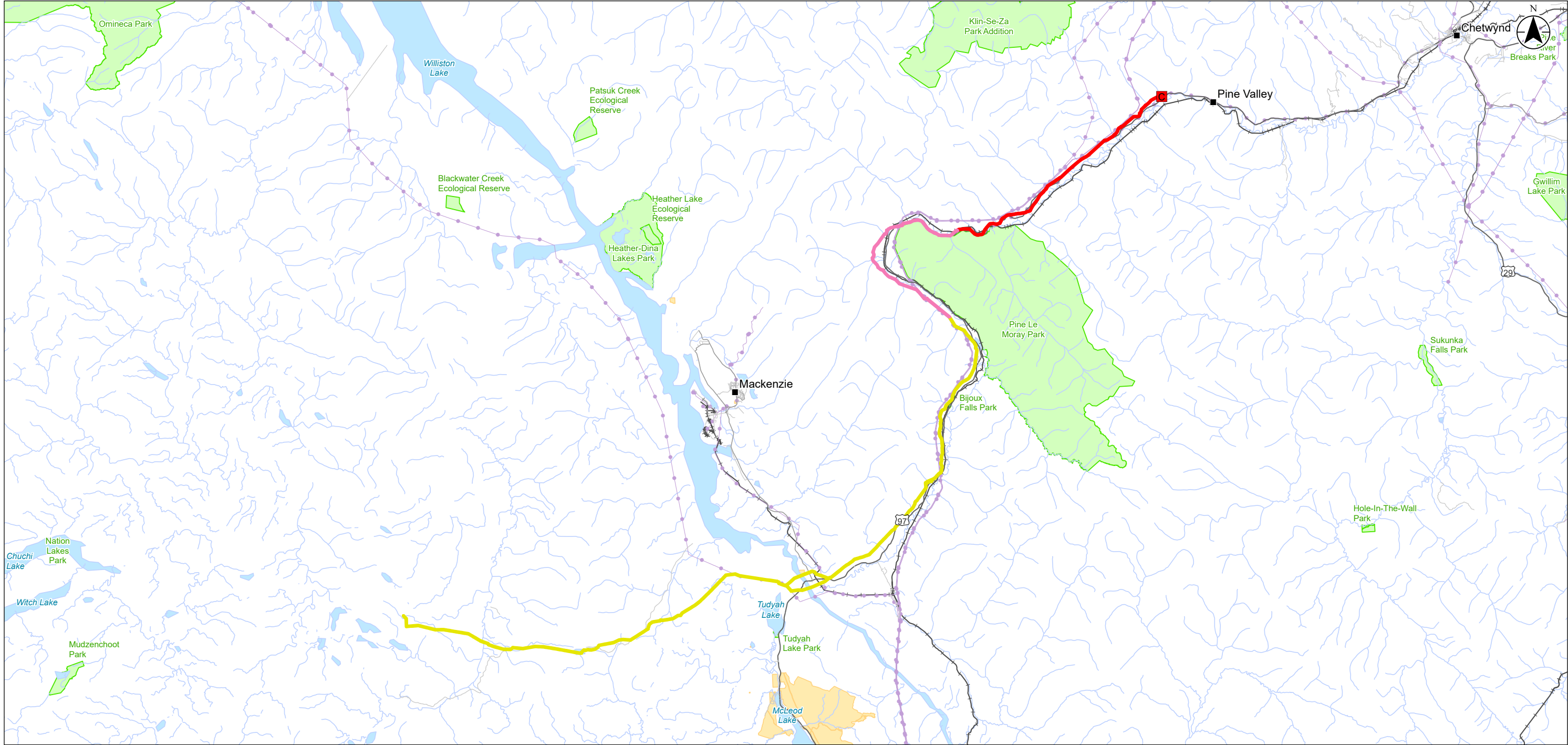
The existing conditions for heritage and archaeological resources are similar to those provided in Heritage and Archaeological Resources, Section 26.3 of the Application (PRGT 2014a). A review of the RAAD application (Government of British Columbia 2024c) on April 9, 2024 identified no recorded archaeological sites within 200 m of the LAA.

A Fossil Impact Assessment (FIA) has not been undertaken for the Project as this level of study was not required for the Application (PRGT 2014a). Rather the Application relied on a desktop review to assess potential effects to paleontological resources. The Application (PRGT 2014a) identified that the pipeline route crossed two main areas of high palaeontological potential. One of the areas of high potential is outside of the Eastern Route Alternative, occurring on a different segment of the Project. The second area of high potential was identified along the original route, and the Eastern Route Alternative crosses equivalent strata that have the same anticipated high palaeontological potential as the original route (Figure 17.1). This area of high palaeontological potential is where the Eastern Route Alternative crosses bedrock of Triassic to Cretaceous age, extending west from the initiation point to the Solitude Mountain area. The bedrock along the remainder of the Eastern Route Alternative has nil to medium palaeontological potential. While no recorded fossil sites are listed within the Eastern Route Alternative, 15 sites are listed within 400 m of the Project footprint, and 39 fossil sites are listed within 5 km of the Project footprint (Government of British Columbia 2024d). The number of known fossil sites around the Project has increased because a provincial site database is now available (Government of British Columbia 2024d) and the Eastern Route Alternative runs along areas of existing disturbance that have provided easy access for research palaeontologists.



Revised: 2024-04-17 By: tqulichini

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**Notes**  
1. Coordinate System: NAD 1983 BC Environment Albers  
2. Data Sources: DataBC, Government of British Columbia;  
Natural Resources Canada  
3. Watercourse linework is from the Freshwater Atlas 1:50K  
dataset from DataBC

- City, Town, Village or District Municipality
- Highway
- Road
- Local Street
- Railway
- Transmission Line
- Watercourse

- First Nations Reserve
- Parks, Protected Areas, Ecological Reserves, and Conservancies
- Waterbody

- Compressor Station
- Eastern Route Alternative**
  - High Palaeontological Potential
  - Medium Palaeontological Potential
  - Nil to Low Palaeontological Potential

0 10 20 km  
1:500,000 (at original document size of 11x17)



Project Location Prince Rupert  
British Columbia  
Project Number 123514678  
Prepared by TQULICHINI on 20240411  
Requested by LBOHACH on 20240410  
Reviewed by SLEMAY on 20240411  
Client/Project/Report

Prince Rupert Gas Transmission Ltd.  
Archaeology  
Figure No.  
**17.1**  
Title  
**KEY AREAS OF PALAEOLOGICAL  
POTENTIAL ALONG THE EASTERN  
ROUTE ALTERNATIVE**

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## 17.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage, with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to heritage and archaeological resources. This feedback has been considered and summarized in Table 17.1 and has been integrated into the heritage and archaeological resources effects assessment.

**Table 17.1 Summary of Engagement Feedback Related to Heritage and Archaeological Resources**

Comment	Sources	PRGT Response
Doig River First Nation has previously noted that the Pine River valley is associated with trails that are used to access harvesting areas. Pine River is intersected and paralleled by the Eastern Route Alternative.	NGTL 2013; TCSI 2013	<ul style="list-style-type: none"> <li>An AOA and/or an AIA will be conducted for portions of Pine River valley trails that intersects the Eastern Route Alternative not covered by a previously completed AIA. The Project welcomes any information on traditional use trails that Doig River First Nation may wish to provide.</li> </ul>
Doig River First Nation has previously stated that there are habitation areas near John Hart Highway (intersected and paralleled by the Eastern Route Alternative) and Tudyah Lake and Windy Point Lake (within the Indigenous Interests LAA).	Firelight 2014a	<ul style="list-style-type: none"> <li>An AOA and/or an AIA will be conducted for all portions of the revised Project footprint not covered by a previously completed AIA. The Project welcomes any more detailed information that Doig River First Nation may wish to provide for these habitation areas.</li> </ul>
Halfway River First Nation identified a water route following Williston Lake west of Finally continuing south to Kerry Lake. This travelway is crossed by the Eastern Route Alternative.	DMCS and HRFN 2014	<ul style="list-style-type: none"> <li>An AOA and/or an AIA will be conducted for all portions of the revised Project footprint not covered by a previously completed AIA. The Project welcomes any more detailed information that Halfway River First Nation may wish to provide for this water route.</li> </ul>
Halfway River First Nation previously expressed concerns that the Project and other developments will affect campsites, habitation areas, ceremonial and sacred areas, and burial sites.	Fasken Martineau 2013b	<ul style="list-style-type: none"> <li>It is a goal of the archaeological assessment process to identify and provide management recommendations for HCA-protected archaeological sites within the Project footprint. These include campsites and habitation sites predating 1846 and all burials. Consideration is also given to ceremonial and sacred sites which may not include physical evidence of past activities, as determined through engagement with the affected Indigenous Nations.</li> </ul>



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**Application for Eastern Route Alternative Amendment to EAC #14-06**  
**Section 17 Heritage and Archaeological Resources**  
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Comment	Sources	PRGT Response
McLeod Lake Indian Band previously reported that the southern end of the Williston Reservoir, near the confluence of the Pack and Parsnip rivers, is a travel route that precedes the construction of the WAC Bennett Dam. The southern end of the Williston Reservoir, specifically the Pack and Parsnip rivers, are intersected by the Eastern Route Alternative.	Firelight 2015	<ul style="list-style-type: none"> <li>An AOA and/or an AIA will be conducted for all portions of the revised Project footprint not covered by a previously completed AIA. The Project welcomes any more detailed information that Halfway River First Nation may wish to provide for this water route.</li> </ul>
Nak'azdli Whut'en previously expressed concerns regarding the identification of culturally significant sites, citing reasons of cultural practices, historic destruction, scavenging, or potential site desecration. A general area of concern is in the vicinity of Phillip Creek, which is intersected by the Eastern Route Alternative.	CTSC 2014a, BCEAO 2014	<ul style="list-style-type: none"> <li>It is a goal of the archaeological assessment process to identify and provide management recommendations for HCA-protected archaeological sites within the Project footprint. These include campsites and habitation sites predating 1846 and all burials. Consideration is also given to culturally significant, ceremonial and sacred sites which may not include physical evidence of past activities, as determined through engagement with the affected Indigenous Groups.</li> <li>An AOA and/or an AIA will be conducted for all portions of the revised Project footprint not covered by a previously completed AIA. The Project welcomes any more detailed information that Nak'azdli Whut'en may wish to provide for this area.</li> </ul>
Saulteau First Nations reported that there are habitation areas near Pine River, which is intersected and paralleled by the Eastern Route Alternative.	Firelight 2014b	<ul style="list-style-type: none"> <li>An AOA and/or an AIA will be conducted for all portions of the revised Project footprint not covered by a previously completed AIA. The Project welcomes any more detailed information that Saulteau First Nations may wish to provide for these habitation areas.</li> </ul>





## 17.3 Amendment Effects Assessment

### 17.3.1 Potential Effects and Mitigation Measures

The potential effects and mitigation measures for heritage and archaeological resources are the same as provided in Heritage and Archaeological Resources, Section 26.4 of the Application (PRGT 2014a). A summary of potential effects and measurable parameters for heritage and archaeological resources is provided in Table 17.2.

**Table 17.2 Potential Effects and Measurable Parameters for Heritage and Archaeological Resources**

Potential Effect	Measurable Parameter
Disturbance of archaeological sites	Number of disturbed or destroyed sites
Hindering or increasing access to archaeological sites	Number of sites with changed access
Disturbance of historical sites	Number of disturbed or destroyed sites
Hindering or increasing access to historical sites	Number of sites with changed access
Disturbance of palaeontological sites	Number of disturbed or destroyed known or high potential sites
Other applicable considerations raised by Indigenous groups	These are incorporated in the measurable parameters for the preceding effects

Avoidance of archaeological and historical sites is the preferred management approach. Where avoidance of sites is not feasible, mitigation would be achieved following site management procedures outlined in the Heritage Resources Management Plan (PRGT 2016) and would meet or exceed standards defined by the Archaeology Branch and BCER.

Mitigation measures for palaeontological resources follow EAO's direction on the Application (PRGT 2014a) and established chance find protocols. The EAO Assessment Report (EAO 2014a) stated that the proponent is required to provide a professional palaeontologist to monitor construction activities in zones considered to have high potential (EAO 2014a, Section 8.1.3). Following the definitions used in the Application (PRGT 2014a), lands with high palaeontological potential extend from the initiation point of the Eastern Route Alternative to the Solitude Mountain area (Figure 17.1). Disturbance of bedrock in this area will be monitored by a professional palaeontologist.

TK information with respect to heritage and archaeological resources provided by Indigenous Nations to PRGT was considered but did not change the results of the assessment. An overview of identified issues concerning disturbance or changed access to historical and archaeological sites are included in this Amendment. Where specific site locations are identified in the Project footprint, these will be targeted and assessed as part of the AOA and/or AIA.



## 17.3.2 Residual Effects

Following the procedures outlined in the Heritage or Palaeontological Resources Discovery Contingency Plan, residual effects on heritage and archaeological resources are the same as provided in the Heritage and Archaeological Resources, Section 26.5.3 of the Application (PRGT 2014a).

## 17.3.3 Changes to Characterization of Residual Effects

The assessment of residual effects on heritage and archaeological resources is the same as that provided in the Heritage and Archaeological Resources, Section 26.5.1 of the Application (PRGT 2014a). While the characterization of residual effects in EAO Assessment Report (Table 17.3) focused on archaeological sites and resources, the characterization of residual effects would be the same for heritage resources, including palaeontological resources.

**Table 17.3 Changes to EAO Assessment Report Characterization of Residual Effects – Heritage and Archaeological Resources**

Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
<i>Context</i>	<i>Disturbance varies</i>	<i>Heritage resources are protected under the HCA. Mitigation measures for potentially affected sites would be determined in consultation with the Archaeology and Heritage Branch, and may take the form of avoidance, systematic data recovery, and/or construction monitoring to avoid or reduce the loss of scientific data resulting from site destruction.</i>	No change
<i>Magnitude</i>	<i>Low to Moderate</i>	<i>Generally impacts would be avoided or largely mitigated (and therefore of low magnitude), but there is potential to affect portions of archaeological sites of moderate or high value. However, information collection should generally mitigate these impacts to be relatively low.</i>	No change
<i>Extent</i>	<i>Project Footprint</i>	<i>Generally limited to portions of the Project footprint that are having direct ground disturbance.</i>	No change
<i>Duration</i>	<i>Permanent</i>	<i>Any archaeological values not collected would likely be permanently destroyed.</i>	No change
<i>Reversibility</i>	<i>Irreversible</i>	<i>Any permanent losses would be irreversible.</i>	No change
<i>Frequency</i>	<i>Once</i>	<i>Disturbance to archaeological sites would occur only one time (i.e., during construction ground disturbance).</i>	No change
<i>Likelihood</i>	<i>There is a moderate to high likelihood that some archaeological resources would be adversely affected.</i>		No change

<sup>1</sup> The text in italics was copied from the Environmental Assessment Office Report for the Prince Rupert Gas Transmission Project (EAO 2014a)



Characterization of Residual Effects from the 2014 EAO Assessment Report <sup>1</sup>			Changes to the Residual Effects Characterization
Criteria	Assessment Rating	Rationale	
Significance	<p><i>EAO notes that heritage resources are protected under the HCA and the mitigation measures for potentially affected sites would be determined in consultation with the Archaeology and Heritage Branch and OGC.</i></p> <p><i>Considering the above analysis and having regard to the conditions identified in the TOC (which would become legally binding as a condition of an EA Certificate), EAO is satisfied that the proposed Project is not likely to have significant adverse residual archaeological effects.</i></p>		-
Confidence	<p><i>High Confidence – Limitations on the effects assessment include the difficulty to accurately identify the presence of archaeological resources within the Project footprint. The AIA will increase the confidence in the assessment, provided the results are accepted by the Archaeology and Heritage Branch.</i></p> <p><i>Confidence in the overall effects assessment is high, given that provincially required mitigation programs would be conducted and would be based on input from Aboriginal communities and regulatory bodies.</i></p>		No change

### 17.3.4 Cumulative Effects Assessment

The characterization of residual effects to heritage resources has not changed relative to the characterization provided in the EAO Assessment Report (2014a), therefore the Project's contribution to cumulative effects is consistent with the previous assessment. The assessment of potential cumulative effects on heritage and archaeological resources is the same as that provided in the Heritage and Archaeological Resources Section 26.6 of the Application (PRGT 2014a). Given the residual effects on heritage and archaeological resources identified in this Amendment, no further cumulative assessment is necessary.

### 17.3.5 Risks and Data Uncertainty

The level of uncertainty for predicted effects on heritage and archaeological resources is currently considered to be low. The Eastern Route Alternative includes areas not previously subject to AOA, AIA or FIA, and if left unaddressed these would result in a high level of uncertainty and associated risk. However, an AOA and/or an AIA will be conducted under an HCA HIP for all portions of the revised Project footprint not covered by a previously completed AIA. By following site avoidance and/or regulated site mitigation measures recommended by the AIA and presented within the Heritage Resources Management Plan (PRGT 2016, Appendix F-8) and Heritage or Palaeontological Resources Discovery Contingency Plan (PRGT 2016, Appendix F-8, Section 2.4), the level of uncertainty and associated risk for predicted effects on heritage and archaeological resources will remain low.



## 18 Human Health

Human health was identified as a VC in the Application Information Requirements (PRGT 2014b) for the Application (PRGT 2014a) due to anticipated project interactions with human health. EAO concluded in their Assessment Report (EAO 2014a) that the proposed Project would not likely result in any residual adverse effects on human health. The Amendment includes a new compressor station location, so this section describes the conservatism of the original assessment and evaluates any potential for changes to the EAO's conclusions. The term "human health" in the context of the environmental assessment refers to the biophysical and physiological health related to a person's exposure to environmental pollutant or chemical contaminants. This definition of "human health" is consistent with the assessment methods and guidance for a Human Health Risk Assessment (HHRA) (BC Ministry of Health 2022), which is designed to characterize human health risk from exposure to environmental pollutants. The assessment of human health is based on the principles of chemistry, biology, biochemistry, and toxicology. Information presented in this section is consistent with the Application (PRGT 2014a) and updated where necessary and relevant. The definition of the human health LAA and RAA is the same as presented in the Application (PRGT 2014a), and applied to this Amendment.

### 18.1 Baseline Conditions

Existing conditions for the Amendment are supported by human health information from the Application. Human health in the context of this assessment is defined as the biophysical health of people from their exposure to environmental pollutants in the air, water, soil, and food. The Human Health VC (Section 29.0) of the Application (PRGT 2014a) had determined that the potential effects to human health were based on Project-related changes to air quality and marine country food quality. Therefore, existing conditions for human health are based on existing air quality and existing marine country food quality. Given that there are no changes proposed to marine components of the Project as part of the Amendment, the focus of this section will be baseline air quality conditions.

Baseline air quality data was collected from three provincial air quality monitoring stations near the new compressor station location (Peace Valley Attachie Flat Upper Terrace station, Willow Flats Compressor Station 2, Pine River Hasler station) (see Section 5.1).

Table 18.1 shows the baseline concentration of SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> in the region encompassing the new compressor station. Concentrations of NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> near the new compressor station are below the British Columbia AAQO at baseline, indicating that the region has good air quality (Table 18.1). The baseline concentration of PM<sub>2.5</sub> was the greatest relative to the British Columbia AAQO, and generally resulted from seasonal forest fires in the region and not from industrial or other anthropogenic activities.



**Table 18.1 Baseline Air Quality for the Amended Compressor Station Location**

Criteria Air Contaminant	Averaging Period	2017 BC Ambient Air Quality Objective ( $\mu\text{g}/\text{m}^3$ )	Baseline Concentration ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	1-hour*	113	37.0
	Annual	32	5.1
SO <sub>2</sub>	1-hour**	183	10.3
	Annual	13	0.8
PM <sub>2.5</sub>	24-hour	25	18.6
	Annual	8	4.5
PM <sub>10</sub>	24-hour	50	26.0

Notes:

\* Based on the 98<sup>th</sup> percentile of the 1-hour daily maximum over three consecutive years.

\*\* Based on the 99<sup>th</sup> percentile of the 1-hour daily maximum over three consecutive years.

Although the Application had assessed inhalation risk associated with hazardous air pollutants (HAPs) and polycyclic aromatic hydrocarbons (PAHs), there is no baseline air quality information for HAPs and PAHs. Provincial air quality monitoring stations do not measure these pollutants. Generally, HAPs and PAHs are monitored in real-time to address safety hazards in indoor occupational settings. In these scenarios, an active source of emissions could result in concentrations building up to dangerous levels within an enclosed space. In ambient rural environments, it is reasonable to assume that the baseline concentration of HAPs and PAHs is negligible, and by extension the baseline health risks from exposure to HAPs and PAHs are also negligible. This assumption was applied to all compressor station locations in the original Application, and it is also applied for the Amendment.

## 18.2 Influence of Engagement and Consultation

PRGT has engaged, and continues to engage with Indigenous Nations to discuss the Project and the proposed amendments, including the Eastern Route Alternative Amendment. Since filing the Application, Indigenous Nations have shared interests and concerns through the Project-specific engagement program, including Project-specific TLU studies related to human health. This feedback has been considered and summarized in Table 18.2 and has been integrated into the human health effects assessment.



**Table 18.2 Summary of Engagement Feedback Related to Human Health**

Comment	Sources	PRGT Response
McLeod Lake Indian Band expressed concerns regarding the chemical contamination of berries and the resulting adverse health effects.	NGTL 2015c; Firelight 2015	PRGT will implement mitigation for traditional use plants in the CEMP (PRGT 2016), specifically: <ul style="list-style-type: none"> <li>Restrict the general application of herbicide near traditional use species and rare plant communities. Spot spraying, wicking, mowing or hand-picking are acceptable measures for weed control in these areas.</li> </ul> Traditional and country foods were identified as an indicator in the assessment of potential effects on human health in the Application (PRGT 2014a). The changes in pipeline routing and compressor station location for the Amendment do not change the conclusion that the Project will have a negligible magnitude effect on human health.
Saulteau First Nations previously expressed concerns about the health impacts of eating fish affected by industrial contamination.	Sunderman and Lions Gate 2013	Traditional and country foods were identified as an indicator in the assessment of potential effects on human health in the Application (PRGT 2014a). The changes in pipeline routing and compressor station location for the Amendment do not change the conclusion that the Project will have a negligible magnitude effect on human health.

## 18.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, additional mitigation measures (to the 2014 EAC Application), anticipated residual effects, changes to the EAO Assessment Report and Application effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessment, for the human health VC. This assessment is informed by a desktop review of recent air quality emissions data available within the RAA.

### 18.3.1 Potential Effects and Mitigation Measures

The Application considered two potential effects on human health: 1) changes to human health linked to the inhalation exposure of air pollutants, and 2) changes to human health linked to the exposure to chemical contaminants in marine country foods. As this Amendment will not result in any changes to marine components of the Project, the focus of this Amendment is on changes to human health linked to inhalation exposure of air pollutants.



For the land-based portion of the pipeline ROW, the Application determined that there were no operable exposure pathways for adverse human health effects during the construction phase. Construction activities are not anticipated to result in chemical pollutant releases to the surrounding terrestrial or aquatic environment that could adversely affect human health. Construction vehicles, equipment and other construction activities would produce air pollutants, but the magnitude of these emissions is cumulatively lower than that of the operation phase and dispersed along the entire length of the pipeline route. Air pollutants from construction vehicles and construction activities are expected to last from days to several weeks at any specific segment of the pipeline ROW as construction progress along the entire route over 4 years. Since the construction emissions are cumulatively lower than the operations phase, and also dispersed along the entire length of the pipeline ROW, the construction phase scenario was not quantitatively assessed in the Application, and this approach also applies to the Amendment.

During the operation phase of the Project, emissions of air pollutants from the compressor station could disperse in the atmosphere to places where people live or conduct recreational activities. Emissions of air pollutants during the operation phase are also greater than during the construction phase. Therefore, the land-based assessment for human health in the Application focused on the inhalation of air pollutants from each compressor station along the pipeline ROW.

