Prince Rupert Gas Transmission Project: Application for Marine Route Alternative Amendment to EAC #E14-06

June 21, 2024

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Reviewed by:	Menser, Jennifer Digitally signed by Menser, Jennifer Date: 2024.06.21 09:01:59 -07'00'	Approved by:	Digitally signed by Prystay, Ward Date: 2024.06.21 '08:38:11 -07'00
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	Jennifer Menser, Principal		Ward Prystay, Senior Vice President
	Printed Name and Title		Printed Name and Title

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Acronyms / Abbreviations

AIA	Archaeological Impact Assessment
AOA	Archaeological Overview Assessment
BC	British Columbia
BCER	British Columbia Energy Regulator
CCME	Canadian Council for Ministers of the Environment
CDC	Conservation Data Centre
CEMP	Construction Environmental Management Plan
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPC	Certified Pipeline Corridor
CPD	Certified Project Description
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
GHG	Greenhouse Gas
ha	Hectare
HADD	Harmful Alteration, Disruption, or Destruction of fish habitat
HCA	Heritage Conservation Act
HDD	Horizontal Directional Drilling
HIP	Heritage Inspection Permit
IA	Important Area
KICNA	Kts'm'atiin Inlet Cultural and Natural Area
KP	Kilometre post

km	Kilometre
KSMA	Kwa'ka-pal (Nass Bay) Special Management Area
LAA	Local Assessment Area
LNG	Liquefied Natural Gas
m	Metre
NFA	Nisga'a Final Agreement
NLG	Nisga'a Lisims Government
OGC	Oil and Gas Commission
PAHs	Polycyclic Aromatic Hydrocarbons
PRGT	Prince Rupert Gas Transmission Ltd.
RAA	Regional Assessment Area
RoW	Right of Way
the Project	Prince Rupert Gas Transmission Project
SARA	Species at Risk Act
SEEMP	Social and Economic Effects Management Plan
TLU	Traditional Land Use
VC	Valued Component
VOC	Volatile Organic Compounds

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 (BC) 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 proposed development of the Pacific NorthWest LNG Project has since been terminated and the environmental assessment certificate for that project expired on November 25, 2019. The EAC was issued under the former BC *Environmental Assessment Act* (2002), and five amendments to EAC #E14-06 have been approved to date. An extension to EAC #E14-06 was also issued, which extends the validity of the 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 km west of the Nisga'a village of Gingolx and 82 km north of the Port of Prince Rupert. To support Project planning to deliver natural gas to the Ksi Lisims LNG Facility at Wil Milit, PRGT has identified routing changes in portions of Nass Bay, Iceberg Bay, Nasoga Gulf, and Portland Inlet that would be necessary for delivery. As such, PRGT is requesting an amendment to EAC #E14-06 in accordance with Section 32(1) of the BC *Environmental Assessment Act* (2018) for the Marine Route Alternative.

The Marine Route Alternative Amendment comprises two key components: 1) Nass Bay Route, and 2) Ksi Lisims LNG Pipeline Connection. The Amendment would require changes to the Certified Project Description as follows:

- Nass Bay Route: This change adds the option for PRGT to use a 9.4 km reroute of the pipeline corridor with a deviation of up to approximately 1.5 km from the established Certified Pipeline Corridor (CPC). The proposed route provides several anticipated benefits, which are discussed in Section 2. The Nass Bay Route includes a small (0.2 hectare [ha]) terrestrial expansion of the CPC just prior to where the pipeline would enter the marine environment at Nass Bay. The small expansion is referred to as the Nass Bay Approach and is necessary to accommodate pipeline routing within the CPC.
- Ksi Lisims LNG Pipeline Connection: This change adds the option for PRGT to reroute the pipelines such that they terminate at the Ksi Lisims LNG Facility rather than at Lelu Island in the Port of Prince Rupert. This change would reroute the marine pipelines northward through Portland Inlet and Portland Canal to a new terminal point at Wil Milit at the northern end of Pearse Island. A Proposed Pipeline Connection Area is identified as part of this change to provide flexibility for planning, detailed design, and constructability.