The Amendment includes only land portions of the pipeline ROW and the location of one compressor station. Therefore, the Human Health VC for this Amendment will provide an update of the health risks associated emissions from the new compressor station.

During the operation phase, the new compressor station will use either electric-drive or natural gas turbine engines to produce electricity. To be conservative, this Amendment evaluates potential effects from natural gas turbine engines. These natural gas turbine engines are the dominant emission sources of air pollutants from the Project. Other sources of air pollutants include non-point source emissions such as maintenance vehicles and equipment. Occasional maintenance vehicle exhaust and fugitive dust from roads will have a limited influence on air quality along the pipeline ROW.

One way to assess the human health risk from air pollutants is to identify the locations where people are most likely to be exposed, such as residential homes, schools, hospitals, or daycares. These locations are called human receptor locations, and they can have different levels of health risk depending on how far they are from the source of the emissions. The closer a human receptor location is to the emission source, the higher the concentration of air pollutants and the higher the health risk. Conversely, the farther a human receptor location is from the emission source, the lower the concentration of air pollutants and the lower the health risk.

Another way to assess the human health risk from air pollutants is to use the modelled air concentrations at the fenceline of the emission source, where the concentrations are expected to be the highest. This approach represents an extreme or worst-case scenario because it assumes that people are living right next to the emission source, which is unrealistic. However, this approach can be useful to demonstrate that if there are no unacceptable health risks at the boundary of the emission source, then there would also be no unacceptable health risks at the human receptor locations, because they are all further away from the emission source and would have lower concentrations of air pollutants.



The Application considered the effects of the project on human health by characterizing the worst-case scenario. This means that the health risk was calculated based on the modelled air concentrations at the fenceline of the compressor station, assuming that people are living along the fenceline. This approach provides a conservative estimate of the health risk, because it does not account for the dispersion and dilution of the air pollutants as they travel away from the compressor station. The Assessment Report (EAO 2014a) determined that the proposed Project would not likely result in any residual adverse effects to human health.

### **Mitigation Measures**

Mitigation measures are defined as actions that may be taken by the proponents, provincial and federal health regulators, or the public to reduce the predicted health risks to people. Mitigation measures for human health are recommended when there is an unacceptable level of predicted health risks that requires further action to reduce the risk. Based on this definition and condition for mitigation, there were no human health mitigations identified in the Application, and no new mitigation measures recommended for the Amendment.

There may be mitigation measures from other VC chapters that have a secondary effect of reducing health risks. For example, air quality mitigations such as using low-sulphur fuel or reducing idling of vehicle and equipment are intended to reduce emissions of air pollutants, including air pollutants that are not directly harmful to people (e.g., greenhouse gases). The secondary effect of reducing emissions of air pollutants includes reducing the degree of health risk. These types of mitigation measures are described in the Air Quality VC, as they are intended to meet air quality requirements. These types of mitigations were not identified from any specific human health concern, and therefore not considered a human health mitigation measure.

#### **18.3.1.1 Inhalation Exposure to Non-carcinogenic Air Pollutants**

In the Application, non-carcinogenic risk from the inhalation of criteria air contaminants (CACs) and HAPs were evaluated at the Johnson Creek compressor station. This assessment was over-conservative in that it represents a scenario where people lived along the compressor station fenceline and therefore, exposed to the highest concentration of CACs and HAPs.

The non-carcinogenic effect to human health is quantified using the measurable parameter known as the concentration ratio (CR). The CR is the ratio between the exposure concentration of an air pollutant (also known as a contaminant of potential concern [COPC]) to its respective health-based exposure benchmark or toxicological reference value. Provincial, federal, and international health regulatory agencies develop health-based exposure benchmarks and toxicological reference values for use in human health risk assessments.





When the CR is less than 1.0, the COPC exposure concentration is below the health-based exposure benchmark or toxicological reference value. In this case, the health risk is considered minimal (for COPCs with non-threshold effects) or negligible (for COPCs with threshold effects). A threshold effect is one where a minimum threshold dose or exposure concentration of a COPC must be exceeded for that COPC to exert a toxic effect. A non-threshold effect is when there is no clear threshold dose or exposure concentration that results in a toxic effect, meaning that some degree of risk may be associated with any degree of exposure.

When the CR is greater than or equal to 1.0, it means that the COPC exposure concentration is above the exposure benchmark or toxicological reference value. If the CR is greater than 1.0, there is a potential for adverse health effects and a more detailed characterization of the potential health risk may be required.

In the Application, the greatest predicted risk was from 1-hour NO<sub>2</sub> exposure with a CR of 0.18. This degree of health risk is below the threshold CR of 1.0, indicating a minimal health risk along the compressor station fenceline and therefore, at human receptor locations further away. The CR was even lower for the remaining CACs (SO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>). A similar range of health risk is anticipated for the new compressor station location, meaning that the residual effects to human health are the same for non-carcinogenic effects.

In the Application, the CR for HAPs was low. For short-term exposures, the greatest predicted risk was from 1-hour formaldehyde exposure with a CR of 0.0051. For long-term exposure, the greatest predicted risk was from annual average exposure to acrolein with a CR of 0.0036. This means that the concentration of HAPs is less than 1% of the concentration needed for an unacceptable degree of health risk. This degree of health risk is below the threshold CR of 1.0, indicating a minimal health risk from HAPs along the compressor station fenceline and therefore, at human receptor locations further away. The CR associated with HAPs would need to increase by several order of magnitude before exceeding an unacceptable level of health risk.

The amended location of the compressor station location does not result in a meaningful increase to its emission profile and emission inventory. Therefore, the non-carcinogenic risk for the amended location of the compressor station is expected to be similar to that described in the Application.

#### **18.3.1.2 Inhalation Exposure to Carcinogenic Air Pollutants**

In the Application, cancer risk from the inhalation of carcinogenic HAPs and PAHs were evaluated at the Johnson Creek compressor station. This assessment was protective of a scenario where people lived along the compressor station fenceline and therefore, exposed to the highest concentration carcinogenic air pollutants over a lifetime of 80 years.

This assumption is conservative and over-predicts the health risk because there would be no sensitive human receptor locations along the fenceline of the compressor station. Residential homes, schools, hospitals, or daycares would be further away, where lower concentrations of carcinogenic HAPs and PAHs are predicted. The lifespan of the Project is also planned for 40 years, meaning that the exposure duration could not reach up to 80 years.



The carcinogenic effect to human health is quantified using the measurable parameter known as the incremental lifetime cancer risk (ILCR). Carcinogenic effects are non-threshold effects where any level of exposure carries some degree of cancer risk. Biologically, this cancer risk may be interpreted as an accumulation of genetic mutations in the body over a lifetime. The biological effect is expressed as “cancer risk” rather than a definitive cancer diagnosis or a definitive probability of developing cancer because there is no specific threshold dose of a carcinogenic substance that is shown to consistently result in cancer to an individual. For this assessment, the carcinogenic COPCs include three HAPs (1,3-butadiene, formaldehyde, and benzene) and carcinogenic PAHs.

Exposure to carcinogenic contaminants results in an increase in the ILCR. Health Canada consider an ILCR that is less than 1 in 100,000 (i.e., 0.00001 or  $1 \times 10^{-5}$ ) to represent a negligible cancer risk increase (Health Canada 2023; Ministry of Health 2022).

In the Application, formaldehyde had the highest ILCR at  $4.6 \times 10^{-8}$  (i.e., 1 in 21.7 million people) among the three carcinogenic HAPs. This degree of cancer risk is below Health Canada’s cancer risk threshold by three orders of magnitude (about 1,000 times lower than the cancer risk threshold of  $1 \times 10^{-5}$ ). If people lived along the fenceline of the compressor station during the operation phase, their cancer risk from exposure to carcinogenic HAPs would be below Health Canada’s cancer risk threshold.

In the Application, the ILCRs for 13 carcinogenic PAHs were summed because they have a similar mechanism of carcinogenic action. Under this scenario, cancer risks for multiple chemicals may be summed together. The cumulative maximum ILCR for PAHs is  $3.4 \times 10^{-12}$  (i.e., 1 in 294 billion people). This degree of cancer risk is well below Health Canada’s cancer risk threshold.

This minimal cancer risk would be further reduced if the conservative assumptions were adjusted to illustrate a realistic exposure scenario. For example, quantifying the ILCR at more distant locations such as residential homes would further reduce the cancer risk. Adjusting the exposure duration to the project lifespan of 40 years would also reduce the ILCR further, since it was assumed that people would be exposed over their entire lifespan of 80 years.

The amended location of the compressor station location does not result in a meaningful increase to its emission profile and emission inventory. Therefore, the cancer risk for the amended location of the compressor station is expected to be similar to that described in the Application. The ILCR would need to increase by a factor of about 1,000 times (for carcinogenic HAPs) to 1,000,000 times (for carcinogenic PAHs) at the compressor station fenceline to reach the level deemed to be an unacceptable risk by Health Canada.

### **18.3.2 Residual Effects**

No new residual effects to human health are expected from the changes proposed in the Amendment. Residual effects of this Amendment on human health are predicted to be comparable to the effects predicted for the section of the Project that the Amendment would replace. EAO concluded in their Assessment Report (EAO 2014a) that the proposed Project would not likely result in any residual adverse effects on human health. In consideration of the predicted effects on human health, the conclusions presented in the EAO Assessment Report (EAO 2014a) remain valid with the proposed changes. Given



that there are no anticipated residual adverse effects on human health, an assessment of cumulative effects is not warranted.

## **18.4 Risks and Data Uncertainty**

The assessment of human health relies on predictive modelling of future environmental conditions. The overall reliability and confidence in the air dispersion model results depends on the modelling software used and the accuracy of the air quality model plan inputs (e.g., climate and wind conditions, project emission inventory, emission rates, and other natural and man-made emission sources).

The air dispersion modelling for this assessment followed the British Columbia Air Quality Dispersion Modelling Guideline (BC ENV 2022). The software used was CALPUFF for the dispersion modelling, CALMET for the meteorological modelling, and CALPOST for the post-processing of the CALPUFF modelling data.

The assessment of human health also applied conservative assumptions that would either over-estimate or avoid underestimating the health risk from exposure to CACs, HAPs, and PAHs. These conservative assumptions include:

1. The assumption that people live along the fenceline of the compressor station and therefore are exposed continuously to the maximum modelled concentrations of CACs and HAPs over their 80-year lifetime (even when the Project is proposed for 40 years). This extreme scenario is unrealistic and overstates the health risk.
2. The Project and its compressor stations are operating at 100% capacity at all times of the year. This results in overestimating the emission rates, as the Project is not anticipated to be operating at 100% capacity at all times.

Overall, these risks and uncertainties are present in the Application and the Amendment, and have not changed, relatively.



## 19 Section 25 Matters

While the Project was assessed under the *Environmental Assessment Act* (2002), this Amendment takes into consideration matters identified in section 25 of the *Environmental Assessment Act* (2018). Many of these factors were prescribed in the Project's Application Information Requirements (PRGT 2014b), considered as part of the Application (PRGT 2014a), and relevant findings were presented in the EAO Assessment Report (EAO 2014a). A summary of these matters and how they are considered in the context of this Amendment is included in Table 19.1.



**Table 19.1 Section 25 Matters**

Section	Assessment Matter	Relevance and Rationale
25(1)	The effects of the project on Indigenous Nations and rights recognized and affirmed by section 35 of the <i>Constitution Act, 1982</i>	The Application (PRGT 2014a) and the EAO Assessment Report (EAO 2014a) assessed effects under the <i>Environmental Assessment Act</i> (2002). The effects of the Project on the meaningful exercise of rights were assessed for each Indigenous Nation included in Schedule B of the Section 11 Order. Relevant to this Amendment, this included Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Saulteau First Nations, Takla Nation, and West Moberly First Nations. Blueberry River First Nations and Doig River First Nation were identified on Schedule C of the Section 11 Order and were therefore not assessed in the Application (PRGT 2014a). Horse Lake First Nation was not included in the Application because of the Project's original location but is now being engaged on the Eastern Route Alternative (see Section 3.0 and Section 20.0).
25(2)(a)	Positive and negative direct and indirect effects of the reviewable project, including environmental, economic, social, cultural and health effects and adverse cumulative effects	The Application (PRGT 2014a) considered both adverse and positive effects; however, negative direct and indirect effects were the primary focus of the assessment for each VC. An assessment of adverse cumulative effects was also completed for each VC. Section 2.5 of the EAO Assessment Report (EAO 2014a) discussed the benefits (positive effects) of the Project including direct and indirect employment, tax revenue and social benefits.  In the Amendment, positive and negative direct and indirect effects are discussed where relevant in individual VC chapters (Sections 5 through 18). Potential changes to effects resulting from the Amendment are compared to the findings of the EAO Assessment Report (EAO 2014a).
25(2)(b)	Risks and uncertainties associated with those effects, including the results of any interaction between effects	The characterization of effects within the EAO Assessment Report (EAO 2014a) included the identification of likelihood and confidence for effects to each VC. In addition, a significance determination was provided. These effects characterization descriptors and the significance determination inherently incorporated the consideration of risks and uncertainties. The Application (PRGT 2014a) presented assumptions used for the assessment for each VC, in association with a description of the conservative approach that was taken to accommodate the resulting uncertainties. As such, risk and uncertainty were incorporated into the Application (PRGT 2014a) and the EAO Assessment Report (EAO 2014a). Changes to risk and uncertainty associated with this Amendment are identified within individual VC chapters, where applicable.
25(2)(c)	Risks of malfunctions or accidents	The EAO Assessment Report (EAO 2014a) included an assessment of accidents and malfunctions. While the location of Project-related infrastructure would shift, this does not result in material changes to the assessment of accidents and malfunctions, including identification of potential effects, mitigation measures, or residual effects, and therefore it is not discussed further.



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25(2)(d)	Disproportionate effects on distinct human populations, including populations identified by gender	The Application (PRGT 2014a) and EAO Assessment Report (EAO 2014a) were assessed under the <i>Environmental Assessment Act</i> (2002) where evaluation of disproportionate effects on distinct human populations, including populations identified by gender, was not required. The Amendment assesses disproportionate effects on different segments of the population including gender, Indigeneity, low-income status, and age in the context of Employment (Section 13), Community Infrastructure and Services (Section 14) and Indigenous Interests (Section 20).
25(2)(e)	Effects on biophysical factors that support ecosystem function	In the Amendment, the effects on biophysical factors that support ecosystem function are evaluated in Section 19.1 and take into consideration the findings of the VC assessments in Sections 5 to 18 of this Amendment.
25(2)(f)	Effects on current and future generations	The characterization of effects in the EAO Assessment Report (EAO 2014a) included consideration of duration and reversibility of effects, to provide an understanding of how effects are distributed over time. Sections 5 to 18 of the Amendment consider potential for changes to this distribution of effects over time relative to the EAO's conclusions for the Project as a whole. The changes to the Project identified in this Amendment are limited in nature, within the context of the Project as a whole, and will not have measurable effects (by themselves) on current and future generations. However, the EAO Assessment Report (EAO 2014a) identified operational jobs and social benefits as positive effects of the Project. These are expected to have positive effects on current and future generations. Effects on current and future generations are assessed in Appendix H.2.3 of the Employment VC (Section 13). The ability of Doig River First Nation, Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Sauteau First Nations, Takla Nation, and West Moberly First Nations to continue to meaningfully exercise their Indigenous and/or treaty rights and interests is assessed in Section 20.0.
25(2)(g)	Consistency with any land-use plan of the government or an Indigenous Nation if the plan is relevant to the assessment and to any assessment conducted under Section 35 or 73	<p>Section 16 (Land and Resource Use) considered land use plans both in the overview of existing conditions and effects assessment. In the existing conditions section of the Application, an overview of government and Indigenous land use planning documents was provided, including:</p> <ul style="list-style-type: none"> <li>• Land and Resource Management Plans</li> <li>• Indigenous Land Use Planning</li> <li>• Official Community Plans</li> </ul> <p>The Eastern Route Alternative intersects the Caribou Recovery Committee Review Area Zone B1 (see Section 12) but does not intersect any new Indigenous land use or management plans developed since the Application. Section 7.2.3 of the EAO Assessment Report (EAO 2014a) summarizes Project-related effects on land and resources, and key proposed mitigation assessed in the Application. From its assessment, the EAO was satisfied that the Project would not likely have significant adverse residual effects on land and resource use. Effects of the Eastern Route Alternative on Land and Resource Use (as assessed in Section 16) are generally similar to those considered in the Application (PRGT 2014).</p>



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25(2)(h)	Greenhouse gas emissions, including the potential effects on the province being able to meet its targets under the <i>Greenhouse Gas Reduction Targets Act</i> (now called the <i>Climate Change Accountability Act, 2018</i> )	<p>The Application (PRGT 2014a) considered the construction and operation of 780 km of terrestrial pipeline and 120 km of submarine pipeline. Chapter 6 of the Application (PRGT 2014a) and Chapter 5.3 of the EAO Assessment Report (EAO 2014a) concluded that there would likely be significant adverse effects regarding greenhouse gas emissions during operations. The revisions to the Project considered in this Amendment will reduce the terrestrial pipeline length by approximately 60 km. There is no change to the number of compressor stations that may combust natural gas. As a result, greenhouse gas emissions are anticipated to be comparable to what was assessed in the Application (PRGT 2014a; Section 6) and EAO Assessment Report (EAO 2014a; Section 5.3).</p> <p>PRGT acknowledges the emission reduction targets under the <i>Climate Change Accountability Act</i> are set for 2030, 2040, and 2050. The Project is expected to be operating during each target year. Greenhouse gas (GHG) emissions from Project operation will mainly be from natural gas combustion at compressor stations, as described in the Application. The Amendment does not result in a substantive change in GHG emissions during Project operation. Therefore, the Amendment will not adversely alter the results of the assessment in the Application (PRGT 2014).</p>
25(2)(i)	Alternative means of carrying out the Project that are technically and economically feasible, including through the use of the best available technologies, and the potential effects, risks and uncertainties of those alternative	<p>This Amendment represents an alternative means of carrying out the Project. The Eastern Route Alternative has been selected based on detailed routing and in response to feedback from Indigenous Nations.</p> <p>The Eastern Route Alternative does not change the original assessment of alternative means of carrying out the Project. Planning of the Project included a detailed routing process to identify route options that were considered technically and economically feasible. This information informed Section 2.4 Alternative Means of Undertaking the Proposed Project of the EAO Assessment Report (EAO 2014a). The Application and CPD (Section 1.0 of the Application [PRGT 2014a]) include several alternative routes and construction methods.</p>
25(2)(j)	Potential changes to the reviewable project that may be caused by the environment	<p>The Application (PRGT 2014a) included an assessment of potential changes to the Project that may be caused by the environment. The results of this assessment are presented in Section 10.3 (Effects of the Environment on the Proposed Project) of the EAO Assessment Report (EAO 2014a). Mitigation measures (e.g., engineering design standards) identified in the Application are applicable to the proposed changes in this Amendment. While the location of Project-related infrastructure would shift, this does not result in material changes to the assessment of effects of the environment on the Project. No changes to the EAO assessment are expected because of this Amendment and no new mitigation measures for effects of the environment on the Project are proposed. As a result, effects of the environment on the Project are not discussed further.</p>
25(2)(k)	Other prescribed matters	There are no other prescribed matters for consideration



## **19.1 Effects on Biophysical Factors that Support Ecosystem Function**

An assessment of the effects of the Project on biophysical factors that support ecosystem function was not included in the original Application or the EAO Assessment Report. The following assessment (Table 19.2) uses the Ecosystem Function Scoping Tool of the Effects Assessment Policy Version 1.0 (EAO 2020b) to consider the effects of the changes proposed in this Amendment on those factors. The mitigation measures set out in the CEMP (PRGT 2016) and other additional plans and measures required under EAC #14-06, and the additional mitigation measures proposed in this amendment are predicted to avoid or reduce adverse effects in a manner that maintains ecosystem functions.





**Table 19.2 Assessment of Biophysical Factors, Potential Interactions and Valued Component Assessments**

Possible Interaction	Key Consideration	Description of Potential Interactions / Rationale for Exclusion	Valued Components
<b>Habitats Supporting Ecosystem Function Category</b>			
☒	Could the proposed changes to the Project cause impacts to ecosystems that provide unique or critical habitats that support ecosystem function? (for example, wetlands, old forest)	<p>The Amendment overlaps freshwater aquatic resources, vegetation and wetland resources, and wildlife habitat.</p> <p>The Amendment intersects one Ungulate Winter Range for moose and three caribou herd ranges that are part of the Southern Mountain – Central Group population of woodland caribou. The footprint overlaps five grizzly bear population units. The Amendment does not intersect any Important Bird Areas.</p> <p>There are no mapped terrestrial critical habitat areas within the Project footprint. Biophysical attributes that describe critical habitat for caribou (Central Group – low elevation) include:</p> <ul style="list-style-type: none"> <li>• Low predation risk</li> <li>• Low sensory disturbance</li> <li>• Access to terrestrial lichens, arboreal lichens, horsetails</li> <li>• Access to ice/free water/slush</li> <li>• Canopy snow interception (travel)</li> <li>• Minimal physical obstructions</li> </ul> <p>These biophysical attributes are less likely to be present within 1 km of the Amendment where it overlaps caribou range compared to the section of the approved route it will replace because of higher existing disturbance at baseline. The alignment of the amendment with existing disturbance reduces potential incremental project effects compared to the section of the approved route it would replace, and the Caribou Mitigation and Management Plan will be implemented to further avoid or reduce adverse effects.</p> <p>The Amendment does not overlap any critical habitat polygons for aquatic species at risk.</p>	<p>Section 9, Freshwater Aquatic Resources</p> <p>Section 11, Vegetation and Wetland Resources</p> <p>Section 12, Wildlife and Wildlife Habitat</p>



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Possible Interaction	Key Consideration	Description of Potential Interactions / Rationale for Exclusion	Valued Components
<input checked="" type="checkbox"/>	Could the proposed changes to the Project cause impacts to potential or listed ecological communities?	The Project footprint overlap fifteen blue-listed ecological communities representing upland forest, floodplain and wetland, and one red-listed floodplain community. Effects on these listed communities are expected to be similar in characterization to the effects on listed communities previously considered in the EAO Assessment Report (EAO 2014a).	Section 11, Vegetation and Wetland Resources
<input checked="" type="checkbox"/>	Could the proposed changes to the Project make an ecosystem more susceptible to change?	The Amendment would parallel existing linear disturbance for a substantial portion of the route, resulting in a decrease in potential edge effects and fragmentation relative to the section of the approved route that it would replace. It is not anticipated that this Amendment would result in additional susceptibility to ecosystem changes relative to the Project as approved.	Section 11, Vegetation and Wetland Resources Section 12, Wildlife and Wildlife Habitat
<b>Habitat Patches Category</b>			
<input type="checkbox"/>	Could the proposed changes to the Project result in barriers to species movement? Or could species be inhibited from moving between habitat patches?	The proposed route is not expected to create new barriers to fish movement with implementation of mitigation measures in the CEMP (PRGT 2016), nor will it change the effects characterizations, including change in wildlife movement, that were considered in the assessment of the Project as approved.	Section 9, Freshwater Aquatic Resources Section 11, Vegetation and Wetland Resources Section 12, Wildlife and Wildlife Habitat
<input checked="" type="checkbox"/>	Is there the potential for habitats to be isolated and/or fragmented by the Project?	The Project footprint is within 1 km of Highway 97 for approximately 107 km of its length and overlaps with existing disturbances. This extensive overlap reduces the creation of new forest habitat fragmentation relative to the section of the approved route that it would replace	Section 9, Freshwater Aquatic Resources Section 11, Vegetation and Wetland Resources Section 12, Wildlife and Wildlife Habitat
<input checked="" type="checkbox"/>	Will there be Project effects to ecological corridors or key habitats in a migration route due to the proposed changes?	The Amendment does not interact with migration corridors or key habitats within a migration route. The Project is not expected to result in changes to movement or migration for fish species. The proposed changes to the Project is expected to only have limited interactions with local migrations of birds, mammals, and amphibians through the wildlife and wildlife habitat LAA. Change in movement is assessed as an effect on Wildlife and Wildlife Habitat (Section 12).	Section 9, Freshwater Aquatic Resources Section 12, Wildlife and Wildlife Habitat



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Possible Interaction	Key Consideration	Description of Potential Interactions / Rationale for Exclusion	Valued Components
<b>Natural Disturbance Regimes Category</b>			
<input type="checkbox"/>	Could natural disturbance regimes be altered as a result of the proposed changes to the Project (e.g., fire suppression, flood control, forest clearing)?	<p>The natural disturbance regimes of the forest ecosystem within the assessment boundaries have stand-replacing disturbance event intervals ranging from approximately 100 years to greater than 250 years. The Project is not expected to alter this disturbance regime.</p> <p>The Project is not expected to alter wetland function, hydrology, or slope stability to the extent that it would alter natural disturbance regimes such as flooding, erosion, fires, or landslides.</p>	Section 8, Hydrology Section 11, Vegetation and Wetland Resources
<input checked="" type="checkbox"/>	Could there be a change in Project effects in the future due to natural disturbance regimes changing as a result of future climate?	Climate change is predicted to increase the intensity and frequency of extreme weather events and dry and wet periods. These assessment of effects of the environment on the Project as described in Section 10.3 of the EAO Assessment Report (EAO 2014a) included consideration of climate effects, and no changes to these conclusions are anticipated as a result of the Amendment. Engineering design of the pipeline has included consideration of the effects of climate change.	Section 8, Hydrology Section 11, Vegetation and Wetland Resources
<b>Structural Complexity Category</b>			
<input checked="" type="checkbox"/>	Are there potential effects related to the Project effects to specific features within an ecosystem that are important for the life stage of a species?	<p>Local loss of old forest may result in local reduction in availability of important habitat features (e.g., den/roost sites, tree cavities, nesting sites) within the wildlife and wildlife habitat LAA.</p> <p>There are no mapped terrestrial critical habitat areas within the Project footprint. Biophysical attributes that describe critical habitat for caribou (Central Group – low elevation) include:</p> <ul style="list-style-type: none"> <li>• Low predation risk</li> <li>• Low sensory disturbance</li> <li>• Access to terrestrial lichens, arboreal lichens, horsetails</li> <li>• Access to ice/free water/slush</li> <li>• Canopy snow interception (travel)</li> <li>• Minimal physical obstructions</li> </ul>	Section 11, Vegetation and Wetland Resources Section 12, Wildlife and Wildlife Habitat



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Possible Interaction	Key Consideration	Description of Potential Interactions / Rationale for Exclusion	Valued Components
		<p>These biophysical attributes are less likely to be present within 1 km of the Amendment area where it overlaps caribou range compared to the section of the approved route it will replace because of higher existing disturbance at baseline. The alignment of the Eastern Route Alternative with existing disturbance reduces potential incremental project effects compared to the section of the approved route it would replace, and the Caribou Mitigation and Management Plan will be implemented to further avoid or reduce adverse effects.</p> <p>The magnitude of effects would be similar to those considered in the EAO Assessment Report (EAO 2014a).</p>	
<input checked="" type="checkbox"/>	Could the proposed changes to the Project cause a reduction in the structural complexity of an ecosystem?	<p>Trees will be removed during clearing of the ROW. Areas not required for operations will be revegetated in accordance with the CEMP (PRGT 2016) and are anticipated to return to an equivalent level of structural complexity. Maintenance activities along the ROW, where required, will keep the vegetation community in an herbaceous or shrub state. Vegetation management is expected to be limited to an approximately 10 m wide portion of the ROW centred on the ditch line during operation.</p>	Section 11, Vegetation and Wetland Resources
<input checked="" type="checkbox"/>	As a result of the changes to the Project, will an ecosystem be managed to a certain seral stage?	Maintenance activities along the 10 m wide portion of the ROW, where required, will keep the vegetation community in an herbaceous or shrub state.	Section 11, Vegetation and Wetland Resources
<b>Hydrologic or Oceanographic Patterns Category</b>			
<input type="checkbox"/>	Could hydrologic patterns and/or flow be altered by the Project?	The Project is not expected to require the taking of water during operation. Key mitigation measures are included in the CEMP (PRGT 2016) for maintaining drainage across the ROW and managing temporary effects during construction. As a result, effects to hydrologic patterns and stream flows are not anticipated.	Section 8, Hydrology
<input type="checkbox"/>	Could oceanographic patterns be altered by the Project?	The Amendment does not affect the marine environment.	N/A



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Possible Interaction	Key Consideration	Description of Potential Interactions / Rationale for Exclusion	Valued Components
<b>Nutrient Cycling Category</b>			
<input type="checkbox"/>	Will the Project result in an input of nutrients into the ecosystem (for example, waste discharges)?	The Amendment will include the operation of a compressor station at a revised location. If a natural gas fired turbine is selected, operation of the compressor station will result in the release of criteria air contaminants. Criteria air contaminants are not anticipated to accumulate or result in nutrient loading in the ecosystem.	Section 5, Air Quality
<input checked="" type="checkbox"/>	Will the Project cause a change in the flow of nutrients through an ecosystem (e.g., land clearing, erosion or scouring, changes to water flow)?	The Amendment will require clearing and grading of the ROW. Clearing activities would have effects on litter drop and nutrient cycling associated with clearing for approximately five to ten years. Erosion risks are highest during construction, although they are managed through application of interim erosion and sediment control measures. Erosion risk is predicted to be fully mitigated within five years of construction after vegetation is reestablished on the ROW and temporary workspaces.	Section 9, Freshwater Aquatic Resources Section 11, Vegetation and Wetland Resources
<b>Purification Services Category</b>			
<input type="checkbox"/>	Could proposed changes to the Project discharges lead to accumulation of waste or chemicals in an ecosystem?	The Amendment will include the operation of a compressor station at a revised location. If a natural gas fired turbine is selected, operation of the compressor station will result in the release of criteria air contaminants. Criteria air contaminants are not anticipated to accumulate or result in nutrient loading in the ecosystem.	Section 5, Air Quality
<b>Biotic Interactions Category</b>			
<input type="checkbox"/>	Could the Project have effects to keystone or foundation species that have the potential to alter ecosystems?	The proposed changes to the Project is not expected to have new effects, compared to the approved Project, on keystone or foundation species. Effects on freshwater aquatic species, vegetation and wetland species, and wildlife species are anticipated to remain unchanged from those provided in the EAO Assessment Report (EAO 2014a).	Section 9, Freshwater Aquatic Resources Section 11, Vegetation and Wetland Resources Section 12, Wildlife and Wildlife Habitat
<input type="checkbox"/>	Could Project effects allow for invasive species to change ecosystem function?	The proposed changes to the Project will not have new effects or change the characterization of predicted effects related to invasive species from those predicted in the EAO Assessment Report (EAO 2014a).	Section 11, Vegetation and Wetland Resources
<input checked="" type="checkbox"/>	Will there be species impacts that could change predator prey dynamics?	The proposed changes to the Project will not have new effects or change the characterization of predicted effects related to predator-prey dynamics from those predicted in the EAO Assessment Report (EAO 2014a).	Section 12, Wildlife and Wildlife Habitat



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Possible Interaction	Key Consideration	Description of Potential Interactions / Rationale for Exclusion	Valued Components
<b>Population Dynamics Category</b>			
<input type="checkbox"/>	Could the Project impact wildlife species at a population level?	The Project is not expected to result in changes in wildlife species at the population level, and the Amendment is not anticipated to change the conclusions of the EAO Assessment Report (EAO 2014a) regarding potential for effects to wildlife species.	Section 12, Wildlife and Wildlife Habitat
<b>Genetic Diversity Category</b>			
<input type="checkbox"/>	Will there be the possibility of reducing the genetic diversity of wildlife populations?	The Project is not expected to result in changes in wildlife species genetic diversity at the population level, and the Amendment is not anticipated to change the conclusions of the EAO Assessment Report (EAO 2014a) regarding potential for effects to wildlife species.	Section 12, Wildlife and Wildlife Habitat



## 20 Assessment of Potential Effects on Indigenous Interests

### 20.1 Scope of Amendment

Under Section 25(1) of the *British Columbia Environmental Assessment Act* (2018), effects of the Project on Indigenous Nations and rights recognized and affirmed by Section 35 of the *Constitution Act, 1982* must be assessed. The Application (PRGT 2014a) was assessed under the *British Columbia Environmental Assessment Act* (2002) and the effects of the Project on the meaningful exercise of rights were assessed for each Indigenous Nation included in Schedule B of the Section 11 Order. As applicable to the location of the Amendment, this included Halfway River First Nation, Tse'Khene (McLeod Lake) Indian Band, Nak'azdli Whut'en, Saulteau First Nations, Takla Nation, and West Moberly First Nations. Following submission of the Application, EAO revised the Section 11 Order, identifying Doig River First Nation as a Schedule B Indigenous Nation, rather than a Schedule C Indigenous Nation because of information provided by Doig River First Nation related to historic use of the Project approved route area, particularly in the Hudson's Hope and Peace River area (EAO 2014a). Additional Indigenous Nations were also listed in the Schedule B as well as in Schedule C of the Section 11 Order; however, the territories of those Indigenous Nations are not overlapped by the Amendment area and have therefore not been included in the assessment of Indigenous interests for this Amendment. For the Amendment, the ability of Doig River First Nation, Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Saulteau First Nations, Takla Nation, and West Moberly First Nations to exercise their Indigenous and/or treaty rights and interests is assessed in Sections 20.2 to 20.8.<sup>1</sup>

#### 20.1.1 Methods

This section assesses how the Amendment may affect the people, lands, and resources of Indigenous Nations whose areas of interests are overlapped by the Amendment. The Amendment is located partially within the boundaries of Treaty 8, and in the areas of interest of seven Indigenous Nations: Doig River First Nation; Halfway River First Nation; McLeod Lake Indian Band; Nak'azdli Whut'en; Saulteau First Nations; Takla Nation; and West Moberly First Nations.

To complete this assessment, the following are discussed for each Indigenous Nations interests assessed in the Amendment:

- Potential effects of changes associated with the Amendment on Indigenous interests
- Indigenous Knowledge, information sources, assumptions, and limitations
- Summary of mitigation measures to avoid or reduce adverse effects on Indigenous interests

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<sup>1</sup> As defined in the EAO Effects Assessment Policy Section 4: "interests relate to an Indigenous Nation and their rights recognized and affirmed by Section 35 of the *Constitution Act, 1982*, including Treaty rights and Aboriginal rights and title that may be impacted by a proposed project" (EAO 2020b).



- Preliminary overview of each potentially affected Indigenous Nation
- Preliminary overview of the key interests and concerns of each potentially affected Indigenous Nation identified during the Application, through engagement feedback and outcomes, through Project-specific TLU studies, and through a review of the publicly available feedback provided by Indigenous Nations engaged on recent applications, considered in the context of the Amendment area
- Potential residual effects on Indigenous interests
- Changes to the characterization of residual adverse effects on Indigenous interests after mitigation
- Cumulative effects
- The potential for disproportionately distributed effects on Indigenous Nations' interests
- Risks and data uncertainty

The assessment methods are consistent with Section 33.1 of the Application (PRGT 2014a). The Indigenous Interests LAA is a 2 km wide corridor centered on the Eastern Route Alternative alignment, and the RAA is each Indigenous Nation's asserted or established traditional territory.

### **20.1.2 Influence of Consultation and Engagement on the Amendment**

Section 35 of the *Constitution Act*, 1982 recognizes and affirms existing Indigenous and treaty rights of the Indigenous, Inuit, and Métis peoples of Canada (SCC 2016). Section 35 rights are understood to be those practices, traditions, and customs integral to the distinctive culture of the Indigenous Nation claiming the right (SCC 1996).

PRGT assumes that each Indigenous Nation potentially affected by the Amendment may hold asserted or established Indigenous and treaty rights in the Amendment area. This assessment includes consideration for interests or matters of importance that may be identified by each potentially affected Indigenous Nation.

The Indigenous Nations engaged or notified of the Amendment are listed in Table 20.1. Additional information regarding PRGT's engagement activities with the Indigenous Nations identified in Table 20.1 are provided in Section 3.1.





**Table 20.1 Indigenous Nations Potentially Affected by the Project**

	Indigenous Nation <sup>1</sup>
Treaty 8 Indigenous Nations	Doig River First Nation
	Halfway River First Nation
	Tse'Khene (McLeod Lake) Indian Band
	Saulteau First Nations
	West Moberly First Nations
Non-treaty Indigenous Nations	Nak'azdli Whut'en
	Takla Nation

Note:

<sup>1</sup> PRGT has committed to sharing Project information with additional Indigenous Nations if identified by EAO and any information provided through ongoing engagement will be assessed in the context of the Amendment.

### 20.1.3 Indigenous Knowledge

PRGT understands that there is no universally accepted definition of Indigenous Knowledge, and that it is nation-specific and place-based. It is understood to include direct observations about the biophysical world, as well as ecological indicators, oral histories, community practices, language, teachings, laws, relationships, rituals, cultural identity, spirituality, cultural values, and other ways of knowing that have been identified by Indigenous Nations engaged on the Project (EAO 2020c; IAAC 2020). Indigenous Knowledge is both cumulative and dynamic, developed through the experiences of earlier generations, informing current generations' practices, and adapting to the contexts experienced by contemporary Indigenous Nations (IAAC 2020).

PRGT recognizes that Indigenous Nations are best positioned to identify interests, concerns, preferred assessment approach, and sources of information to consider when analysing and assessing effects. This information requires the same consideration as any other information source.

#### 20.1.3.1 Information Sources

The Application included a review and integration of applicable information from Project-specific TLU studies or other written submissions prepared by Doig River First Nation, Halfway River First Nation, McLeod Lake Indian Band, Nak'azdli Whut'en, Saulteau First Nations, Takla Nation, and West Moberly First Nations, as well as engagement feedback and information identified through a literature review of publicly available sources of each potentially affected Indigenous Nation. In addition to the sources incorporated to the Application, the Amendment considers Project-specific TLU studies and engagement feedback that have been submitted by potentially affected Indigenous Nations to PRGT since the filing of the Application in 2014. Finally, in combination with the outcomes of PRGT's engagement (Section 20.1.2), publicly available information available from recent Indigenous interests assessments on other comparable projects, including key interests and concerns, was reviewed to provide an understanding potential effects on Indigenous interests. Existing conditions specific to each Indigenous Nation are described in Sections 20.2 to 20.8.



#### 20.1.3.1.1 Literature Review

The literature review was conducted to review existing publicly available information for Indigenous Nations potentially affected by the Project. The literature review focused on information not previously considered in the Application related to Indigenous interests and the potential for effects of the Amendment on the meaningful exercise of rights. The literature review considered information from the following sources:

- Publicly available studies previously completed by the potentially affected Indigenous Nations for other developments
- Regulatory filings for other types of resource developments (e.g., pipelines, powerlines, and compressor stations)
- Government reports and databases
- Historical and ethnographic literature
- Peer-reviewed literature and scientific publications
- Relevant internet sources (e.g., Indigenous Nation websites)

Information was drawn from sources relevant to the location of the Amendment and to the Indigenous Nations potentially affected by the Project.

#### 20.1.3.1.2 Traditional Land Use Studies

Each of the potentially affected Indigenous Nations prepared Project-specific reports, including TLU studies. While some reports were shared in advance of filing the Application, others were shared after submission. The following TLU studies have been reviewed to consider whether additional interests and concerns have been identified, which were not previously identified in the Application, as well as to consider areas of interest potentially affected by the Amendment. Where additional information was identified, it has been integrated into the Amendment, including in the assessments of related VCs.

- Doig River First Nation
  - Doig River First Nation Knowledge and Use Study Final Report for TransCanada Pipelines Ltd.'s Prince Rupert Gas Transmission Pipeline Project (Firelight 2014a)
- Halfway River First Nation
  - Halfway River First Nation Traditional Land Use and Ecological Knowledge of TransCanada Pipelines Limited's Proposed Prince Rupert Gas Transmission Project Final Report (DMCS and HRFN 2014)
- McLeod Lake Indian Band
  - McLeod Lake Indian Band Knowledge and Use Study Report for TransCanada Pipelines Ltd.'s Prince Rupert Gas Transmission Pipeline Project Final Report (Firelight 2015)



- Nak'azdli Whut'en
  - Nak'azdli Response: Follow-Up to the Red Flag Issues Identified in Nak'azdli's Preliminary Report to PRGT (CSTC 2014a)
  - Nak'azdli Band: Preliminary Use and Occupancy Study for the Prince Rupert Gas Transmission Project (CSTC 2014b)
- Saulteau First Nations
  - Saulteau First Nations Knowledge and use Study for TransCanada Pipelines Ltd. Prince Rupert Gas Transmission Project (Firelight 2014b)
- Takla Nation
  - Prince Rupert Gas Transmission Project Traditional Land Use Study: Takla Lake First Nation (TLFN and Sharp 2014)
- West Moberly First Nations
  - Land Use Conflict Analysis of the Prince Rupert Gas Transmission Project with the Cultural Activities of West Moberly First Nations in Treaty No. 8 (WMFN 2015)

Indigenous Nations will have the opportunity to conduct new or updated TLU studies. TLU reports received following the filing of the Amendment will inform site-specific mitigation.

#### 20.1.3.1.3 Amendment Engagement Feedback

In October 2023, PRGT began engaging with potentially affected Indigenous Nations about the Eastern Route Alternative Amendment. Feedback received during engagement activities has been considered in the context of the Amendment and integrated where applicable.

### 20.1.4 Data Use and Limitations

Information shared by Indigenous Nations has been considered in alignment with protocols, and consent for its use and public disclosure was provided. The list of source information considered in the Amendment was shared with Indigenous Nations during PRGT's ongoing engagement. Each nation was invited to review and provide PRGT with feedback on the sources considered and recommend additional sources to be considered in the context of the Amendment. The sources of information and Indigenous Knowledge used in describing background information and key interests and concerns were provided to Indigenous Nations for review and comment. TLU studies previously provided to PRGT by Indigenous Nations will be used in alignment with existing Protocol Agreements.

The results of PRGT's Project specific engagement, Project specific studies, and literature review reflect the best available information regarding the Indigenous interests of the Indigenous Nations potentially affected by the Project. Where feedback is not available, a conservative approach is taken, which assumes that Indigenous interests exist for each potentially affected Indigenous Nation in the vicinity of the Project, even if these interests are not specifically identified by the nations. The lack of information does not represent a lack of interest or concern to Indigenous Nations.



### **20.1.5 Potential Effects**

This assessment on Indigenous interests considers the predicted effects of the proposed changes to the Project on each of the VCs assessed in the Amendment (Sections 5 to 18) and considers how these effects could affect the ability of Indigenous Nations to exercise their Indigenous and treaty rights. Given the interactions identified in, and in consideration of the EAO Assessment Report (EAO 2014a), potential interactions associated with the proposed changes to the Project include:

- Disruption of hunting, trapping, fishing, and/or plant gathering (i.e., harvesting)
- Disruption or reduced use of trails and travelways
- Disruption or reduced use of habitation areas
- Disturbance or reduced use of gathering areas and sacred areas
- Disruption of cultural transmission
- Disruption of governance

In the Application, disruption of hunting, trapping, fishing, and plant gathering were conservatively assessed for every Indigenous Nation engaged on the Project, regardless of whether these activities were specifically identified by the Indigenous Nation, because they are interests commonly understood to be exercised by Indigenous Nations. Indigenous interests related to trails and travelways, habitation, gathering, and sacred areas, cultural transmission, and governance were only assessed when Indigenous Nations had identified potential effects pertaining to these interests. Taking a conservative approach, the Amendment considered all originally identified potential effects for each Indigenous Nation, conservatively assuming potential interactions in these instances. This assessment conservatively assumes that construction and/or operation of the Project may result in the same or similar potential effects on Indigenous interests as those identified in Section 33 of the Application (PRGT 2014a). Potential pathways for changes to Indigenous interests are therefore the same as those identified in the Application. Some examples include loss or alteration of access to preferred harvesting areas and habitation, gathering, and sacred areas, change in availability and health of culturally important species and habitats, and disruption in the ability to make decisions regarding land use and transmit knowledge. This assessment also considers the potential for disproportionately distributed effects on subpopulations of Indigenous Nations.

PRGT will continue to engage with Indigenous Nations to identify interests and concerns with respect to the Amendment. Should new potential effects be identified during engagement with Indigenous Nations, they will be assessed in the context of the Amendment.

### **20.1.6 Mitigation Measures**

The following is a summary of mitigation measures to avoid or reduce potential adverse effects on Indigenous and treaty rights and interests, including those identified during the Application and EAO Assessment, BCER Treaty 8 Mitigation Measures, and Caribou Recovery Committee measures. Mitigation measures have been consolidated in this section rather than repeating for each Indigenous Nation.



#### **20.1.6.1 Application Mitigation Measures and EAO Conditions**

Mitigation measures to avoid or reduce potential adverse effects on Indigenous and treaty rights and interests include those identified in the Application (PRGT 2014a) and the Conditions of Environmental Assessment Certificate #E14-06 (EAO 2014b). Key measures, commitments, and conditions include<sup>2</sup>:

- In the event that harvesting areas or important habitats are identified, PRGT committed to consulting with Indigenous Nations to identify site-specific strategies.
- PRGT will continue to work with Indigenous Nations to practically address any Project-specific issues related to cumulative effects on all Indigenous interests. PRGT is committed to working with Indigenous Nations to understand and, where possible, address Project-specific issues that may adversely affect their use of lands and resources for traditional purposes.
- PRGT will provide Cultural Awareness Training to Project personnel. If requested by an Indigenous Nation prior to PRGT providing training, PRGT must make efforts to engage with the Indigenous Nations to determine the scope and content of the training.
- PRGT has developed and will implement a No-Hunting, No-Trapping, No-Fishing, and No-Plant Gathering Policy for PRGT's employees and contractors during work hours. PRGT shall develop, implement and enforce a policy restricting employees from possessing or storing firearms, bows and crossbows or fishing equipment in construction camps or in work vehicles, unless on the request of PRGT, EAO in consultation with the Ministry of the Environment, determines that a designated wildlife monitor may carry a firearm for animal control safety purposes.
- PRGT will implement a SEEMP (PRGT 2016c). The SEEMP includes specific actions to address the following:
  - Planning and implementation for effective engagement with potentially affected Indigenous Nations, local governments, and provincial service delivery agencies regarding effects related to community level infrastructure and services including water, waste (solid and liquid), health and social services
  - Approach to designing and communicating programs related to employment and contracting opportunities, skills training and education
  - Monitoring and reporting on the effectiveness of the mitigation set out in the Application and in the SEEMP
  - If necessary, description of an adaptive management approach, including the implementation of alternative mitigation, to address unpredicted effects directly related to the Project.
- PRGT will implement the CEMP (PRGT 2016a) developed in consultation with the relevant regulatory agencies, and Indigenous Nations with the approval of EAO.
- PRGT must implement a construction monitoring program for Indigenous Nations that provides opportunities for individuals of Indigenous Nations to monitor construction activities.

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<sup>2</sup> Some mitigation measures, commitments, and conditions have been abridged from the original sources to focus on aspects pertaining to Indigenous interests, or the location of the Amendment or have been edited for clarity (e.g., defining acronyms).



- PRGT must, at the request of one or more Indigenous Nation:
  - (i) Provide a schedule of construction activities
  - (ii) Provide notification, a minimum of 30 days in advance, of operations activities causing disturbance to land, vegetation or watercourses
  - (iii) Prior to providing (i) and (ii), PRGT must seek input from the Indigenous Nation(s) about the format of the information

Further, PRGT must, at the request of one or more Indigenous Nation:

- Provide plans for offsets on aquatic, riparian, or in-stream values required by a relevant regulatory agency, for information sharing purposes prior to submission to the relevant regulatory agency
- Discuss the development of the CEMP, as well as any plans set out in the EAO Table of Conditions, and other relevant plans developed to meet regulatory requirements. If Indigenous Nations provide traditional use studies (TUS) or TEK to PRGT after the date of the EAC, PRGT must consider the TUS and/or TEK in authorization applications related to the construction or operation of the Project.

In addition to these mitigation measures, commitments, and conditions, PRGT is committed to engaging with Indigenous Nations to develop specific mitigation strategies in the event that new interests are identified, in accordance with the Traditional Land Use Site Discovery Contingency Plan.

#### **20.1.6.2 BCER Treaty 8 Planning and Mitigation Measures**

On January 15, 2024, BCER published Treaty 8 Planning and Mitigation Measures (BCER 2024). These Measures were drafted by BCER in collaboration with all British Columbia Treaty 8 First Nations. They apply to energy resource development permits issued by BCER throughout Treaty 8 in British Columbia (e.g., *Energy Resource Activities Act*, *Land Act*, *Forest Act*, *Water Sustainability Act*) and came into effect April 15, 2024. PRGT will implement applicable Treaty Planning and Mitigation Measures, as required, and as identified through engagement with Indigenous Nations (PRGT 2016).

#### **20.1.6.3 Caribou Recovery Committee**

On February 21, 2020, the Province of British Columbia, the Government of Canada<sup>3</sup>, Saulteau First Nations, and West Moberly First Nations signed a partnership agreement for the Conservation of the Southern Mountain Caribou – Central Group (Province of British Columbia 2023a). As part of this partnership, a Caribou Recovery Committee (CRC) was established to review applications for resource development activities, as specified in the partnership agreement (Province of British Columbia 2023a). The CRC reviews all applications for provincial authorizations related to resource development activities within (or overlapping) Zones A1, B1, B4, and B5. Of the zones, the Eastern Route Alternative overlaps

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<sup>3</sup> Specifically, the Minister of the Environment (“Minister of Environment and Climate Change”) who is responsible for the Department of the Environment (“Environment and Climate Change Canada” or “ECCC”)



with Zone B1 (Sustainable Resource Activity Area). Approximately 315 ha of the footprint is within Zone B1.

On June 14, 2024, the provincial government announced the expansion of Klinse-Za / Twin Sisters Provincial Park, noting “the park expansion is the result of a historic 2020 partnership agreement between the governments of BC, Canada, Saulneau First Nations, and West Moberly First Nations” and is intended to better protect caribou habitat as well as sacred sites (BC Gov News 2024). Current routing for the Eastern Route Amendment is being planned to avoid the Twin Sisters Park Expansion, if possible.

## 20.2 Doig River First Nation

### 20.2.1 Existing Conditions

#### 20.2.1.1 Rights, Governance and Legal Characteristics

Doig River First Nation (Tsaa? che ne dane) members are descendants of the Dane-zaa peoples who have occupied the Peace River region for thousands of years (DRFN n.d.(a)). Doig River First Nation was part of the Fort St. John Beaver Band, which also included Blueberry River First Nations when they signed Treaty 8 in 1900 (DRFN n.d.(a)). Doig River First Nation became an independent First Nation in 1977 (BCAFN 2023a; Fasken Martineau 2013a; DRFN n.d.(a)).

Doig River First Nation is located in the Peace River district along the Doig River in British Columbia. Doig River First Nation is a member of the Treaty 8 Tribal Association (Crown-Indigenous Relations and Northern Affairs Canada [CIRNAC] 2024b). Doig River First Nation is governed under the *Indian Act* election system with a Chief and three Councillors elected to a two-year term (CIRNAC 2024b).

**Table 20.2 Doig River First Nation Elected Officials**

Title	Name	Appointment Date	Expiry Date
Chief	Trevor Makadahay	11/24/2023	11/23/2025
Councillor	Starr Acko	11/24/2023	11/23/2025
Councillor	Brittany Brinkworth	11/24/2023	11/23/2025
Councillor	Justin Davis	11/24/2023	11/23/2025

Source: CIRNAC 2024b

#### 20.2.1.1.1 Land Management, Claims, and Agreements

Doig River First Nation (Band No. 548) administers three reserves covering an area of approximately 1,366.2 ha (CIRNAC 2024b):

- Beaton River 204 (North Half) (357.3 ha)
- Doig River 206 (1,000.8 ha)
- Gat Tah Kwa (8.1 ha)



Doig River First Nation nearest populated land base to the Eastern Route Alternative is Doig River 206 Reserve, located 146 km to the northeast.

In 2020, Doig River First Nation signed the Framework Agreement on First Nation Land Management which is a government-to-government agreement that allows First Nations to opt out of the land management sections of the *Indian Act* and assume governance and management control of their lands and natural resources (DRFN n.d.(a)). Doig River First Nation has signed as a developmental nation, meaning it is working on a process to develop a land code with its members, alongside the Land Code Development Committee, to organize a community ratification vote by the members for approval (Canada Energy Regulator [CER] 2022).

On January 18, 2023, the Province of British Columbia reached agreement with Treaty 8 First Nations, including Doig River First Nation, in response to the *Yahey* decision. This resulted in the Consensus Document, which included a letter of agreement and a revenue sharing agreement signed with Doig River First Nation that aims to support wildlife, land, resource, and cumulative effects management. As part of the Consensus Document, Doig River First Nation identified Enhanced Management Areas (DRFN n.d.(a), 2023a, 2023b). These areas are not intersected by the Eastern Route Alternative.

#### **20.2.1.2 Population**

As of April 2024, Doig River First Nation had a registered population of 324 members. Of the 87 living on reserve, 47 were male and 40 were female; one male lives on other reserves; and of the 236 living off reserve, 115 were male and 121 were female (CIRNAC 2024b).

#### **20.2.1.3 Preliminary Overview of Key Doig River First Nation Interests and Concerns**

Through a review of information provided in Doig River First Nation's Project-specific TLU study (Firelight 2014b), engagement feedback, and from publicly available information, the following is a summary of Doig River First Nation's interests and concerns relevant to the Amendment.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Doig River First Nation. Any new information brought forward by Doig River First Nation will be reviewed and considered by PRGT.

##### **20.2.1.3.1 Disruption of Harvesting**

In the EAO Assessment Report, Doig River First Nation identified effects on wildlife, wildlife habitat, hunting, fishing, trapping, and plant gathering as key interests and concerns (EAO 2014a). Through their Project-specific TLU study, Doig River First Nation previously reported that members continue to support themselves through hunting, fishing, guiding, trapping, and collecting plants and other resources (Firelight 2014a).

Doig River First Nation has previously expressed concerns about changes to patterns of movement among ungulates and migratory birds (Fasken Martineau 2013a), as well as loss of large animals, such as grizzly bears and wolves; amphibians and reptiles, birds and waterfowl, furbearers, and ungulates (Fasken Martineau 2013a; Spectra Energy 2019; CER 2020). They have further noted that large-scale





industrial development within Treaty 8 territory has increasingly put pressure on their traditional activities protected by Treaty 8, further noting a decline in wildlife populations, particularly moose, caribou, and porcupine. Doig River First Nation previously noted a strong historical and cultural relationship with caribou and have identified them as vital to their cultural continuity (CER 2020). Doig River First Nation noted that caribou are now at such low numbers that they are no longer hunted by Doig River First Nation members (Firelight 2014a).

Doig River First Nation also previously reported that even when they do have a successful hunt, they cannot always eat harvested animals because many animals show signs of illness. Doig River First Nation members attribute illnesses in moose and other wildlife to the contamination of air, water and plants from chemicals around industrial project areas, and from herbicides sprayed along cleared areas and roads (Firelight 2014a).

Doig River First Nation previously reported that fishing has always been an important subsistence activity and they continue to fish on a regular basis for sustenance (Firelight 2014a). Doig River First Nation has expressed concerns about potential effects on fish, fish habitat, fish migration, and species composition within the various waterways of the Peace River Valley as well as contamination of fish (Fasken Martineau 2013a), further noting that the quality of water and fish in the region has declined, to the point where they often do not feel safe using these resources (Firelight 2014a).

Gathering berries, food plants, medicine plants and plants with other uses is an important subsistence and cultural activity and Doig River First Nation reported picking berries and other plants whenever the opportunity arises, often when out hunting or fishing. (Firelight 2014a). Doig River First Nation reported that traditional harvesting has declined with the associated decline of plant and berry species for food and medicine (Treaty 8 First Nations Community Assessment Team and The Firelight Group Research Cooperative [T8FNCAT] 2012; DRFN 2023b). Doig River First Nation has previously expressed concerns regarding the effects of industry and development on traditionally important plants, including contamination, habitat loss and invasive species (Fasken Martineau 2013a; DRFN 2023b; CER 2020; AiM 2021b).

Harvesting activities occur throughout Doig River First Nation's Traditional Territory including the Peace River and the Pine River valleys (NGTL 2015a, 2015b; AiM 2021a; DRFN 2023b; Firelight 2014a). Harvesting activities such as hunting, fishing, and gathering berries and other plant materials are particularly intense around the Peace River, Moberly Lake and the Upper Moberly River. Harvesting activities also occur at Kobes Creek Road, Farrell Creek Road, where Gravel Hill Creek meets Williston Lake, where Dunlevy Creek meets Williston Lake, Johnson Creek Road, Canyon Drive, Hudson Hope, Moberly River Road, East Side of Williston Lake, Callazon Creek, between Tudyah Lake and Windy Point Lake, John Hart Highway (Firelight 2014a).

The Pine River and the John Hart Highway are intersected and paralleled by the Eastern Route Alternative, and Callazon Creek is crossed by the Eastern Route Alternative. Tudyah Lake and Windy Point Lake are within the Indigenous Interests LAA and the Eastern Route Alternative may interact with the lakes. The Eastern Route Alternative is not anticipated to interact with the remaining harvesting areas described above that are within Doig River First Nation's Traditional Territory.



#### 20.2.1.3.2 Disruption or Reduced Use of Trails and Travelways

In the EAO Assessment Report, Doig River First Nation identified effects on trails and travelways as a key interest and concerns (EAO 2014a). Doig River First Nation previously reported the presence of many trails and routes used to access specific areas and to travel through the landscape, including trails used for hunting, trapping, fishing, collecting berries and accessing campsites, and canoeing routes within the approved route (Firelight 2014a). Doig River First Nation identified continued access to lands and waters as being of critical value and importance, explaining that their livelihood and culture is dependent on unimpaired access and use of a healthy and intact ecosystem that supports the community's ability to camp, hunt, trap, fish, and spend time out on the land (Firelight 2014a).

Doig River First Nation has reported the presence of historically important access routes, including a water route used to travel to the mountains, an old rafting route along the Peace River, an old horse trail from Hudson Hope to Fort St John, and trails used travel to Moberly Lake and from Hudson Hope to Halfway Reserve (Firelight 2014a).

Doig River First Nation has previously noted that the Pine River valley is associated with trails used for seasonal hunting, fishing, gathering, and trade (NGTL 2013; TCSI 2013). Doig River First Nation also noted that members used to travel a route from the Kiskatinaw River, Rio Grande, Smokey River, Dunvegan, and Fort St. John; however, the route has been changed due to settlers (CER 2022).

The Pine River is intersected and paralleled by the Eastern Route Alternative. The Eastern Route Alternative is not anticipated to interact with the remaining trails and travelways described above that are within Doig River First Nation's Traditional Territory.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Indigenous Nations. Any new information brought forward by Doig River First Nation regarding disruption or reduced use of trails and travelways will be reviewed and considered by PRGT.

#### 20.2.1.3.3 Disruption or Reduced Use of Habitation Areas

Doig River First Nation's Project-specific TLU study reported that continued use and habitation is of critical value and importance, and that their livelihood and culture is dependent on unimpaired access and use of a healthy and intact ecosystem that supports the community's ability to camp, hunt, trap, fish, and spend time out on the land (Firelight 2014a). Doig River First Nation previously noted that habitation sites in the approved route area include currently used cabins, frequently returned-to campsites, and sites of Elders' camps, as well as historical camping places; they further note that the proposed Project will have an impact on their habitation, as it will directly eliminate large areas of land used by Doig River First Nation (Firelight 2014a). Doig River First Nation previously observed that the areas that currently remain for habitation and use are often greatly degraded by visible disturbance to the landscape, and increased traffic, noise, and noxious smells from industrial development (Firelight 2014a).

Doig River First Nation has previously reported that northeastern British Columbia was historically important to their seasonal round and camping and harvesting from the land remains an important year-round activity for many Doig River First Nation members (CER 2022; DRFN 2023a, 2023b; T8FNCAT



2012). Doig River First Nation has identified habitation areas at Kobes Creek Road, Farrell Creek, Farrell Creek Road, where Gravel Hill Creek meets Williston Lake, where Dunlevy Creek meets Williston Lake, Johnson Creek Road, Moberly Lake, Hudson Hope, Moberly River Road, East Side of Williston Lake, John Hart Highway, and between Tudyah Lake and Windy Point Lake (Firelight 2014a).

The John Hart Highway is intersected and paralleled by the Eastern Route Alternative. Tudyah Lake and Windy Point Lake are within the Indigenous Interests LAA and may interact with the Eastern Route Alternative. The Eastern Route Alternative is not anticipated to interact with the remaining habitation areas described above that are within Doig River First Nation's Traditional Territory.

#### 20.2.1.3.4 Disruption or Reduced Use of Gathering Areas and Sacred Areas

In the EAO Assessment Report, Doig River First Nation identified effects on culturally important sites as a key interest and concern (EAO 2014a). Doig River First Nation's Project-specific TLU study reported that cultural values identified within the approved route area include ceremonial and gathering places where activities such as drumming and hand games have taken place, and teaching areas for teaching youth about culture, history, ceremonies, songs, place names, animal tracks, and berry picking, as well as sites where baskets and dry meat have been made (Firelight 2014a). Doig River First Nation has expressed concern that potential effects will result in a reduced sense of connection to the land, particularly spiritual sites, due to noise and visual pollution from construction, garbage, traffic, and the presence of pipeline workers, non-Indigenous hunters and others (Firelight 2014a).

Doig River First Nation has previously reported that gathering places and sacred sites are located throughout their Traditional Territory (NGTL 2013; DRFN 2023b), and include the 90,000 ha area section of the Traditional Territory declared as K'ih tsaa?dze (meaning "old spruce") Tribal Park (Suzuki 2018; T8FNCA 2012). This Tribal Park straddles the Alberta- British Columbia border and holds rich cultural significance (Suzuki 2018; T8FNCA 2012). Doig River First Nation has reported Tsazuulh Saagae (Big Camp), Hanas Saahge? (Doig River), Netl'uk (Osborne River), Sweeney Creek, Gat Tah Kwa (Montney), and Alaa? Sato (Peterson's Crossing) as important areas (DRFN n.d.(a)).

Tse'K'wa (Charlie Lake Cave) is an important site for Doig River First Nation and has been designated as a national historic site by the Government of Canada (DRFN n.d.(b)). The site contains artifacts and raven remains that are thousands of years old. Doig River First Nation purchased the land that Charlie Lake Cave is situated on jointly with Prophet River First Nation and West Moberly First Nations to care for the site (DRFN n.d.(b)). The sacred and important areas described above are within Doig River First Nation's Traditional Territory. They are not anticipated to interact with the Eastern Route Alternative.

Doig River First Nation previously voiced concerns around the potential effects that development may have on important places, such as ancestral gathering locations for camping, habitation, fishing, hunting, ceremonial and sacred areas, burials, freshwater springs and locations associated with oral histories (Fasken Martineau 2013a; CER 2020b). The concern for the disturbance of burial sites includes the psycho-social effects associated with the destruction of grave sites (Fasken Martineau 2013a). Doig River First Nation previously expressed concern about increased noise and loss of enjoyment of the land due to development and increased human presence on the land (Fasken Martineau 2013a). Additionally, Doig River First Nation expressed concern for the psychological grief that members have experienced due to



development impacts and stated that through regulatory processes there needs to be the ability to address this grief (DRFN 2023a). Doig River First Nation previously reported that development projects should consider cultural offsets, such as cultural centers, when considering the impacts to Indigenous rights (CER 2023).

#### **20.2.1.3.5 Disruption of Cultural Transmission**

Following the submission of the Application, Doig River First Nation's Project-specific TLU study (Firelight 2014a) emphasised the importance of cultural transmission and expressed concern regarding loss of landscape, specific sites, and resources that are used for teaching their children and passing on their culture. Doig River First Nation further noted that the loss of a specific place, either permanently or for a long period of time, frequently results in a gap in the transmission of place-based knowledge and eliminates the place as a cultural resource for remembering, teaching, and learning the knowledge and cultural practices associated with it (Firelight 2014a). Doig River First Nation has further noted that potential effects will result in reduced opportunities for teaching how to hunt, fish and pick berries and medicinal plants, and associated cultural protocols, due to reductions in wildlife populations or contamination or perceived contamination of resources (Firelight 2014a).

Doig River First Nation previously reported that their lands have been taken up to an extent that treaty rights have been infringed and that they can no longer exercise them within their lands as Treaty 8 intended (DRFN 2023a, 2023b). Doig River First Nation previously described that land restrictions such as rights of way, fences, and roads prevent them from accessing areas to practice their treaty and Indigenous rights which has led to members' concerns for loss of culture, language, and their way of life (DRFN 2021). Additionally, Doig River First Nation members reported that the conversion to private lands has pushed members further from their lands with limited potential to return; members are concerned that further development will continue to alienate members from the area (DRFN 2023a).

#### **20.2.1.3.6 Disruption of Governance**

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws and governance systems. Doig River First Nation has not identified any issues related to disruption of governance in addition to those described above.

### **20.2.2 Residual Effects on Doig River First Nation Interests**

Residual effects of the Amendment on Doig River First Nation interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that Doig River First Nation members may choose not to pursue their interests near Project activities.

At the time of the Application, Doig River First Nation had identified interests and issues related to hunting, trapping, fishing, plant gathering, and culturally important sites, trails, and travelways (as identified in the EAO Assessment Report). Doig River First Nation had not identified any issues related to



governance or cultural transmission; however, as described in Section 20.2.1, additional interests have been considered for Doig River First Nation based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including Moberly Lake, the Upper Moberly River, and the Peace River, which were identified as areas of interest by Doig River First Nation. As a result, these areas are not anticipated to be affected to the same extent.

### **20.2.3 Changes to Characterization of Residual Effects on Doig River First Nation Interests**

The EAO Assessment Report did not include a detailed characterization of residual effects on Doig River First Nation's interests. Based on information available pertaining to Doig River First Nation interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by Doig River First Nation in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the EAO Assessment Report.

Although the Amendment would reduce the overall Project footprint (i.e., it is approximately 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted negligible impacts on Doig River First Nation's trapping interests and minor impacts on Doig River First Nation's hunting, fishing, plant gathering, cultural sites, and trails and travelways interests (EAO 2014a). Project residual effects on Doig River First Nation interests were characterized as negligible to minor in the EAO Assessment Report (EAO 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.3 summarizes potential effects, mitigation, and residual effects for Doig River First Nation interests. No new Project effects (or effect pathways) were identified for the Amendment components. As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on Doig River First Nation and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.



**Table 20.3 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Doig River First Nation Interests**

<b>Amendment Component</b>	<b>Project Phase</b>	<b>Change in Proposed Works or Activities</b>	<b>Change in Potential Effects</b>	<b>Change in Mitigation or Enhancement Measures</b>	<b>Change in Mitigation or Enhancement Measures Success Rating</b>
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	Consideration of Treaty 8 Planning and Mitigation Measures (BCER 2024)	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change

## 20.2.4 Cumulative Effects

Through feedback shared in Doig River First Nation's Project-specific TLU study, Doig River First Nation stated concerns about the impact of industrial development projects within its Traditional Territory (Firelight 2014a). Of primary concern are adverse effects upon wildlife, plants, water quality and fish. Doig River First Nation also identified continued use, habitation and access to lands and waters of being of critical importance (Firelight 2014a).

Residual cumulative effects on Doig River First Nation interests are expected to be consistent for the Amendment as compared to the approved route. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.

The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including Moberly Lake, the Upper Moberly River and the Peace River, which were identified as areas of interest by Doig River First Nation. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing residual cumulative effects on Doig River First Nation's interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 as well as applicable Treaty 8 Planning and Mitigation Measures, as required will also reduce residual cumulative effects on Doig River First Nation's interests and enhance restoration efforts in the Amendment area.



PRGT will continue to engage with Doig River First Nation to practically address any Project-specific issues related to cumulative effects on the nation's interests. Information will be reviewed as it is received by Doig River First Nation to determine if any additional mitigation measures are required.

## **20.2.5 Disproportionately Distributed Effects on Doig River First Nation Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Doig River First Nation's members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect Doig River First Nation members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect Doig River First Nation members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade).
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Doig River First Nation members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect Doig River First Nation members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of Doig River First Nation members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with Doig River First Nation, PRGT aims to reduce these disproportionate effects.

## **20.2.6 Risks and Data Uncertainty**

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and, the implementation of mitigation measures and conditions. Confidence in the predicted effects on Doig River First Nation's interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with Doig River First Nation advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage Doig River First Nation to enhance the consideration of Doig River First Nation's interests and reduce uncertainty.



## 20.3 Halfway River First Nation

### 20.3.1 Existing Conditions

#### 20.3.1.1 Rights, Governance, and Legal Characteristics

Halfway River First Nation is one of four Dane-zaa (Beaver-speaking) communities of the Peace River region in northeastern British Columbia (BCAFN 2023b; Halfway River Group 2023). The nation's main community is in Wonowon, which is approximately 75 km northwest of Fort St. John (BCAFN 2023b; CIRNAC 2024c; Halfway River Group 2023). Halfway River First Nation is a signatory to Treaty 8; although the treaty was signed in 1899, the nation did not adhere to the treaty until 1914 (BCAFN 2023b; CIRNAC 2024c; Province of British Columbia 2023b). Prior to 1970s, the nation was part of the Hudson Hope Band, which also included West Moberly First Nations (Halfway River Group 2023). The communities separated in 1977 so that each could become an independent band; Halfway River First Nation is Band No. 546 (BCAFN 2023b; CIRNAC 2024c; Halfway River Group 2023).

Halfway River First Nation is governed under a custom electoral system with a Chief and six Councillors elected to a four-year term (CIRNAC 2024c). Halfway River First Nation is affiliated with the Treaty 8 Tribal Association (CIRNAC 2024c).

**Table 20.4 Halfway River First Nations Elected Officials**

Title	Name	Appointment Date	Expiry Date
Chief	Darlene Hunter	12/14/2020	12/13/2024
Councillor	Joyce Audit (Achla)	12/14/2020	12/13/2024
Councillor	Maizie Metecheah	12/14/2020	12/13/2024
Councillor	Lori Ann Wokeley	12/14/2020	12/13/2024
Councillor	Linda Brady	12/13/2022	12/12/2026
Councillor	William Field	12/13/2022	12/12/2026
Councillor	Charmayne Hunter	12/13/2022	12/12/2026

Source: CIRNAC 2024c

#### 20.3.1.1.1 Land Management, Claims, and Agreements

Halfway River First Nation administers one reserve, Halfway River 168 in the Peace River District, which covers an area of approximately 3,988 ha (CIRNAC 2024c). Halfway River 168 is approximately 90 km northeast of the Eastern Route Alternative.

Halfway River First Nation has initiated three claims since 2010 and each of these claims has been settled with the Federal government (CIRNAC 2024a). These include a claim made in 2010 regarding reserve #168 and the expropriation of lands for Highway 117, and the most recent claim was initiated in 2022 regarding the nation's Treaty 8 land entitlement (CIRNAC 2024a).





Halfway River First Nation has signed several agreements with the Province of British Columbia and industry proponents since 2015 regarding shared decision making for coal, oil and gas, and natural gas projects proposed in its territory (Province of British Columbia 2023b).

On January 18, 2023, the Province of British Columbia reached agreement with Treaty 8 First Nations, including Halfway River First Nation, in response to the Yahey decision. This resulted in the Consensus Document, which included a letter of agreement and a revenue sharing agreement signed with Halfway River First Nation to support the nation's management and stewardship objectives for wildlife, lands, resources, and cumulative effects, and included the identification of Enhanced Management Corridors (EMCs) in the nation's territory and associated industry-specific (e.g., forestry, oil and gas) mitigation measures (HRFN 2023a, 2023b). These areas are not intersected by the Eastern Route Alternative.

### **20.3.1.2 Population**

As of April 2024, Halfway River First Nation had a registered population of 303 individuals. Of the 136 living on reserve, 76 were male and 60 were female; of the seven living on other reserves, three were male and four were female; and of the 160 living off reserve, 83 were male and 77 were female (CIRNAC 2024c).

### **20.3.1.3 Preliminary Overview of Halfway River First Nation Key Interests and Concerns**

Through a review of information considered in the Application, engagement feedback, the Project-specific TLU study (DMCS and HRFN 2014), and from publicly available information, the following is a summary of Halfway River First Nation's interests and concerns relevant to the Amendment area. Disruption of governance was not specifically assessed in the Application; however, these interests were included in the EAO Assessment Report and are described below (EAO 2014a).

Through engagement on the Eastern Route Alternative, Halfway River First Nation requested additional information on what PRGT is doing to reduce cumulative effects regarding the currently permitted route. PRGT responded that in order to address concerns heard from Indigenous Nations the Project is exploring routing options that are within existing disturbances in order to reduce potential cumulative effects.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Halfway River First Nation. Any new information brought forward by Halfway River First Nation will be reviewed and considered by PRGT.

#### **20.3.1.3.1 Disruption of Harvesting**

In the Application (Section 33.2), Halfway River First Nation identified potential adverse effects on plant gathering and potential adverse cumulative effects on aquatic and terrestrial wildlife and wildlife and wildlife habitat, including moose and other ungulates as key interests and concerns (PRGT 2014a). Species of importance to Halfway River First Nation are likely to be present in the Amendment area (PRGT 2014a; S. 33.2). Halfway River First Nation previously reported that the approved route area is



encompassed by important hunting, trapping, and fishing areas, as well as berry and food plant collecting areas (DMCS and HRFN 2014). Halfway River First Nation has also previously expressed concerns about cumulative effects within its Traditional Territory. Halfway River First Nation previously reported that moose is considered an important big game species for the nation; however, the size of the regional moose population is not as large as it once was, and they attributed this decline to various industrial developments (T8FNCAT 2012). Halfway River First Nation has also previously reported that caribou populations have declined (Stantec 2021). Halfway River First Nation stated that the Peace Moberly Tract has important moose habitat, as do the areas surrounding Farrell Creek, the Peace River, and the Halfway River. The islands of the Peace River were identified as moose calving areas (T8FNCAT 2012).

Halfway River First Nation also previously expressed concern about the effects of past industrial and other developments on the composition, migration, and spawning behaviour of culturally important and harvested fish species, and expressed concern regarding changes to fish habitats, watercourses, water quality and wetlands in its territory (e.g., through chemical or other contamination; sedimentation; introduction of construction debris or refuse abandonment) (PRGT 2014a; Fasken Martineau 2013b; TERA 2013, 2014a, 2014b, 2014c). Halfway River First Nation reported that south along the Moberly River, is an area rich in creeks and rivers and is an important fishing resource area (DMCS and HRFN 2014).

The protection of wetlands is a priority for Halfway River First Nation, and nation members previously expressed concerns regarding development-driven effects on wetlands (PRGT 2014a; TERA 2014c). Halfway River First Nation also previously expressed concern around large forestry cut blocks (as well as other developments) that have contributed to the introduction of invasive species in its territory, as these invasive species are perceived to degrade the environment and overall habitat function for plant species of cultural importance (Spectra Energy 2019; Stantec 2021). Halfway River First Nation indicated that the area south of the Peace River Canyon, is an important medicinal plant gathering area (DMCS and HRFN 2014).

A harvesting area near Callazon Creek is intersected by the Eastern Route Alternative. The Eastern Route Alternative is not anticipated to interact with the remaining harvesting areas described above that are within Halfway River First Nation's Traditional Territory.

#### 20.3.1.3.2 Disruption or Reduced Use of Trails and Travelways

In the Application (Section 33.2), Halfway River First Nation identified potential adverse effects on transportation corridors, including overland trails and water routes, such as rivers, creeks, and lakes as key interests and concerns (PRGT 2014a). Halfway River First Nation previously reported that transportation corridors, including overland trail systems and water routes via rivers, lakes, and creeks, provide Halfway River First Nation members with access to fishing areas, hunting grounds, traplines, plant and berry collection areas, spiritual sites, villages, and camps (DMCS and HRFN 2014).

Halfway River First Nation previously identified concerns with alteration of trails in the areas of Bear Flats, Cache Creek, Halfway River, Moberly River, and the Peace Moberly Tract (Fasken Martineau 2013b). Halfway River First Nation also identified three overland trails in the Beryl Prairie area. The Peace River Canyon was identified as a region that supports several important water routes (DMCS and HRFN 2014).



A canoe/steamboat route follows Williston Lake west of Finlay and continues south to Kerry Lake. The canoe/steamboat route is intersected by the Eastern Route Alternative. The Eastern Route Alternative is not anticipated to interact with the remaining trails and travelways described above that are within Halfway River First Nation's Traditional Territory.

#### 20.3.1.3.3 Disruption or Reduced Use of Habitation Areas

Halfway River First Nation previously noted that there are numerous harvesting and occupancy sites, both historic and current, that exist within its Traditional Territory (Fasken Martineau 2013b; DMCS and HRFN 2014). Halfway River First Nation previously expressed concerns that the approved route will affect campsites and habitation areas (DMCS and HRFN 2014).

#### 20.3.1.3.4 Disruption or Reduced Use of Gathering Areas and Sacred Areas

In the Application (Section 33.2), Halfway River First Nation identified potential adverse effects on sacred areas, including the potential desecration of unmarked gravesites and other spiritual sites, removal of place names from the traditional landscape, and access restrictions to traditional use sites as key interests and concerns (PRGT 2014a). Halfway River First Nation previously noted concerns that natural resource development activities may displace or eliminate placenames, resulting in their removal from the community's collective memory; they further noted that traditional knowledge is connected to place and therefore not transferrable geographically, stating that if a place can no longer be accessed, the knowledge that is tied to that place is also lost permanently (DMCS and HRFN 2014). Halfway River First Nation previously expressed concern about the potential effects of industrial activity and development on ancestral gathering places used for camping and habitation, fishing and hunting, travel routes, ceremonial and sacred areas, burial sites, trails, freshwater springs, and associated oral histories, specifically in the areas of the Peace River, Bear Flats, Cache Creek, the Halfway River, the Moberly River, and the Peace Moberly Tract (Fasken Martineau 2013b). Sacred sites known to be near waterways and the confluence of the Halfway and Peace Rivers, near Attachie, are of importance to Halfway River First Nation (T8FNCAT 2012). There are also multiple unmarked Dane-za burials associated with the 1919 Spanish influenza epidemic, including the burial of Chief Attachie. These unmarked burials are reported to be located in the Peace River Valley; however, exact locations are unknown (Fasken Martineau 2013b). Halfway River First Nation previously identified the area from Farrell Creek south to the Moberly River as a culturally significant area that contains placenames, gravesites and other spiritually significant locations (DMCS and HRFN 2014).

The Eastern Route Alternative is not anticipated to interact with the important areas described above that are within Halfway River First Nation's Traditional Territory.

#### 20.3.1.3.5 Disruption of Cultural Transmission

Disruption of cultural transmission was assessed in the Application (PRGT 2014a; Section 33.2.12). Halfway River First Nation previously reported that the region has supported resource procurement and its teachings for both past and present generations and the continual availability of these resources is paramount to Halfway River First Nation (DMCS and HRFN 2014). Halfway River First Nation also previously noted the importance of certain sites that are associated with specific stories and reported that



there are cultural transmission sites in the areas of Bear Flats, Cache Creek, Halfway River, Moberly River, and the Peace Moberly Tract (Fasken Martineau 2013b; DMCS and HRFN 2014).

The Eastern Route Alternative is not anticipated to interact with the cultural transmission sites described above that are within Halfway River First Nation's Traditional Territory.

#### **20.3.1.3.6 Disruption of Governance**

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws, and governance systems. Halfway River First Nation has not identified any issues related to disruption of governance in addition to those described above.

### **20.3.2 Residual Effects on Halfway River First Nation Interests**

Residual effects of the Amendment on Halfway River First Nation interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that Halfway River First Nation members may choose not to pursue their interests near Project activities.

At the time of the Application, Halfway River First Nation had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, gathering areas, sacred areas, and cultural transmission. Halfway River First Nation had not identified any issues related to governance; however, as described in Section 20.3.1, additional interests have been considered for Halfway River First Nation based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the area south of the Peace River Canyon and south along the Moberly River, which were identified as areas of interest by Halfway River First Nation. As a result, these areas are not anticipated to be affected to the same extent.

#### **20.3.3 Changes to Characterization of Residual Effects on Halfway River First Nation Interests**

The EAO Assessment Report did not include a detailed characterization of residual effects on Halfway River First Nation's interests. Based on information available pertaining to Halfway River First Nation interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by Halfway River First Nation in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application.



Although the Amendment would reduce the overall Project footprint (i.e., approximately 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted negligible impacts on Halfway River First Nation's trapping and fishing interests and minor impacts on Halfway River First Nation's hunting, plant gathering, cultural sites, trails and travelways interests (EAO 2014a). Project residual effects on Halfway River First Nation interests were characterized as low magnitude (PRGT 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.5 summarizes potential effects, mitigation, and residual effects for Halfway River First Nation interests. No new Project effects (or effect pathways) were identified for the Amendment components.

As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on Halfway River First Nation and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.

**Table 20.5      Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Halfway River First Nation Interests**

<b>Amendment Component</b>	<b>Project Phase</b>	<b>Change in Proposed Works or Activities</b>	<b>Change in Potential Effects</b>	<b>Change in Mitigation or Enhancement Measures</b>	<b>Change in Mitigation or Enhancement Measures Success Rating</b>
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	Consideration of Treaty 8 Planning and Mitigation Measures (BCER 2024)	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change



#### **20.3.4 Cumulative Effects**

Through feedback shared in their Project-specific TLU study (DMCS and HRFN 2014), Halfway River First Nation stated concerns about the impact of development projects within its Traditional Territory. Of primary concern are any adverse effects upon existing dwellings, spiritual sites, water quality, food and medicinal plants, animal welfare and subsequent fishing, hunting, trapping, and plant gathering activities due to the development of the Amendment. Halfway River First Nation proposes a mitigation framework for addressing impacts, and expects that PRGT will engage with Halfway River First Nation and follow the mitigation framework once impacts are further characterized by both parties.

Residual cumulative effects on Halfway River First Nation interests are expected to be consistent with the Amendment as compared to the approved route. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.

The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the area south of the Peace River Canyon and south along the Moberly River, which were identified as areas of interest by Halfway River First Nation. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing cumulative effects on Halfway River First Nation's interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 as well as applicable Treaty 8 Planning and Mitigation Measures, as required i will also reduce residual cumulative effects on Halfway River First Nation's interests and enhance restoration efforts in the Amendment area.

PRGT will continue to engage with Halfway River First Nation to practically address any Project-specific issues related to cumulative effects on the nation's interests. Information will be reviewed as it is received by Halfway River First Nation to determine if any additional mitigation measures are required.

#### **20.3.5 Disproportionately Distributed Effects on Halfway River First Nation Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Halfway River First Nation's members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect Halfway River First Nation members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations



- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect Halfway River First Nation members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade).
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Halfway River First Nation members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect Halfway River First Nation members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of Halfway River First Nation members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with Halfway River First Nation, PRGT aims to reduce these disproportionate effects.

### **20.3.6 Risks and Data Uncertainty**

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects, and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and the implementation of mitigation measures and conditions. Confidence in the predicted effects on Halfway River First Nation's interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with Halfway River First Nation advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage Halfway River First Nation to enhance the consideration of Halfway River First Nation's interests and reduce uncertainty.

## **20.4 McLeod Lake Indian Band**

### **20.4.1 Existing Conditions**

#### **20.4.1.1 Rights, Governance and Legal Characteristics**

McLeod Lake Indian Band is a signatory of Treaty 8. McLeod Lake Indian Band advised the Government of Canada of their intent to join Treaty 8 in 1987; negotiations commenced in 1992, with McLeod Lake Indian Band entering into Treaty 8 in April of 2000 (MLIB 2023). McLeod Lake Indian Band is governed under a custom electoral system with a Chief and six Councillors elected to a three-year term (CIRNAC 2024d).



**Table 20.6 McLeod Lake Indian Band Elected Officials**

<b>Title</b>	<b>Name</b>	<b>Appointment Date</b>	<b>Expiry Date</b>
Chief	Harlee Chingee	06/05/2023	06/05/2026
Councillor	Jane Inyallie	06/05/2023	06/05/2026
Councillor	Shelby Mitchell	06/05/2023	06/05/2026
Councillor	Sonya Solonas	06/05/2023	06/05/2026
Councillor	Hugh Tweed	06/05/2023	06/05/2026
Councillor	Anita Vallee	06/05/2023	06/05/2026
Councillor	Jodie Ware	06/05/2023	06/05/2026

Source: CIRNAC 2024d

#### 20.4.1.1.1 Land Management, Claims, and Agreements

McLeod Lake Indian Band (Band No. 618) administers 22 reserves covering an area of approximately 18,285 ha (CIRNAC 2024d):

- McLeod Lake 1
- McLeod Lake 5
- Arctic Lake 10
- Blue Lake 24
- Carp Lake 3
- Carp Lake South 7
- Davie Lake 28
- Finlay Bay 21
- Hominka 11
- Kerry Lake East 9
- Kerry Lake West 8
- Mackenzie 19
- McIntyre Lake 23
- Pack River 2
- Quaw Island 25
- Sas Mighe Indian 32
- Tacheeda Lake 14
- Tom Cook 26
- War Lake 4
- Weedon Carp 6
- Weedon Lake 27
- Weston Bay 20

Through treaty negotiations, McLeod Lake Indian Band acquired eight areas of non-reserve land (1 ha each) for hunting, trapping, and berry picking purposes at the following locations (MLIB 1999):

- Colbourne Creek
- Reynolds Creek
- Chuyazega Lake





- Grayling Lake
- Firth Lake
- McLeod Lake
- Parsnip River
- Isadore Creek

McLeod Lake Indian Band also purchased two fee-simple lands following the signing of the Treaty 8 Adhesion (MLIB 1999):

- Summit Lake (56 ha)
- Mackenzie Junction (43 ha)

McLeod Lake Indian Band's nearest populated land base, McLeod Lake 5, is located approximately 10 km south of the Eastern Route Alternative.

In January 2023, the Province of British Columbia reached agreement with Treaty 8 First Nations, including McLeod Lake Indian Band, in response to the Yahey decision. This resulted in a May 2023 agreement which outline co-management and stewardship of the land and natural resources (Province of British Columbia 2023c). Details regarding the scope and implementation of these agreements are not yet publicly available.

#### **20.4.1.2 Population**

As of April 2024, McLeod Lake Indian Band had a registered population of 570 members. Of the 96 living on reserve, 45 were male and 51 were female; of the 35 living on other reserves, 22 were male and 13 were female; one male lives on Crown land; and of the 436 living off reserve, 191 were male and 245 were female (CIRNAC 2024d).

#### **20.4.1.3 Preliminary Overview of McLeod Lake Indian Band Key Interests and Concerns**

Through a review of information considered in the Application, engagement feedback, the Project-specific TLU study (Firelight 2015), and from publicly available information, the following is a summary of McLeod Lake Indian Band's interests and concerns relevant to the Amendment area.

Through engagement on the Eastern Route Alternative, McLeod Lake Indian Band expressed concerns around the original permitted route crossing into the Callazon and Mugaha valleys, recommending a re-route to avoid both through the Pine Pass. McLeod Lake Indian Band expressed the following concerns regarding the Eastern Route Alternative regarding ecological, environmental and legal concerns:

- McLeod Lake Indian Band requested avoidance of a stream used for drinking water. McLeod Lake Indian Band requested collaboration to find a solution, asking about feasibility of HDD or boring the section to completely avoid the area.



- Concerns regarding erosion and sediment control, recommending trenchless options.
- Requested access controls are implemented, with revegetation occurring following the completion of construction.
- Expressed a preference for the Eastern Alternative Route (Option 1)

Disruption of cultural transmission and disruption of governance was not specifically assessed in the Application; however, these interests were included in the EAO Assessment Report and are described below (EAO 2014a).

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from McLeod Lake Indian Band. Any new information brought forward by McLeod Lake Indian Band will be reviewed and considered by PRGT.

#### 20.4.1.3.1 Disruption of Harvesting

In the Application (Section 33.3), McLeod Lake Indian Band identified potential adverse effects on rivers, creeks, and plant gathering areas as key interests and concerns (PRGT 2014a). McLeod Lake Indian Band previously reported that McLeod Lake Indian Band extensively uses the approved route area for hunting, fishing, trapping, gathering berries and other plant materials, and camping (Firelight 2015).

McLeod Lake Indian Band reported that hunting is not only important for subsistence, but also for food, clothing, and medicine. McLeod Lake Indian Band indicated that animal populations are in decline and harvesters must travel further to find animals (Firelight 2015). McLeod Lake Indian Band expressed concern regarding potential effects of the Project on wildlife, including noise, habitat destruction and fragmentation and changes in predator-prey dynamics (Firelight 2015). McLeod Lake Indian Band also previously expressed concerns regarding changes in wildlife, reporting animals with green or yellow internal organs and a general decline in animal health particularly around areas of industrial development. McLeod Lake Indian Band reported that Tsedeka Creek is important moose habitat. The Mugaha Valley, east of the Williston Reservoir, is an important area for hunting and trapping. Mount Morfee and the surrounding area are widely reported as a rich hunting area for groundhog and other game (Firelight 2015).

McLeod Lake Indian Band previously reported that fishing is an important activity, noting the importance of both water quality and quantity in the approved route area (Firelight 2015). McLeod Lake Indian Band also previously expressed concerns regarding industrial pollution and contamination of wetlands and waterways (TERA 2013). They are particularly concerned about water quality at pipeline watercourse crossings (NGTL 2015c). McLeod Lake Indian Band has noted a decline in fishing and water quality in its traditional territory due to industrial activity, particularly the mercury contamination within the Williston Reservoir watershed, noting that many McLeod Lake Indian Band members have stopped eating harvested fish. McLeod Lake Indian Band reported that fishing occurs along Mugaha Creek, Peace River, and Sukunka River (Firelight 2015).



McLeod Lake Indian Band reported that gathering berries and plants is an important subsistence and cultural activity. Harvesters return to known plant harvesting sites year after year and are also always on the lookout for new areas, often picking berries while they are camping, fishing, or hunting (Firelight 2015). McLeod Lake Indian Band noted that healthy vegetation supports healthy wildlife populations, and species such as black spruce, birch, tamarack, jack pine, and aspen are important to moose and other ungulates (TERA 2013). McLeod Lake Indian Band previously reported that harvesting areas have become limited due to industrial development. McLeod Lake Indian Band expressed concerns regarding the chemical contamination of berries and the resulting adverse health effects (NGTL 2015c; Firelight 2015). McLeod Lake Indian Band identified the Mugaha Valley, east of the Williston Reservoir, as an important area for gathering berries and other plant materials (Firelight 2015).

Tsedeka Creek, Mugaha Valley and Mugaha Creek, Peace River, and Sukunka River were previously identified as part of McLeod Lake Indian Band's review of the approved route. With the Eastern Route Alternative, there is no anticipated interaction with these harvesting areas described above. They are, however, located within McLeod Lake Indian Band's Traditional Territory.

#### 20.4.1.3.2 Disruption or Reduced Use of Trails and Travelways

In the Application (Section 33.3), McLeod Lake Indian Band identified potential adverse effects from the creation of access routes in the vicinity of the approved route, which would increase access for non-local residents (PRGT 2014a). McLeod Lake Indian Band previously reported that transportation values include trails used for hunting, trapping, and accessing campsites; as well as water routes used for accessing cabins, traplines, preferred hunting, and fishing areas (Firelight 2015).

McLeod Lake Indian Band previously reported that trails were also historically important for accessing traplines and hunting and gathering areas, as well as a means of communication (Big Sky 2013; CER 2023). The Rocky Mountain Portage Trail extends from the east end of Williston Reservoir along the north side of the Peace River, then south to the end of Charlie Lake, and east into Alberta (Big Sky 2013). McLeod Lake Indian Band reported traveling between Fort McLeod, Alberta and Fort St. John along the Parsnip, Finlay, and Peace Rivers (CER 2023). McLeod Lake Indian Band previously reported that the southern end of the Williston Reservoir, near the confluence of the Pack and Parsnip rivers, is a travel route that precedes the construction of the WAC Bennett Dam (Firelight 2015). McLeod Lake Indian Band has previously expressed concerns about the Kiskatinaw River, an old thoroughfare that was once used for travel (CER 2023).

The southern end of the Williston Reservoir, specifically the Pack and Parsnip rivers, are intersected by the Eastern Route Alternative. The remaining trails and travelways described above are within McLeod Lake Indian Band's Traditional Territory. The Eastern Route Alternative is not anticipated to interact with those trails and travelways.



#### 20.4.1.3.3 Disruption or Reduced Use of Habitation Areas

McLeod Lake Indian Band previously indicated that habitation values include temporary or occasional, and permanent or seasonal, camps and cabins (Firelight 2015). McLeod Lake Indian Band previously reported that numerous harvesting and occupancy sites, both historic and current, exist within its Traditional Territory (Big Sky 2013). The Mugaha Valley, east of the Williston Reservoir, is an important area for camping (Firelight 2015). The Eastern Route Alternative is not anticipated to interact with the Mugaha Valley and east of the Williston Reservoir.

#### 20.4.1.3.4 Disturbance or Reduced Use of Gathering Areas and Sacred Areas

McLeod Lake Indian Band previously expressed concerns regarding disturbance of spiritual and ceremonial sites, noting that connection to the land is essential to members' spirituality (Firelight 2015). McLeod Lake Indian Band previously reported that members maintain a strong spiritual connection to the landscape and sacred sites and burial grounds are located throughout its Traditional Territory. McLeod Lake Indian Band stated there is a potential for gravesites to be located anywhere members traveled in the past (Rescan 2013; TERA 2013). McLeod Lake Indian Band ascribes cultural value to the entire Peace River valley from the Williston Reservoir to the Alberta border. McLeod Lake Indian Band uses the Peace River as a place for prayer and gatherings and storytelling, as well as the transfer for knowledge to younger generations (Big Sky 2013). The Eastern Route Alternative is not anticipated to interact with the harvesting areas described above that are within McLeod Lake Indian Band's Traditional Territory.

#### 20.4.1.3.5 Disruption of Cultural Transmission

McLeod Lake Indian Band previously reported concerns about the loss of the sense of connection to the landscape and opportunities for cultural transmission due to the dramatic changes already taking place due to industrial development (Firelight 2015). McLeod Lake Indian Band also noted that their culture and identity is rooted in a close connection to the land and animals and the transmission of culture and traditional cultural practices from generation to generation is critical (Firelight 2015).

#### 20.4.1.3.6 Disruption of Governance

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws and governance systems. McLeod Lake Indian Band has not identified any issues related to disruption of governance in addition to those described above.

### 20.4.2 Residual Effects on McLeod Lake Indian Band Interests

Residual effects of the Amendment on McLeod Lake Indian Band interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that McLeod Lake Indian Band members may choose not to pursue their interests near Project activities.



At the time of the Application, McLeod Lake Indian Band had identified interests and issues related to hunting, trapping, fishing, plant gathering, habitation areas, gathering areas, and sacred areas. McLeod Lake Indian Band had not identified any issues related to trails and travelways, cultural transmission, or governance; however, as described in Section 20.4.1, additional interests have been considered for McLeod Lake Indian Band based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the Callazon and Mugaha valleys, which were identified as areas of interest by McLeod Lake Indian Band. As a result, these areas are not anticipated to be affected to the same extent.

### **20.4.3 Changes to Characterization of Residual Effects on McLeod Lake Indian Band Interests**

The EAO Assessment Report did not include a detailed characterization of residual effects on McLeod Lake Indian Band's interests. Based on information available pertaining to McLeod Lake Indian Band interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by McLeod Lake Indian Band in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application.

Although the Amendment would reduce the overall Project footprint (i.e., approximately 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted minor impacts on McLeod Lake Indian Band's trapping, fishing, plant gathering, and cultural sites, trails, and travelways interests and minor to moderate impacts on McLeod Lake Indian Band's hunting interests (EAO 2014a). Project residual effects on McLeod Lake Indian Band interests were characterized as low magnitude (PRGT 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.7 summarizes potential effects, mitigation, and residual effects for McLeod Lake Indian Band interests. No new Project effects (or effects pathways) were identified for the Amendment components.

As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on McLeod Lake Indian Band and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.



**Table 20.7 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – McLeod Lake Indian Band Interests**

Amendment Component	Project Phase	Change in Proposed Works or Activities	Change in Potential Effects	Change in Mitigation or Enhancement Measures	Change in Mitigation or Enhancement Measures Success Rating
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	Consideration of Treaty 8 Planning and Mitigation Measures (BCER 2024)	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change

#### 20.4.4 Cumulative Effects

Through feedback shared in their Project-specific TLU study, McLeod Lake Indian Band stated concerns about the impact of development projects within its Traditional Territory (Firelight 2015). The nation further noted that large-scale industrial development has increasingly put pressure on McLeod Lake Indian Band's traditional land base and traditional activities protected by Treaty 8 (Firelight 2015).

Residual cumulative effects on McLeod Lake Indian Band interests are expected to be consistent for the Amendment as compared to the approved route. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.

The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the Callazon and Mugaha valleys, which were identified as areas of interest by McLeod Lake Indian Band. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing residual



cumulative effects on McLeod Lake Indian Band's interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 as well as applicable Treaty 8 Planning and Mitigation Measures, as required will also reduce residual cumulative effects on McLeod Lake Indian Band interests and enhance restoration efforts in the Amendment area.

PRGT will continue to engage with McLeod Lake Indian Band to practically address any Project-specific issues related to cumulative effects on the nation's interests. Information will be reviewed as it is received by McLeod Lake Indian Band to determine if any additional mitigation measures are required.

#### **20.4.5 Disproportionately Distributed Effects on McLeod Lake Indian Band Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of McLeod Lake Indian Band's members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect McLeod Lake Indian Band members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect McLeod Lake Indian Band members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade).
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect McLeod Lake Indian Band members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect McLeod Lake Indian Band members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of McLeod Lake Indian Band members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with McLeod Lake Indian Band, PRGT aims to reduce these disproportionate effects.



20.4.6 Risks and Data Uncertainty

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects, and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and the implementation of mitigation measures and conditions. Confidence in the predicted effects on McLeod Lake Indian Band’s interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with McLeod Lake Indian Band advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage McLeod Lake Indian Band to enhance the consideration of McLeod Lake Indian Band’s interests and reduce uncertainty.

20.5 Nak’azdli Whut’en

20.5.1 Existing Conditions

20.5.1.1 Rights, Governance and Legal Characteristics

Nak’azdli Whut’en is a non-treaty Nation located mainly in and around Fort St. James. Nak’azdli Whut’en is governed under a custom electoral system with a Chief and four Councillors elected to a four-year term (CIRNAC 2024e). Nak’azdli Whut’en is in Stage 4 treaty negotiations with the British Columbia Treaty Commission, and negotiations regarding reconciliation initiatives are ongoing (GoBC 2024a).

Table 20.8 Nak’azdli Whut’en Elected Officials

Title	Name	Appointment Date	Expiry Date
Chief	Aileen Prince	08/27/2020	08/31/2024
Councillor	Alyssa Lepka	08/27/2020	08/31/2024
Councillor	Elizabeth Sam	08/27/2020	08/31/2024
Councillor	Fred Sam	08/27/2020	08/31/2024
Councillor	Murial Sam	08/27/2020	08/31/2024

Source: CIRNAC 2024e

20.5.1.1.1 Land Management, Claims, and Agreements

Nak’azdli Whut’en (Band No. 614) administers 17 reserves covering an area of approximately 1500 ha (CIRNAC 2024e):

- Beaver Islands 8
- Carrier Lake 15
- Great Bear Lake 16
- Inzana Lake 12





- Mission Lands No. 17
- Nak'Azdli
- Nehounlee Lake (Six Mile Lake) 13
- Six Mile Meadow 6
- Sowchea 3
- Sowchea 3A
- Stuart Lake (Dunah Island) 10
- Stuart Lake (Hungry Island) 9
- Tatsadah Lake 14
- Tatselawas (Stuart River) 2
- Uzta (Nahounli Creek) 4
- Uzta (Nahounli Creek) 7A
- Williams Prairie Meadow 1A

Nak'azdli Whut'en's nearest populated land base, Williams Prairie Meadow 1A, is located approximately 73 km southwest of the Eastern Route Alternative.

#### **20.5.1.2 Population**

As of April 2024, Nak'azdli Whut'en had a registered population of 2,063 members. Of the 705 living on reserve, 363 were male and 342 were female; of the 66 living on other reserves, 36 were male and 30 were female; of the four living on own Crown Land, three were male and one was female; and of the 1,288 living off reserve, 620 were male and 668 were female (CIRNAC 2024e).

#### **20.5.1.3 Preliminary Overview of Nak'azdli Whut'en Key Interests and Concerns**

Through a review of information considered in the Application, engagement feedback, the Project-specific TLU study (CSTC 2014b), and from publicly available information, the following is a summary of Nak'azdli Whut'en's interests and concerns relevant to the Amendment area.

Disruption of cultural transmission and disruption of governance were not specifically assessed in the Application; however, these interests were included in the EAO Assessment Report and are described below (EAO 2014a).

Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en expressed routing concerns with the approved route and requested avoiding Inzana Lake and maintaining a minimum distance of 2 km from upper Nation River. PRGT noted that the Eastern Route Alternative would be further in distance from Inzana Lake and the upper Nation River. Additionally, Nak'azdli Whut'en indicated that with electrification and the power draw for compressor stations, impacts to upstream water need to be considered.



Nak'azdli Whut'en Keyoh holders also expressed through engagement concerns regarding communicating Project updates, cumulative impacts, routing, and gaps in the spawning habitat assessment. Concerns were raised that fieldwork to support the Eastern Route Alternative were being conducted without prior notification to Keyoh holders. PRGT has committed to sending notifications to Keyoh holders prior to field work taking place with the intention that a Keyoh holder have the opportunity, where possible to attend as a Keyoh monitor. PRGT has also committed to work with Nak'azdli Whut'en and Keyoh holders to develop and implement the Construction Monitoring and Community Liaison Program and to providing Project updates and engaging on these updates on a regular basis. Keyoh Holders also indicated that the Eastern Route Alternative would bring the pipeline close to a family cabin, cross the Philip Lake Trapline, be too close to lakes and streams, and that there was a preference to avoid these areas.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Nak'azdli Whut'en. Any new information brought forward by Nak'azdli Whut'en will be reviewed and considered by PRGT.

#### 20.5.1.3.1 Disruption of Harvesting

Through engagement on the Eastern Route Alternative, Nak'azdli Whut'en indicated that salmon numbers have declined to a point of collapse and expressed concern for drought and for caribou. Nak'azdli Whut'en also reported that the Eastern Route Alternative crosses the Philip Lake Trapline.

In the Application (Section 33.7), Nak'azdli Whut'en identified potential adverse effects on wildlife and wildlife habitat, fish and fish habitat, and plant gathering areas as key interests and concerns (PRGT 2014a). Nak'azdli Whut'en's previously reported that hunting is integral to Nak'azdli Whut'en identity, culture, diet, and the exercise of Indigenous rights (CSTC 2014b). Nak'azdli Whut'en reported that large game species, in particular moose, are under increased hunting pressure (CSTC 2014b). Nak'azdli Whut'en also noted concerns about woodland caribou and their habitat, particularly around the Nation River, which is adjacent to recognized woodland caribou habitat (CSTC 2014b). Nak'azdli Whut'en previously reported that a creek south of Stuart Lake is also important for caribou migration (EAO 2014a).

Nak'azdli Whut'en expressed concerns about the health of traditionally hunted wildlife species and reported health issues, such as poor meat quality and cysts in large game species, especially moose (CSTC 2014b). Nak'azdli Whut'en also reported concerns about the potential effects of gas leaks, noise, vibration, and dust pollution on terrestrial wildlife species (CSTC 2014b). Nak'azdli Whut'en previously recommended baseline conditions for wildlife should be adequately understood, and key species (including moose and caribou) are monitored during Project activities because Nak'azdli Whut'en members rely heavily on traditionally hunted wildlife species for daily subsistence and are significant to the identity and cultural construct of Nak'azdli Whut'en members (CSTC 2014b). Hunting locations reported by Nak'azdli Whut'en include, Phillip Lakes/Creek, Sasklo Dome, Rainbow Creek, Upper Nation River, Chichnojih Lake, Kalder Lake, Sheshehadji Lake, Tzagay Lake, Cripple Creek, Cripple Lake, Inzana Lake (south), Taslinoheko Creek, Inzana Mountain, Mount Milligan area, Stuart Lake, Stuart River, and Kazcheck Creek (CSTC 2014b; EAO 2014a; DFO and NRCAN 2009; Nak'azdli Natural Resources Office 2017; Stantec 2018).



Nak'azdli Whut'en reported that trapping has always been and continues to be a significant activity for Nak'azdli Whut'en identity and cultural economy and noted that trapping provides supplementary income for many Nak'azdli Whut'en families (CSTC 2014b). Reporting that existing development activities (i.e., clear-cutting, agriculture, mining, landownership), have limited trapping resources, Nak'azdli Whut'en expressed concerns regarding the potential for the Project to create further impairment to trapping rights and resources (CSTC 2014b). Trapping locations reported by Nak'azdli Whut'en include, Hatdudatehl Lake, Phillip Lakes/Creek, Upper Nation River, Chichnojih Lake, Sheshehadji Lake, Tzagay Lake, Cripple Creek, Cripple Lake, Phillip Creek and Phillip Lake, Stuart Lakes, Stuart River and Mount Milligan area (EAO 2014a; DFO and NRCan 2009; Nak'azdli Natural Resources Office 2017).

Nak'azdli Whut'en previously reported that water plays a central role to the overall health and culture of Nak'azdli Whut'en, and that fish are an integral aspect of Nak'azdli Whut'en culture and identity (CSTC 2014b). Nak'azdli Whut'en members have expressed concerns regarding the health of white sturgeon, salmon, and waterways within close proximity to the approved route, and have further expressed concerns about leaks, damaged pipelines, and sedimentation impacting the water quality and fish habitat (CSTC 2014b). Middle River and Kazchek Creek were reported as an important fishing location and identified as prime spawning ground for salmon (CSTC 2014a; TransCanada 2014). Other fishing locations reported by Nak'azdli Whut'en include Chichnojih Lake, Kalder Lake, Sheshehadji Lake, Chuchi Lake, Tzagay Lake, Cripple Creek, Cripple Lake, Phillip Lake, Phillip Creek, Upper Nation River, Inzana Lake, Taslinoheko Creek, Rainbow Creek, Middle River, Trembleur Lake, Kazchek Creek, Mount Milligan area, Stuart River and Stuart Lakes (EAO 2014a; DFO and NRCan 2009; Nak'azdli Natural Resources Office 2017).

Nak'azdli Whut'en reported that many plant and wood materials are still commonly used (CSTC 2014b). Nak'azdli Whut'en members previously reported concerns about long-term health and viability of important traditional medicines and plant gathering sites along (and east of) Nation River (CSTC 2014b). Nak'azdli Whut'en previously raised concerns about potential effects to gathering practices including changes in habitat, effects to culturally critical plant species, real or perceived contamination of medicinal plants, reduced plant diversity and increased invasive species (EAO 2014a). Gathering locations reported by Nak'azdli Whut'en include Sasklo Dome, Sasklo Ridge, Inzana Lake (south), Inzana Mountain, Phillip Creek, Upper Nation River, Rainbow Creek, Chichnojih Lake, Kalder Lake, Sheshehadji Lake, Chuchi Lake (east), Tzagay Lake, Kazchek Creek, Mount Milligan area, Stuart River and Stuart Lakes, Cripple Creek, and Cripple Lake, as well as an important traditional medicine plant habitat in the wetlands to the east of the Nation River (EAO 2014a; DFO and NRCan 2009; Nak'azdli Natural Resources Office 2017).

Phillip Creek is intersected by the Eastern Route Alternative. The remaining harvesting areas described above are within Nak'azdli Whut'en's Traditional Territory. The Eastern Route Alternative is not anticipated to interact with these areas.



#### 20.5.1.3.2 Disruption or Reduced Use of Trails and Travelways

Nak'azdli Whut'en's previously reported that trails are an important part of Nak'azdli Whut'en culture and noted that trading with other First Nations along the west coast occurred along the Grease Trails, which extended from Nak'azdli Whut'en Traditional Territory to the west coast (CSTC 2014b). Nak'azdli Whut'en reported concerns about restricted access to traditional trails and travelways, noting that traditional trail systems may intersect or be in close proximity to the approved route (CSTC 2014a). Nak'azdli Whut'en also has raised concerns about Project effects to navigation on the waterways caused by watercourse crossing construction (EAO 2014a). Locations of interest were identified by Nak'azdli Whut'en, include traditional trail systems in the Sasklo Dome, Mount Milligan, Nation Lakes area and Nation River (CSTC 2014a; DFO and NRCan 2009). These trails and travelways are within Nak'azdli Whut'en's Traditional Territory. The Eastern Route Alternative is not anticipated to interact with these trails and travelways.

#### 20.5.1.3.3 Disruption or Reduced Use of Habitation Areas

Through engagement, Keyoh Holders stated that the Eastern Route Alternative would bring the pipeline close to a family cabin, and that there was a preference to avoid the location. The location of the cabin has been shared with PRGT and PRGT will engage with Keyoh Holders to discuss mitigation measures.

Nak'azdli Whut'en's previously stated the importance of overnight sites, which include temporary, seasonal, permanent, and occasional camp sites and cabins (CSTC 2014b). Habitation areas are found throughout Nak'azdli Whut'en's Traditional Territory and are usually located close to trapping and harvesting sites (CSTC 2014b). Nak'azdli Whut'en members have expressed concerns about potential Project effects on cabins and cabin use, including from noise, pollution, loss of plants and wildlife around the cabins/sites, loss of enjoyment and increased public access to locations (CSTC 2014b).

Nak'azdli Whut'en reported overnight sites, including Sasklo Dome, Hatdudatehl Lake, Phillip Lakes/Creek, Upper Nation River, Rainbow Creek, and Kalder Lake (CSTC 2014a). Nak'azdli Whut'en also identified habitation sites at Inzana Lake (south), Taslinoheko Creek, Chichnojih Lake, Chichnojih Creek, Sheshehadji Lake, and Chuchi Lake (east) (EAO 2014a; DFO and NRCan 2009). These overnight sites are within Nak'azdli Whut'en's Traditional Territory. The Eastern Route Alternative is not anticipated to interact with these sites.

#### 20.5.1.3.4 Disruption or Reduced Use of Gathering Areas and Sacred Areas

Nak'azdli Whut'en previously reported that sacred and gathering sites (fixed cultural sites) include burial sites, death sites, sacred sites, archaeological sites, gathering locations, and ceremonial sites (CSTC 2014b). In addition to associated traditional knowledge and cultural practices, each site has its own cultural significance that is important to Nak'azdli Whut'en cultural identity and sense of belonging (CSTC 2014b).

Nak'azdli Whut'en previously expressed concerns regarding the identification of culturally significant sites, citing reasons of cultural practices, historic destruction, scavenging, or potential site desecration. Nak'azdli Whut'en further noted that exact locations are guarded and protected by Nak'azdli Whut'en members (CSTC 2014b). Nak'azdli Band reported that there are numerous sites described as being of



sacred significance in the Nak'azdli Band's Traditional Territory, stating that the Sasklo Dome and Sasklo Ridge formation region is sacred land (EAO 2014a). Nak'azdli Whut'en members previously reported areas containing sites of cultural significance include Hatdudatehl Lake, Phillip Lakes/Creek, Upper Nation River, and Rainbow Creek, Inzana Mountain, Inzana Lake (south), Chichnojih Lake, Dolphin Lake, Kalder Lake, Sheshehadji Lake, Chuchi Lake (east), Tzagay Lake, Cripple Creek, Cripple Lake, and Taslinoheko Creek (CSTC 2014a; EAO 2014a).

Phillip Creek is intersected by the Eastern Route Alternative. While the remaining sacred sites described above are within Nak'azdli Whut'en's Traditional Territory, the Eastern Route Alternative is not anticipated to interact with these sites.

#### 20.5.1.3.5 Disruption of Cultural Transmission

Nak'azdli Whut'en's previously reported that traditional knowledge including knowledge of plants and medicines, wildlife, harvesting, hunting, and trapping sites, harvesting methods, overnight sites, cultural sites, and traditional practices are shared from one generation to the next (CSTC 2014b). Nak'azdli Whut'en explained that knowledge of legends, spirits, burials of ancestors, and the relationship Nak'azdli Whut'en has with the land is important, as it affirms where Nak'azdli Whut'en came from, and where future generations will go (CSTC 2014b). Nak'azdli Whut'en reported that members continue to heavily rely on their land and resources, including plants, animals, and other materials, and have expressed the importance sharing intergenerational knowledge for the maintenance of traditional and cultural practices (CSTC 2014b).

Nak'azdli Whut'en has also previously reported that existing development has affected the ability to conduct cultural practices due to environmental contamination, landscape disturbances due to development in the region, increased competition from outsiders and poor animal health (WCGTP 2014).

#### 20.5.1.3.6 Disruption of Governance

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws and governance systems. Nak'azdli Whut'en had not identified any issues related to disruption of governance in addition to those described above.

### 20.5.2 Residual Effects on Nak'azdli Whut'en Interests

Residual effects of the Amendment on Nak'azdli Whut'en interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that Nak'azdli Whut'en members may choose not to pursue their interests near Project activities.



At the time of the Application, Nak'azdli Whut'en had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, and sacred areas, and cultural transmission. Nak'azdli Whut'en had not identified any issues related to gathering areas, cultural transmission, or governance; however, as described in Section 20.5.1, additional interests have been considered for Nak'azdli Whut'en, based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including Inzana Lake and the upper Nation River, which were identified as areas of interest by Nak'azdli Whut'en. As a result, these areas are not anticipated to be affected to the same extent.

### **20.5.3 Changes to Characterization of Residual Effects on Nak'azdli Whut'en Interests**

The EAO Assessment Report did not include a detailed characterization of residual effects on Nak'azdli Whut'en's interests. Based on information available pertaining to Nak'azdli Whut'en interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by Nak'azdli Whut'en in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application.

Although the Amendment would reduce the overall Project footprint (i.e., approximately 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted minor impacts on Nak'azdli Whut'en's interests (EAO 2014a). Project residual effects on Nak'azdli Whut'en interests were characterized as low to moderate magnitude (PRGT 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.9 summarizes potential effects, mitigation, and residual effects for Nak'azdli Whut'en interests. No new Project effects (or effects pathways) were identified for the Amendment components. As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on Nak'azdli Whut'en and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.



**Table 20.9 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Nak’azdli Whut’en Interests**

Amendment Component	Project Phase	Change in Proposed Works or Activities	Change in Potential Effects	Change in Mitigation or Enhancement Measures	Change in Mitigation or Enhancement Measures Success Rating
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	No change	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change

## 20.5.4 Cumulative Effects

Through feedback shared in their Project-specific TLU study (CSTC 2014b), Nak’azdli Whut’en stated concerns about the impact of development projects within its Traditional Territory. Of primary concern are any adverse effects upon wildlife and wildlife habitat, fish and fish habitat, water quality, plants and harvesting areas, traditional trails habitation sites and cultural and sacred sites.

Residual cumulative effects on Nak’azdli Whut’en interests are expected to be consistent for the Amendment as compared to the approved Project. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.

The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including Inzana Lake and the upper Nation River, which were identified as areas of interest by Nak’azdli Whut’en. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the



disturbances are all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing residual cumulative effects on Nak'azdli Whut'en's interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 will also reduce residual cumulative effects on Nak'azdli Whut'en's interests and enhance restoration efforts in the Amendment area.

PRGT will continue to engage with Nak'azdli Whut'en to practically address any Project-specific issues related to cumulative effects on the nation's interests. Information will be reviewed as it is received by Nak'azdli Whut'en to determine if any additional mitigation measures are required.

## **20.5.5 Disproportionately Distributed Effects on Nak'azdli Whut'en Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Nak'azdli Whut'en's members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect Nak'azdli Whut'en members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect Nak'azdli Whut'en members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade)
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Nak'azdli Whut'en members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect Nak'azdli Whut'en members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of Nak'azdli Whut'en members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with Nak'azdli Whut'en, PRGT aims to reduce these disproportionate effects.





20.5.6 Risks and Data Uncertainty

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects, and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and the implementation of mitigation measures and conditions. Confidence in the predicted effects on Nak’azdli Whuten’s interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with Nak’azdli Whut’en advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage Nak’azdli Whut’en to enhance the consideration of Nak’azdli Whuten’s Indigenous interests and reduce uncertainty.

20.6 Saulneau First Nations

20.6.1 Existing Conditions

20.6.1.1 Rights, Governance and Legal Characteristics

Saulteau First Nations signed adhesion to Treaty 8 in 1914 and are a Dane-zaa and Cree speaking community (SFN n.d.). Saulteau First Nations is located at the east end of Moberly Lake in northeastern British Columbia. Saulteau First Nations is governed under a custom electoral system with a Chief and four Councillors elected to a three-year term (CIRNAC 2024f). Saulteau First Nations is affiliated with the Treaty 8 Tribal Association (CIRNAC 2024f).

Table 20.10 Saulteau First Nations Elected Officials

Title	Name	Appointment Date	Expiry Date
Chief	Rudy Paquette	06/27/2023	06/27/2026
Councillor	Donovan Cameron	06/27/2023	06/27/2026
Councillor	Justin Gauthier	06/27/2023	06/27/2026
Councillor	Juritha Owens	06/27/2023	06/27/2026
Councillor	Colleen Totusek	06/27/2023	06/27/2026

Source: CIRNAC 2024f

20.6.1.1.1 Land Management, Claims, and Agreements

Saulteau First Nations administers one reserve, East Moberly Lake 169 in the Peace River District, which covers an area of approximately 3,025.8 ha (CIRNAC 2024f). East Moberly Lake 169 is approximately 38 km northeast of the Eastern Route Alternative.

On January 18, 2023, the Province of British Columbia reached agreements with Treaty 8 First Nations, including Saulteau First Nations, in response to the *Yahey* decision. This resulted in the Consensus Document, which included a letter of agreement and a revenue sharing agreement were signed with Saulteau First Nations that aim to support wildlife, land, resource, and cumulative effects management.



Within the Consensus Document, areas for enhanced management and restoration have been identified. Saulteau First Nations were granted stewardship over the Lower Moberly Watershed, Sukunka Trench, Murray River Headwaters, and collaborative management planning areas (SFN 2023). These areas are not intersected by the Eastern Route Alternative.

As described in Section 20.1.6.3, Saulteau First Nations are signatories on the Caribou Partnership Agreement.

### **20.6.1.2 Population**

As of April 2024, Saulteau First Nations had a registered population of 1,404 individuals. Of the 381 living on reserve, 186 were male and 195 were female; of the 24 living on other reserves, 11 were male and 13 were female; of the 12 living on own Crown Land, four were male and eight were female; and of the 987 living off reserve, 468 were male and 519 were female (CIRNAC 2024f).

### **20.6.1.3 Preliminary Overview of Saulteau First Nations Key Interests and Concerns**

Through a review of information considered in the Application, engagement feedback, the Project-specific TLU study (Firelight 2014b), and from publicly available information, the following is a summary of Saulteau First Nations' interests and concerns relevant to the Amendment area.

Disruption of governance was not specifically assessed in the Application; however, these interests were included in the EAO Assessment Report and are described below (EAO 2014a).

Through engagement on the Eastern Route Alternative, Saulteau First Nations expressed environmental and cultural concerns with the approved route, including the approved route crossing the Peace Moberly Tract, an ACCI, impacts to crossings of the Moberly River, and impacts to sacred areas including the Klin-Se-Za protected area and Beattie Peaks/Twin Sisters. PRGT responded by reiterating commitments of working together on feasible re-route options. PRGT shared the following contextual changes regarding the re-routing options:

- Both alternative re-routing options do not impact Saulteau First Nations Treaty Land Entitlement (TLE)
- Both alternative re-routing options do not impact/affect any Saulteau First Nations ACCI
- Impacts to Caribou Partnership Agreement area are reduced with both options

Through engagement, Saulteau First Nations expressed a preference for Option 1, stating it was a better route. Saulteau First Nations noted they would like to see an eastern alternative amendment application actioned as soon as possible.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Saulteau First Nations. Any new information brought forward by Saulteau First Nations will be reviewed and considered by PRGT.



#### 20.6.1.3.1 Disruption of Harvesting

In the Application (Section 33.4), Saulteau First Nations identified potential adverse effects on traditional use sites as a key interest and concern (PRGT 2014a). Saulteau First Nations reported that its use of lands (both in the past and currently), extends through much of the upper Peace River Valley and adjacent watersheds, but is particularly focused on areas south of the Peace River, especially around Moberly Lake (Firelight 2014b). The area north of the Peace River, between the Peace and Pine Rivers, is an area that has been used for generations (Firelight 2014b). Saulteau First Nations noted the continued importance of the land for their livelihood and way of life, as the land and water, and hunting, fishing and subsistence practices remain critical to physical sustenance, social relationships, cultural transmission, and spiritual life (Firelight 2014b). Saulteau First Nations previously reported that they rely heavily upon the ACCI and the Peace Moberly Tract for sustenance. Saulteau First Nations reported that the Beryl Prairie Road is used to hunt grouse and rabbits (Firelight 2014b). Saulteau First Nations also reported that the Pine River and Peace River are important areas for hunting and trapping (Firelight 2014b; Traditions 2013). Pete Lake, Johnson Creek Road and the Hudson's Hope area have been identified as areas for hunting (Firelight 2014b).

It has been reported by Saulteau First Nations that there has been a decrease in the quality and quantity of game, which has been attributed to habitat disturbance and the cumulative effects caused by pipelines, oil and gas wells, roads and other linear disturbances associated with industry (Firelight 2014b; PRGT 2014a). Saulteau First Nations previously noted that roads, traffic noise and the increase of recreational hunters negatively affects wildlife. Ungulates such as moose, elk and caribou, were reported as declining, as well as furbearer populations (Golder 2013). Saulteau First Nations reported that the low numbers of caribou are a particular concern (Firelight 2014b).

An important issue for Saulteau First Nations is food security. The amount of contamination entering the food chain has been an issue of concern for Saulteau First Nations members as they have seen sickness in harvested moose such as growths in the meat and black blood. Because of this, harvesters explained that they cannot always eat the meat even after a successful hunt (Firelight 2014b).

Saulteau First Nations reported changes to fish and fish spawning due to water contamination, and increased sedimentation noting decreases in fish size and populations (PRGT 2014a; Olson et al. 2018). Saulteau First Nations previously expressed concerns about water quality and the health impacts of eating fish affected by industrial contamination and about the potential effects of water crossings on spawning habitat (Sunderman and Lions Gate 2013; PRGT 2014a). Saulteau First Nations has previously stated that members fish within the Peace and Moberly Rivers (Site C Joint Review Panel 2014). Saulteau First Nations also reported fishing on the Upper Moberly River, Pete Lake and Moberly Lake (Firelight 2014b).

Saulteau First Nations noted that traditionally important plants have been affected by industrial developments, increased traffic and road networks due to dust (PRGT 2014a). It was also reported that the herbicides sprayed on the cleared spaces and roads have caused harvesters to avoid these areas due to fears of contamination (Firelight 2014b). Saulteau First Nations reported the perception of contamination to the soil and traditional country foods from past oil and gas development (AiM 2021b). Previously, concerns have also been raised by Saulteau First Nations in relation to a decrease in plant



populations and the potential for effects on traditionally important plant species and the continued ability of the community to partake in traditional use activities such as harvesting (NGTL 2015c; Sunderman and Lions Gate 2013).

Saulteau First Nations reported plant gathering locations along the Upper Moberly River, and the area between the Johnson Creek Road and Pete Lake and the area north of the Peace River, between the Peace and Pine Rivers and the Twin Sisters (Firelight 2014b).

The Pine River is intersected and paralleled by the Eastern Route Alternative. The remaining harvesting areas described above are within Saulteau First Nations' Traditional Territory and the Eastern Route Alternative is not anticipated to interact with these areas.

#### 20.6.1.3.2 Disruption or Reduced Use of Trails and Travelways

Saulteau First Nations reported trails and travelways in the following areas: Clearwater Lake, Jackfish Lake, Lost Lake, Maurice Lake, Big Lake, Tent Town, Cameron Lakes Trail and Wilkie Creek (Firelight 2014b). Saulteau First Nations previously reported that along the Moberly River there is an old trail towards Mackenzie that is used for hunting for moose and other animals, making dry meat and pemmican, and picking berries; there are also many trails in the Hudson's Hope area (Firelight 2014b). These sites were previously identified as part of Saulteau First Nations' review of the approved route. With the Eastern Route Alternative, there is no anticipated interaction with these harvesting areas described above but are within Saulteau First Nations' Traditional Territory.

Saulteau First Nations previously reported that trails and travelways have been, and continue to be, used by Saulteau First Nations to access harvesting areas within its Traditional Territory, with waterways noted as important travel routes (Firelight 2014b). Saulteau First Nations reported that due to pipeline routes following the path of least resistance, along gentle slopes and sometimes game trails, just as travel routes do, there is a potential for land use conflicts (PRGT 2014a). It has also been reported that industrial activity in Saulteau First Nations' Traditional Territory has decreased its access to natural resources while increasing non-Indigenous access to resources (Firelight 2014b; Olson et al. 2018; Firelight 2014b; Site C Joint Review Panel 2014). Saulteau First Nations has identified Project interactions that may affect transportation routes such as construction and clearing (Firelight 2014b).

#### 20.6.1.3.3 Disruption or Reduced Use of Habitation Areas

Saulteau First Nations previously reported that habitation values can include temporary, seasonal, or permanent camps and cabins. Saulteau First Nations reported habitation areas throughout its Traditional Territory and are concerned that Project-related construction and clearing may disrupt habitation areas (Firelight 2014b).

Saulteau First Nations reported camping areas along the Upper Moberly River and north of the Peace River, between the Peace and Pine Rivers, and the Twin Sisters (Firelight 2014b). The Pine River is intersected and paralleled by the Eastern Route Alternative. The remaining camping areas described above are within Saulteau First Nations' Traditional Territory. The Eastern Route Alternative is not anticipated to interact with these areas.



#### 20.6.1.3.4 Disruption or Reduced Use of Gathering Areas and Sacred Areas

In the Application (Section 33.4), Saulteau First Nations identified adverse effects on the ability to practice traditional activities in proximity to the Twin Sisters mountains (Beattie Peaks), which are considered sacred by the nation (PRGT 2014a). Saulteau First Nations previously reported that spiritual sites, such as the Twin Sisters (Beattie Peaks) are of crucial significance and expressed concern that these sites are highly vulnerable to industrial development Section 33.4 (PRGT 2014a). Saulteau First Nations identified the Twin Sisters as a spiritual place, a ceremonial site, a gathering place for the community, and an area for camping and subsistence use including hunting and berry picking (Firelight 2014b).

Saulteau First Nations also reported that culturally important areas include sites for prayer flags, burials, sweat lodges, place names, harvesting, drying meat, teaching areas, and community culture camps (PRGT 2014a). Saulteau First Nations expressed concern regarding Sundance lodges, sweat lodges, and prayer flag sites along the Johnson Creek Road (Firelight 2014b).

Saulteau First Nations previously reported that, in the past, people were often buried where they died, and burials were often located near trails and camping areas (PRGT 2014a). As such, there is a potential for burial sites to be located throughout its Traditional Territory (PRGT 2014a). Saulteau First Nations reported that numerous harvesting and occupancy sites, both historic and current, exist within its Traditional Territory. Saulteau First Nations use of lands extends through much of the Peace River Valley and adjacent watersheds (Firelight 2014b).

Burial sites have been identified by Saulteau First Nations near Chetwynd (Olson et al. 2018). Saulteau First Nations previously expressed concerns about the noise from development construction in the Charlie Lake Cave area due to the historical and spiritual importance of the area (AiM 2021b).

Gathering areas, sacred areas, and burials described above are within Saulteau First Nations' Traditional Territory. The Eastern Route Alternative is not anticipated to interact with these areas.

#### 20.6.1.3.5 Disruption of Cultural Transmission

Saulteau First Nations previously identified sites where Knowledge Holders and youth go to engage in cultural and spiritual practices and learn about traditional ways (PRGT 2014a). Twin Sisters (Beattie Peaks), areas along Johnson Creek Road, and the area between the Peace and Pine rivers were noted by Saulteau First Nations as important sites for cultural transmission (SFN 2013). Saulteau First Nations reported concerns about the loss of connection to the landscape and opportunities for cultural transmission due to the dramatic changes already taking place due to industrial development (Firelight 2014b).

The Pine River is intersected and paralleled by the Eastern Route Alternative. The remaining sites for cultural transmission described above are within Saulteau First Nations' Traditional Territory. The Eastern Route Alternative is not anticipated to interact with these sites.



#### 20.6.1.3.6 Disruption of Governance

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws and governance systems. Saulteau First Nation had not identified any issues related to disruption of governance in addition to those described above.

### 20.6.2 Residual Effects on Saulteau First Nations Interests

Residual effects of the Amendment on Saulteau First Nations interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that Saulteau First Nations members may choose not to pursue their interests near Project activities.

At the time of the Application, Saulteau First Nations had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, gathering areas, sacred areas, and cultural transmission. Saulteau First Nations had not identified any issues related to governance; however, as described in Section 20.6.1, additional interests have been considered for Saulteau First Nations based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the Peace Moberly Tract, the ACCI, Moberly River, the Klin-Se-Za protected area, and Beattie Peaks/Twin Sisters, which were identified as areas of interest by Saulteau First Nations. As a result, these areas are not anticipated to be affected to the same extent.

### 20.6.3 Changes to Characterization of Residual Effects on Saulteau First Nations Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Saulteau First Nations' interests. Based on information available pertaining to Saulteau First Nations interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by Saulteau First Nations in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application.

Although the Amendment would reduce the overall Project footprint (i.e., up to 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted minor impacts on Saulteau First Nations' trapping, fishing, and plant gathering interests, minor to moderate impacts on Saulteau First Nations' cultural sites, trails, and travelways interests, and moderate impacts on Saulteau First Nations' hunting interests (EAO 2014a). Project residual effects on Saulteau



First Nations interests were characterized as low to moderate magnitude (PRGT 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.116 summarizes potential effects, mitigation, and residual effects for Saulteau First Nations interests. No new Project effects (or effects pathways) were identified for the Amendment components. As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on Saulteau First Nations and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.

**Table 20.11 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Saulteau First Nations Interests**

<b>Amendment Component</b>	<b>Project Phase</b>	<b>Change in Proposed Works or Activities</b>	<b>Change in Potential Effects</b>	<b>Change in Mitigation or Enhancement Measures</b>	<b>Change in Mitigation or Enhancement Measures Success Rating</b>
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	Consideration of Treaty 8 Planning and Mitigation Measures (BCER 2024) Consideration of mitigation measures that may be identified through Caribou Recovery Committee review	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change



#### **20.6.4 Cumulative Effects**

Through feedback shared in their Project-specific TLU study final report, Saulteau First Nations stated concerns about the impact of development projects within its Traditional Territory (Firelight 2014b). They further stressed the continued importance of the land for their livelihood and way of life, noting that the land and water, and hunting, fishing and subsistence practices, remain critical to Saulteau First Nations' physical sustenance, social relationships, cultural transmission, and spiritual life (Firelight 2014). Saulteau First Nations has identified two areas of special significance for their community, the ACCI and the Peace Moberly Tract. Saulteau First Nations rely heavily upon these areas for sustenance, cultural, commercial, and socio-economic purposes.

Residual cumulative effects on Saulteau First Nations interests are expected to be consistent for the Amendment as compared to the approved route. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.

The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the Peace Moberly Tract, the ACCI, Moberly River, the Klin-Se-Za protected area, and Beattie Peaks/Twin Sisters, which were identified as areas of interest by Saulteau First Nations. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing residual cumulative effects on Saulteau First Nations' interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 as well as measures from the Caribou Recovery Committee review and applicable Treaty 8 Planning and Mitigation Measures, as required will also reduce residual cumulative effects on Saulteau First Nations' interests and enhance restoration efforts in the Amendment area.

PRGT will continue to engage with Saulteau First Nations to practically address any Project-specific issues related to cumulative effects on the nation's interests. Information will be reviewed as it is received by Saulteau First Nations' to determine if any additional mitigation measures are required.





### **20.6.5 Disproportionately Distributed Effects on Saulteau First Nations Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Saulteau First Nations' members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect Saulteau First Nations members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect Saulteau First Nations members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade).
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Saulteau First Nations members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect Saulteau First Nations members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of Saulteau First Nations members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with Saulteau First Nations, PRGT aims to reduce these disproportionate effects.

### **20.6.6 Risks and Data Uncertainty**

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects, and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and the implementation of mitigation measures and conditions. Confidence in the predicted effects on Saulteau First Nations' interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with Saulteau First Nations advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage Saulteau First Nations to enhance the consideration of Saulteau First Nations' interests and reduce uncertainty.



## 20.7 Takla Nation

### 20.7.1 Existing Conditions

#### 20.7.1.1 Rights, Governance and Legal Characteristics

Takla Nation is a non-treaty Nation located around Takla Lake. Takla Nation is governed under a custom electoral system with a Chief and four Councillors elected to a four-year term (CIRNAC 2024g). Takla Nation is a member of the Carrier Sekani Tribal Council (CIRNAC 2024g).

Takla Nation is in Stage 4 treaty negotiations with the British Columbia Treaty Commission, and negotiations regarding reconciliation initiatives are ongoing (GoBC 2024b).

**Table 20.12 Takla Nation Elected Officials**

Title	Name	Appointment Date	Expiry Date
Chief	Wilma Abraham	06/08/2021	06/07/2025
Councillor	John Alan French	05/20/2023	05/19/2027
Councillor	Ernie French-Downie	05/20/2023	05/19/2027
Councillor	Anita William	05/20/2023	05/19/2027
Councillor	Colin Jacob Teegee	10/03/2023	05/16/2025

Source: CIRNAC 2024g

#### 20.7.1.1.1 Land Management, Claims, and Agreements

Takla Nation (Band No. 608) administers 17 reserves covering an area of approximately 809 ha (CIRNAC 2024g):

- Bear Lake (Fort Connelly) 4
- Bear Lake (Tsaytut Bay) 1B
- Bear Lake (Upper Driftwood River) 1A
- Bear River (Sustut River) 3
- Cheztainya Lake 11
- Driftwood River (Kastberg Creek) 1
- Klewaduska (Cataract) 6
- Kotsine (Skutsil) 2
- North Tacla Lake (Bates Creek) 10
- North Tacla Lake (North End Meadow) No. 11A
- North Tacla Lake (West Landing) 8
- North Tacla Lake (North End)
- North Tacla Lake 12
- North Tacla Lake 7
- North Tacla Lake 7A
- Tacla Lake (Ferry Landing) 9
- Tsaytut Island 1C
- Tsupmeet (Patcha Creek) 5



Takla Nation's nearest populated land base, North Tacla Lake 7, is located approximately 146 km northwest of the Eastern Route Alternative.

### **20.7.1.2 Population**

As of April 2024, Takla Nation had a registered population of 929 members. Of the 208 living on reserve, 108 were male and 100 were female; of the 19 living on other reserves, 13 were male and 6 were female; and of the 702 living off reserve, 317 were male and 385 were female (CIRNAC 2024g).

### **20.7.1.3 Preliminary Overview of Takla Nation Key Interests and Concerns**

Through a review of information considered in the Application, engagement feedback, the Project-specific TLU study (TLFN and Sharp 2014), and from publicly available information, the following is a summary of Takla Nation's interests and concerns relevant to the Amendment area.

Disruption of governance was not specifically assessed in the Application; however, these interests were included in the EAO Assessment Report and are described below (EAO 2014a).

Through feedback shared in the Takla Nation TLU study (TLFN and Sharp 2014), Takla Nation stated concerns that the Project may cause significant adverse impacts on their use of lands and resources in their territory. Such effects could seriously impair Takla Nation's abilities to carry out their constitutionally protected harvesting rights and impact their title.

Through engagement, Takla Nation stated they are interested in completing an updated TLU study that considers cumulative effects. PRGT responded that Takla Nation will have the opportunity for their TLU report to be updated or a new TLU Report shared and future meetings will be scheduled to discuss. Also through engagement, Takla Nation noted that caribou are an integral component of Takla Nation's culture and acknowledged that the Eastern Route Alternative has been routed to avoid the Moberly caribou herd. Takla Nation also noted that the many herds located in Takla Nation's territory are in decline, particularly the Takla herd.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Takla Nation. Any new information brought forward by Takla Nation will be reviewed and considered by PRGT.

#### **20.7.1.3.1 Disruption of Harvesting**

In the Application (Section 33.8), Takla Nation identified potential adverse effects on wildlife, wildlife habitat, and access to fishing areas as key interests and concerns (PRGT 2014a). Takla Nation reported a continued reliance on country foods as part of members' daily diet; this includes traditional foods obtained from hunting, fishing (especially salmon), and plant and berry harvesting across the territory (TLFN and Sharp 2014). Takla Nation members have reported that wildlife species, large and small, are a significant part of Takla Nation members' diet; the meat is still traded, and shared along kinship ties and hides are still processed, tanned, and sold as clothing for economic purposes (TLFN and Sharp 2014).



Takla Nation has expressed concerns regarding wildlife populations, noting that large game species (in particular moose) have been affected by deforestation, habitat fragmentation and increased hunting pressure (TLFN and Sharp 2014). Takla Nation has expressed concern about effects on wildlife health, wildlife movement, and wildlife access as a result of Project activities including potential increase in traffic, noise and dust pollution, and contaminated soil and water resulting from leaks or spills associated with compression stations (TLFN and Sharp 2014).

Hunting locations reported by Takla Nation include the Middle River and its tributaries, Trembleur Lake, Tahlo Lake, Haul Lake, Tahlo Creek, Nation River, Inzana Lake, and Natowite Lake (TLFN and Sharp 2014; EAO 2014a).

Takla Nation reported that trapping is an important part of Takla Nation cultural economy, and that fur-bearing animal pelts still provide supplementary income for some Takla Nation women, Elders, and other Takla Nation members (TLFN and Sharp 2014). Takla Nation members reported concerns about existing conditions for trapping in Takla Nation territory because of current development activities (i.e., clear-cutting, non-Indigenous land purchases and farming) which have limited land for trapping and trapping resources (access and availability to trapping sites and wildlife) (TLFN and Sharp 2014).

Takla Nation reported that trapping occurs most heavily along waterways and habitation sites throughout Takla Nation territory, and identified the Northwest arm of Takla Lake, areas from Haul Lake to West Landing, and around Tahlo Lake, Tahlo Creek and Nilkitkwa Lake as prime trapping areas. Other trapping locations reported by Takla Nation include along the Middle River to Trembleur Lake and Natowite Lake (TLFN and Sharp 2014; EAO 2014a).

Takla Nation members previously reported that fish are an integral component of Takla Nation subsistence practices (TLFN and Sharp 2014). Takla Nation noted that fish migration and seasonal movements heavily influence the movement of harvesters across their territory, further noting that many Takla members maintain a relationship with Takla Lake because the lake is linked to traditional fishing practices, especially for salmon (TLFN and Sharp 2014). Takla Nation expressed concerns about the effects of overharvesting, and declining health of aquatic ecosystems on important fish species, in particular salmon and sturgeon. Takla Nation has also expressed additional concerns about potential Project effects on aquatic ecosystems, in particular, stream diversions, streambed disturbance, contamination, and long-term effects of vibrations (TLFN and Sharp 2014). Fishing areas previously reported by Takla Nation include several locations between Takla Lake and Fort Babine, as well as Nation Lakes, Tahlo Lake and Creek, Haul Lake, Middle River, Trembleur Lake sub-basins, Nation River, Babine River, Nilkitkwa Lake, Inzana Lake, and Natowite Lake (TLFN and Sharp 2014; EAO 2014a).

Takla Nation previously reported that many plants and wood materials are commonly harvested, and that traditional plant gathering is rooted in traditional knowledge, including key locations, medicinal plant use and preparation (TLFN and Sharp 2014). Takla Nation reported that Nation members rely on medicinal plants and traditional medicines due to the remoteness of the community and Traditional Territory, noting that the protection of medicinal plants is essential for health and maintenance of cultural and traditional practices (TLFN and Sharp 2014). Takla Nation members previously reported concerns about the health of important plant communities, and have observed effects of intensive forestry on culturally significant



plants (TLFN and Sharp 2014). Gathering areas reported by Takla Nation include Tahlo Lake, Haul Lake, Tahlo Creek, Middle River and the Trembleur lake area (EAO 2014a).

The Babine River, Fort Babine, Haul Lake, Inzana Lake, Middle River and its tributaries, Nation Lakes, Nation River, Natowite Lake, Nilkitkwa Lake, Tahlo Creek, Tahlo Lake, Trembleur Lake, and West Landing were previously identified as part of Takla Nation's review of the approved route. While they are within Takla Nation's Traditional Territory, the Eastern Route Alternative is not anticipated to interact with the harvesting areas described above.

#### 20.7.1.3.2 Disruption or Reduced Use of Trails and Travelways

Takla Nation reported that trails and travelways, including waterways, are important for the maintenance of Takla Nation culture, and Takla Nation has strong ties to all the waterways within the territory (TLFN and Sharp 2014). Takla Nation reported the importance of the Grease Trail, which has been heavily used in the past by Takla Nation members for the purposes of trade for a variety of resources such as oolichan oil, herring eggs, and salmon (TLFN and Sharp 2014). Takla Nation reported concerns about existing conditions of their traditional trail systems, and previous effects of vehicle use within Takla Territory; because of previous intensive forestry practices, there has been a shift in reliance on traditional trails to reliance on Forest Service Roads in order to access important sites and territory (TLFN and Sharp 2014). Takla Nation has expressed concerns about restricted access to traditional trails and travel ways during the life of the Project (TLFN and Sharp 2014).

Takla Nation previously stated that extensive traditional trail systems are found between Takla Lake and Babine Lake, including areas near Tahlo Lake, Haul Lake, Middle River, Nilkitkwa Lake, Nation River, Inzana Lake, and Sasklo Lake. The Kaza Lake Trail is a multi-use historic trail running from Takla Landing to Kaza Lake (EAO 2014a). These trail systems were previously identified as part of Takla Nation's review of the approved route. The Eastern Route Alternative is not anticipated to interact with the harvesting areas described above but are within Takla Nation's Traditional Territory.

#### 20.7.1.3.3 Disruption or Reduced Use of Habitation Areas

Takla Nation previously reported the importance of overnight sites (habitation areas), which range from ephemeral short-term encampments to permanent long-term housing facilities (TLFN and Sharp 2014). Takla Nation previously reported continuous use of overnight sites and cabins throughout their territory and in close proximity to the approved route. Takla Nation has expressed concern about Project activities impacting the use of overnight sites, especially near Sutherland Road and Stuart River, citing potential secondary Project effects, such as noise, pollution, increase access to the area (non-Aboriginal access), and loss of wildlife and plants around cabins (TLFN and Sharp 2014). Takla Nation identified habitation sites at Tahlo Lake, Middle River and Nation River (EAO 2014a).

The habitation sites at Tahlo Lake, Middle River and Nation River were previously identified as part of Takla Nation's review of the approved route. The Eastern Route Alternative is not anticipated to interact with these harvesting areas described above but are within Takla Nation's Traditional Territory.



#### 20.7.1.3.4 Disruption or Reduced Use of Gathering Areas and Sacred Areas

In the Application (Section 33.8), Takla Nation identified potential adverse effects on important areas as a key interest and concern (PRGT 2014a). Takla Nation previously reported that sacred and gathering sites (fixed cultural sites) include burial sites, death sites, sacred sites, archaeological sites, gathering locations, and ceremonial sites (TLFN and Sharp 2014). Takla Nation expressed the importance of cultural sites, which members reported have unique cultural significance that is passed intergenerationally and provide Takla Nation members a sense of belonging to particular places and provide a sense of cultural identity (TLFN and Sharp 2014).

Takla Nation members have previously cited concerns in identifying exact locations of culturally significant sites due to cultural practices, historic destruction, scavenging, or potential site desecration; they further noted that exact locations are guarded and protected by Takla Nation members (TLFN and Sharp 2014). Takla Nation identified sites described as being of sacred significance are Tahlo Lake, as well as the area between Takla Lake and Babine Lake (EAO 2014a). These sites were previously identified as part of Takla Nation's review of the approved route. The Eastern Route Alternative is not anticipated to interact with the harvesting areas described above but are within Takla Nation's Traditional Territory.

#### 20.7.1.3.5 Disruption of Cultural Transmission

Takla Nation previously reported that Takla Nation has a long-standing, established relationship with the land and resources, demonstrated in the detailed traditional knowledge, legends, stories, and ancestral use of sites and resources within Takla Nation's Traditional Territory (TLFN and Sharp 2014). Takla Nation reported that they are stewards of the land, and that sharing traditional knowledge generationally allows Nation members to maintain an understanding of the overall health and sustainability of Takla Nation Territory (TLFN and Sharp 2014). Takla Nation noted that the large percentage of youth participating in traditional land and resource use practices is testament to the nations' commitment to the maintenance of cultural and traditional practices and the importance for cultural transmission (TLFN and Sharp 2014).

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from Indigenous Nations. Any new information brought forward by Takla Nation regarding disruption of cultural transmission will be reviewed and considered by PRGT.

#### 20.7.1.3.6 Disruption of Governance

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws and governance systems. Takla Nation had not identified any issues related to disruption of governance in addition to those described above.



## **20.7.2 Residual Effects on Takla Nation Interests**

Residual effects of the Amendment on Takla Nation interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that Takla Nation members may choose not to pursue their interests near Project activities.

At the time of the Application, Takla Nation had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, gathering areas, sacred areas, and cultural transmission. Takla Nation had not identified any issues related to governance; however, as described in Section 20.7.1, additional interests have been considered for Takla Nation based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including Takla Lake, Nation Lakes, Inzana Lake, and Natowite Lake, which were identified as areas of interest by Takla Nation. As a result, these areas are not anticipated to be affected to the same extent.

## **20.7.3 Changes to Characterization of Residual Effects on Takla Nation Interests**

The EAO Assessment Report did not include a detailed characterization of residual effects on Takla Nation's interests. Based on information available pertaining to Takla interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by Takla Nation in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application.

Although the Amendment would reduce the overall Project footprint (i.e., approximately 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted negligible impacts on Takla Nation's trapping interests, minor impacts on Takla Nation's fishing, plant gathering, and cultural sites, trails and travelways interests, and minor to moderate impacts on Takla Nation's hunting interests (EAO 2014a). Project residual effects on Takla Nation interests were characterized as low magnitude (PRGT 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.13 summarizes potential effects, mitigation, and residual effects for Takla Nation interests. No new Project effects (or effects pathways) were identified for the Amendment components.



As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on Takla Nation and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.

**Table 20.13 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Takla Nation Interests**

<b>Amendment Component</b>	<b>Project Phase</b>	<b>Change in Proposed Works or Activities</b>	<b>Change in Potential Effects</b>	<b>Change in Mitigation or Enhancement Measures</b>	<b>Change in Mitigation or Enhancement Measures Success Rating</b>
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	No change	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change

#### **20.7.4 Cumulative Effects**

Through feedback shared in their Project-specific TLU study (TLFN and Sharp 2014), Takla Nation members reported concerns regarding wildlife populations, noting that large game species (in particular moose) have been affected by deforestation, habitat fragmentation and increased hunting pressure, and current development activities (i.e., clear-cutting, non-Indigenous land purchases and farming) which have limited land for trapping and trapping resources in Takla Nation territory (access and availability to trapping sites and wildlife) (TLFN and Sharp 2014).

Residual cumulative effects on Takla Nation interests are expected to be consistent for the Amendment as compared to the approved Project. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.





The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including Takla Lake, Nation Lakes, Inzana Lake, and Natowite Lake, which were identified as areas of interest by Takla Nation. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing residual cumulative effects on Takla Nation's interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 will also reduce residual cumulative effects on Takla Nation's interests and enhance restoration efforts in the Amendment area.

PRGT will continue to engage with Takla Nation to practically address any Project-specific issues related to cumulative effects on the nation's interests. Information will be reviewed as it is received by Takla Nation to determine if any additional mitigation measures are required.

### **20.7.5 Disproportionately Distributed Effects on Takla Nation Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Takla Nation's members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect Takla Nation members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect Takla Nation members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade).
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Takla Nation members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect Takla Nation members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of Takla Nation members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with Takla Nation, PRGT aims to reduce these disproportionate effects.



20.7.6 Risks and Data Uncertainty

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects, and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and the implementation of mitigation measures and conditions. Confidence in the predicted effects on Takla Nation’s interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with Takla Nation advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage Takla Nation to enhance the consideration of Takla Nation’s interests and reduce uncertainty.

20.8 West Moberly First Nations

20.8.1 Existing Conditions

20.8.1.1 Rights, Governance and Legal Characteristics

West Moberly First Nations was originally a part of the Hudson Hope Band with Saulteau First Nations, separating in 1971 to become an independent band (no. 545). West Moberly First Nations adhered to Treaty 8 in 1914 (BCAFN 2023c) and is a member of the Treaty 8 Tribal Association. West Moberly First Nations is governed under a custom electoral system with a Chief and four Councillors (CIRNAC 2024h).

Table 20.14 West Moberly First Nations Elected Officials

Title	Name	Appointment Date	Expiry Date
Chief	Roland Willson	07//16/2021	07/15/2024
Councillor	Clarence Wilson	06/03/2002	
Councillor	Asher Atchiqua	06/08/2020	
Councillor	Robyn Fuller	09/21/2020	09/20/2024
Councillor	Theresa Davis	02/28/2023	02/28/2025

Source: CIRNAC 2024h

20.8.1.1.1 Land Management, Claims, and Agreements

West Moberly Lake First Nations administer one reserve, West Moberly Lake 168A in the Peace River District, which covers an area of approximately 2,033.6 ha (CIRNAC 2024h). West Moberly First Nations’ land base, West Moberly Lake 168a Reserve, is located 23 km northeast of the Eastern Route Alternative.

West Moberly First Nations currently has an active TLE claim, in which there was an alleged failure by Canada to protect traplines in light of the British Columbia Trapline Registration process (CIRNAC 2024a). The Province of British Columbia is undertaking engagement with Treaty 8 First Nations in response to the *Yahey* decision. West Moberly First Nations has not yet signed an agreement with the



Province of British Columbia but discussions are ongoing regarding initiatives set out in the Consensus Document (Province of British Columbia 2023d).

As described in Section 20.1.6.3, West Moberly First Nations are signatories on the Caribou Partnership Agreement.

### **20.8.1.2 Population**

As of April 2024, West Moberly First Nations had a registered population of 374 members. Of the 129 living on reserve, 65 were male and 64 were female; of the 10 living on other reserves, 7 were male and 3 were female; 1 female lives on Crown Land; and of the 234 living off reserve, 115 were male and 119 were female (CIRNAC 2024h).

### **20.8.1.3 Preliminary Overview of West Moberly First Nations Key Interests and Concerns**

Through a review of information considered in the Application, engagement feedback, the Project-specific TLU study (WMFN 2015), and from publicly available information, the following is a summary of West Moberly First Nations' interests and concerns relevant to the Amendment area.

Disruption of governance was not specifically assessed in the Application; however, these interests were included in the EAO Assessment Report and are described below (EAO 2014a).

Through engagement on the Eastern Route Alternative, West Moberly First Nations expressed concerns with the approved route, as it crosses into the Peace Moberly Tract and multiple crossings of the Moberly River, causing cultural values interactions, impacting Treaty Land Entitlement and the Caribou Partnership Agreement area. West Moberly First Nations communicated that Option 1 appears to be reasonable, as it avoids Upper Moberly River and the Moberly caribou area.

Through its ongoing engagement, PRGT will continue to respond to questions and concerns from West Moberly First Nations. Any new information brought forward by West Moberly First Nations will be reviewed and considered by PRGT.

#### **20.8.1.3.1 Disruption of Harvesting**

In the Application (Section 33.5), West Moberly First Nations identified effects on caribou and core caribou habitat as well as effects on wildlife as a result of increased hunting pressure as key interests and concerns (PRGT 2014a). West Moberly First Nations' previously reported that there is a potential for land use conflicts between the hunting, trapping, fishing and gathering activities and the actions and activities of the Project (WMFN 2015). These conflicts may occur over the duration of the construction and operations stages of the development. West Moberly First Nations identified harvesting areas within spatial units of cultural networks and areas (i.e., the Farrell Creek, Moose Call, Moberly River, and Clearwater Creek cultural networks, as well as the Nation Lakes Cultural Area) (WMFN 2015). Additionally, there may be conflicts with the Low Elevation Habitat of the Klinse-Za caribou herd, which has been identified as critical habitat in the Action Plan for the Klinse-Za Caribou Herd.



West Moberly First Nations previously expressed concerns about industrial development within its Traditional Territory and the resulting effects on wildlife (T8FNCAT 2012). In addition to moose populations, West Moberly First Nations has reported that members have seen a decrease in caribou population. West Moberly First Nations has indicated that oil and gas sites have caused changes in ungulates with harvesters noticing diseases, physical abnormalities and changes in animal behaviour (NGTL 2015c). Similarly, West Moberly First Nations previously reported concern for both the Pine River and Graham caribou populations and concerns regarding the effect of development on treaty right to hunt caribou (WMFN 2017, 2018). The Pine River is defined as a critical hunting area for West Moberly First Nations (AiM 2021a).

West Moberly First Nations previously reported a decrease in the population and size of fish and, specifically, lake trout is becoming increasingly rare (T8FNCAT 2012). West Moberly First Nations also reported that there are concerns of pollutants in the water and there has been a decrease of fish consumption due to health concerns (CTQ 2014; WMFN 2014).

Access to fresh water sources is of great importance to West Moberly First Nations and members have expressed concerns regarding water quality in its Traditional Territory (CGGP 2014; WMFN 2014). West Moberly First Nations is particularly concerned about wetland habitats and riparian areas and the potential for industrial development to affect wildlife and vegetation (CGPP 2014). Harvesters have reported a decline in the water quality of the Peace River and its tributaries, resulting in the need to carry water while out on the land (NGTL 2015c).

West Moberly First Nations previously reported that due to the amount of industrial activity within its Traditional Territory, certain plant species are in decline (CTQ 2014). West Moberly First Nations has additionally reported that it is difficult to find berries in traditional spots (WMFN 2014). Contamination is also a major concern and West Moberly First Nations has expressed concerns that there are no clean areas left in which to harvest plants (NGTL 2015c). Pesticides, chemicals, industrial activities, and dust from roads are ongoing issues faced by West Moberly First Nations, and that medicinal plants are especially sensitive to industrial developments (CTQ 2014; WMFN 2014). West Moberly First Nations harvesters have reported visible signs of contamination such as residue and dust on plants and berries, causing harvesting issues as plants with visible contamination are avoided by harvesters because of fears of sickness (WMFN 2014).

The Pine River is intersected and paralleled by the Eastern Route Alternative, and the Klinse-Za caribou herd range is intersected by the Eastern Route Alternative. The cultural networks, and Cultural Area described above were previously identified as part of West Moberly First Nations' review of the approved route. The Eastern Route Alternative is not anticipated to interact with these harvesting areas described above but are within West Moberly First Nations' Traditional Territory.

#### 20.8.1.3.2 Disruption or Reduced Use of Trails and Travelways

Disruption or reduced use of trails and travelways was assessed in the Application (Section 33.5.8). Following the submission of the Application, West Moberly First Nations' TLU study expressed concern regarding travel routes that may temporarily close or become inaccessible (WMFN 2015).



West Moberly First Nations previously reported that trails and travelways have been and continue to be used for access to harvesting areas within its Traditional Territory. Physical access to nearby cultural networks that enable continued access to hunting areas and other cultural activities are highly important to West Moberly First Nations (WMFN 2014). West Moberly First Nations previously raised concerns about its ability to access harvesting sites due to the increase of industrial activity within its Traditional Territory (NGTL 2015c; WMFN 2014).

#### 20.8.1.3.3 Disruption or Reduced Use of Habitation Areas

West Moberly First Nations has previously reported that numerous occupancy sites, both historic and current, exist within West Moberly First Nations' Traditional Territory. West Moberly First Nations has indicated that locations of camp areas and campsites are not stagnant and can move from year to year (WMFN 2014). West Moberly First Nations reported that specific sites may have cultural values; important examples of these sites include drumming sites, singing sites, prayer sites, storytelling sites, and healing areas (WMFN 2014).

#### 20.8.1.3.4 Disruption or Reduced Use of Gathering Areas and Sacred Areas

West Moberly First Nations identified spatial units of cultural networks and areas (i.e., the Farrell Creek, Moose Call, Moberly River, and Clearwater Creek cultural networks, as well as the Nation Lakes Cultural Area (WMFN 2015). Within the Moose Call and Moberly River cultural networks, there are a number of cultural values that previously identified, including several culture camps sites and areas, TLE sites, heritage sites and locations, and sacred sites (e.g., prayer trees). The majority of these are situated in the Moberly River Cultural Network. Additionally, the Low Elevation Habitat of the Klinse-Za caribou herd has been identified as critical habitat in the Action Plan for the Klinse-Za Caribou Herd (WMFN 2015).

The Farrell Creek Cultural Network and the Peace Moberly Tract Cultural Network (or Peace-Moberly Tract) are areas utilized by West Moberly First Nations and have been relied upon for thousands of years (WMFN 2014). Within these cultural networks, hunting, fishing, trapping, gathering, camping, teaching, and cultural activities occur as part of its seasonal round (WMFN 2014).

The Farrell Creek, Moose Call, Moberly River, Peace Moberly Tract, and Clearwater Creek cultural networks, and the Nation Lakes Cultural Area were previously identified as part of West Moberly First Nations' review of the approved route. The Eastern Route Alternative is not anticipated to interact with these cultural networks and areas, but they are within West Moberly First Nations' Traditional Territory.

#### 20.8.1.3.5 Disruption of Cultural Transmission

West Moberly First Nations identified the Twin Sisters and an additional 81 sites used as teaching areas (PRGT 2014a). Following the submission of the Application, West Moberly First Nations' Project-specific TLU study reported that culture camps have the potential to be adversely affected by the Project. West Moberly First Nations also noted that an important feature of these camps are the teachings of values, norms, knowledge, art, stories, and songs (WMFN 2015). West Moberly First Nations previously noted that cultural traditions, customs, and practices as well as the teaching and building of its knowledge base



play an important role in its land use practices and that hunting, trapping, fishing, and plant gathering are part of cultural transmission (WMFN 2014). Further, cultural lore, values, and spirituality can only be properly learned on the land through observations, practicing ceremony, firsthand experience, and listening to Elders (Fasken Martineau 2013c; T8FNCAT 2012). West Moberly First Nations identified culture camps in the following areas Farrell Creek Cultural Network, Moose Call Cultural Network, Moberly River Cultural Network. West Moberly First Nations also noted that camps were located in the Nation River and Nation Lakes area as well as along the Parsnip River, the latter of which are underwater due to the creation of the Williston Reservoir in the 1970s (Firelight 2015).

The Parsnip River is intersected by the Eastern Route Alternative. The Farrell Creek, Moose Call, Moberly River, and Clearwater Creek cultural networks, and the Nation River and Nation Lakes area were previously identified as part of West Moberly First Nations' review of the approved route. The Eastern Route Alternative is not anticipated to interact with these areas for cultural transmission, but they are within West Moberly First Nations' Traditional Territory.

#### 20.8.1.3.6 Disruption of Governance

PRGT understands that the practice or exercise of rights may occur year-round, and that disruptions to harvesting, trails and travelways, and habitation, gathering, and sacred areas may result in disruptions to an Indigenous Nation's cultural laws and governance systems. West Moberly First Nations had not identified any issues related to disruption of governance in addition to those described above.

### 20.8.2 Residual Effects on West Moberly First Nations Interests

Residual effects of the Amendment on West Moberly First Nations interests are predicted to be consistent with the portion of the approved alignment that the Amendment components would replace. Residual effects include the potential for Project activities to temporarily affect access to important sites during construction. Additionally, PRGT understands that West Moberly First Nations members may choose not to pursue their interests near Project activities.

At the time of the Application, West Moberly First Nations had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, gathering areas, sacred areas, and cultural transmission. West Moberly First Nations had not identified any issues related to governance; however, as described in Section 20.8.1, additional have been considered for West Moberly First Nations based on subsequent engagement, the TLU study, and publicly available literature. As described in Section 20.1.5 it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area. The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the Peace Moberly Tract, Moberly River, Treaty Land Entitlements, and the Caribou Partnership Agreement area, which were identified as areas of interest by West Moberly First Nations. As a result, these areas are not anticipated to be affected to the same extent.



### **20.8.3 Changes to Characterization of Residual Effects on West Moberly First Nations Interests**

The EAO Assessment Report did not include a detailed characterization of residual effects on West Moberly First Nations' interests. Based on information available pertaining to West Moberly First Nations interests that was included in the Application combined with the Project-specific TLU study, engagement feedback, and additional information identified through a review of the publicly available sources provided by West Moberly First Nations in recent applications, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application.

Although the Amendment would reduce the overall Project footprint (i.e., approximately 60 km shorter than the section of the approved route it would replace), and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO Assessment Report are consistent with those resulting from the Amendment. After mitigation is applied, EAO Assessment Report predicted minor impacts on West Moberly First Nations' fishing, trapping, and plant gathering interests and moderate impacts on West Moberly First Nations' cultural sites, trails and travelways, and hunting interests (EAO 2014a). Project residual effects on West Moberly First Nations interests were characterized as low magnitude (PRGT 2014a) and with the reduced route length as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 20.15 summarizes potential effects, mitigation, and residual effects for West Moberly First Nations interests. No new Project effects (or effects pathways) were identified for the Amendment components. As further information is shared through engagement, PRGT will review the information in the context of this analysis. PRGT understands that although the footprint will be reduced by the Eastern Route Alternative, engagement with Indigenous Nations is ongoing and there may be new areas of importance or other new Indigenous interests raised through engagement. In consideration of the predicted effects on West Moberly First Nations and mitigation, monitoring, and follow-up programs described in Section 20.1.6, the conclusions presented in the EAO Assessment Report (EAO 2014a) are consistent with the proposed changes.



**Table 20.15 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – West Moberly First Nations Interests**

Amendment Component	Project Phase	Change in Proposed Works or Activities	Change in Potential Effects	Change in Mitigation or Enhancement Measures	Change in Mitigation or Enhancement Measures Success Rating
Eastern Route Alternative	Construction	Yes (reduced terrestrial route by 60 km, paralleling approximately 83% existing disturbance, Project footprint overlaps approximately 45% existing disturbance)	No change	Consideration of Treaty 8 Planning and Mitigation Measures (BCER 2024)  Consideration of mitigation measures that may be identified through Caribou Recovery Committee review	No change
	Operations	Yes (decreased spatial extent of maintenance and inspection activities during operation)	No change	No change	No change

#### 20.8.4 Cumulative Effects

West Moberly First Nations previously stated that natural resources have been and continue to be a part of the territory that forms their seasonal round, which predates the arrival of Europeans (WMFN 2015). West Moberly First Nations expressed concerns about the impact of development in its Traditional Territory, noting that traditional resources are currently under considerable pressure from other development activities (WMFN 2015).

Residual cumulative effects on West Moberly First Nations interests are expected to be consistent for the Amendment as compared to the approved Project. Existing environmental conditions reflect cumulative effects that have already occurred to the environment from past and present projects and physical activities. Past and present projects and physical activities that have been or are being carried out have also influenced the existing conditions for the exercise or practice of Indigenous and treaty rights. The Eastern Route Alternative is proposed in an area where agriculture and industrial development (e.g., forestry, oil and gas) are well established. Overall, anthropogenic land uses and extensive industrial development have altered the current regional landscape.

The Project has been re-routed in consideration of areas of interest identified by Indigenous Nations, including the Peace Moberly Tract, Moberly River, Treaty Land Entitlements, and the Caribou Partnership Agreement area, which were identified as areas of interest by West Moberly First Nations. As a result, these areas are not anticipated to be affected to the same extent. Additionally, the Eastern Route Alternative is along the Highway 97 corridor, which includes the highway and other linear features (e.g., rail, pipelines). Routing through this area reduces cumulative effects because the disturbances are





all within the same corridor, rather than spread across the landscape. The Eastern Route Alternative footprint will be routed alongside some of these disturbances, reducing effects on West Moberly First Nations' interests. Applying the mitigation, monitoring, and follow-up programs described in Section 20.1.6 as well as measures from the Caribou Recovery Committee review and applicable Treaty 8 Planning and Mitigation Measures, as required will also reduce residual cumulative effects on West Moberly First Nations interests and enhance restoration efforts in the Amendment area.

PRGT will continue to engage with West Moberly First Nations to practically address any Project-specific issues related to cumulative effects on the nations' interests. Information will be reviewed as it is received by West Moberly First Nations to determine if any additional mitigation measures are required.

### **20.8.5 Disproportionately Distributed Effects on West Moberly First Nations Interests**

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of West Moberly First Nations' members in the following ways:

- Reduced quality of harvesting experience or access to harvesting areas, which may disproportionately affect West Moberly First Nations members who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced decision-making options and reduced access to areas where social and economic activities occur (e.g., trapping), which may disproportionately affect West Moberly First Nations members who rely more heavily on these environments and their resources for income and for other purposes (e.g., cultural, spiritual, trade)
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect West Moberly First Nations members who rely more heavily on these areas for knowledge transmission, spirituality, and other cultural purposes than non-Indigenous populations
- Reduced access and travel, which may disproportionately affect West Moberly First Nations members who rely more heavily on established routes for safe navigation and to access harvesting areas, or for the maintenance of trade relationships, income, or other purposes than non-Indigenous populations

If these disproportionate effects are experienced, there is potential for culture, identity, mental, physical, and cultural well-being of subpopulations of West Moberly First Nations members to be affected when compared to non-Indigenous populations who may rely less heavily on these resources, habitats, and areas. With implementation of mitigation measures and through engagement with West Moberly First Nations, PRGT aims to reduce these disproportionate effects.



## **20.8.6 Risks and Data Uncertainty**

This assessment takes into account factors such as: engagement feedback received to date; predicted Project effects, and those associated with past, present, and reasonably foreseeable projects and activities; current regulatory requirements and guidelines; the use of conservative assumptions; and the implementation of mitigation measures and conditions. Confidence in the predicted effects on West Moberly First Nations' interests is considered low as assessed in the Application. Confidence in the assessment will increase as engagement with West Moberly First Nations advances and with the application of mitigation, monitoring, and follow-up programs described in Section 20.1.6. PRGT will continue to engage West Moberly First Nations to enhance the consideration of West Moberly First Nations' interests and reduce uncertainty.



## 21 References

### 21.1 Introduction

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