This Marine Route Alternative Amendment application (the Amendment) has been prepared in accordance with the BC *Environmental Assessment Act* (2018) and the *Amendments to Environmental Assessment Certificates and Exemption Orders - Guidance for Holders* (EAO 2024. The assessment generally follows the methods in the Application for an Environmental Assessment Certificate (the Application) (PRGT 2014a), but also includes the Section 25 Assessment Matters 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 as a result of changes proposed in the Amendment are compared to the findings of the EAO Assessment Report (EAO 2014a).

Table ES-1 summarizes the changes to valued components (VC) and associated mitigation measures, effects pathways, and characterization of residual effects from the proposed Amendment. While the proposed changes to the Project, if constructed, would avoid some terrestrial impacts and be substantially shorter in the marine environment compared to the approved route to Lelu Island, no changes to the characterization of residual effects are anticipated as a result of the proposed changes.

In consideration of the predicted effects on Indigenous interests, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes. PRGT will continue to consult 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 quality, Hydrology	No change	No change
Freshwater fish and fish habitat	No change	No change
Marine resources	• If blasting is required for trenching purposes (due to the potential presence of shallow rock substrate in a portion of Nass Bay), a temporary rock platform will be installed over the substrate using cleaned excavated material from the land-based trench. The temporary rock platform will be built to a height above high water to allow blasting to occur in the dry. Blasting in the dry is expected to generate sound pressure levels of lower intensity than would be generated through in-water blasting.	No change

Valued Component	Change to Mitigation	Change to Effects Pathways and Characterization of Residual Effects
	• Blasting will be timed to occur during low tides to further reduce sound pressure levels in the waters surrounding the temporary rock platform.	
Soil	No change	No change
Vegetation and wetland resources	No change	No change
Wildlife	No change	No change
Employment	No change	No change
Community infrastructure and services	No change	No change
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 the Amendment.

Table ES-2 Concordance with the Amendment Application Requirements

Item Number	Amendment Application Requirement	Amendment Application Section
1	EAC number, Exemption Order number (if applicable), project name and current name of EAC or Exemption Order Holder.	1
2	Number of prior amendments and a short summary of each one.	1 and 1.2
3	A short, descriptive name for the proposed amendment (amendments will not be given a number until made).	1
4	The reason for the proposed amendment.	1, 1.1, and 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.	1.1 and 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.	3 and 5

Item Number	Amendment Application Requirement	Amendment Application Section
8	The effect of the revised project on relevant VCs and Indigenous interests assessed in the project's Environmental Assessment (EA) or exemption application and proposed mitigation measures.	4 and 5
9	A description of any Indigenous knowledge that was used in developing the application and confirmation that appropriate permissions are in place.	3, 4, and 5
10	A table showing the VCs 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.	4.1, Table 4.1
11	Any benefits or positive effects that would result from the revised project.	2 and 4
12	Any studies or assessments that would be relevant to the revised project that were submitted during the EA or exemption process.	1.4 and 4
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?	3
14	Government approvals that are related to the requested amendment including any permits or licenses that are expected to also need amendment.	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.	3
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

1 Introduction

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 (BC) 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 approved Project includes:

- Land-based and marine-based sweet natural gas pipelines and associated components;
- Compressor stations and associated components including permanent access roads;
- A meter station and associated components, and;
- Ancillary facilities, inclusive of construction camp sites, pipe stockpile sites, material storage sites, log storage sites, rail sidings, contractor storage yards, laydown areas, borrow sites, hydrostatic test fill lines, upgraded roads and bridges, barge landing sites, material off-loading facilities, dock, jetty, and temporary access roads and workspace.

The Project was reviewed under the former *Environmental Assessment Act* (2002). The Project received approval of five amendments to EAC #E14-06 since November 25, 2014, to address the need for marine facilities, several small reroutes, and additional construction camps. An extension to EAC #E14-06 was also issued, which extends the validity of EAC #E14-06 to November 25, 2024. The proposed development of the Pacific NorthWest LNG Project has since been terminated and the EAC for that project expired on November 25, 2019.

The Project is now planned to supply natural gas to the proposed Ksi Lisims LNG Facility—Natural Gas Liquefaction and Marine Terminal Project (Ksi Lisims LNG Facility) on Pearse Island, approximately 14 km west of the Nisga'a village of Gingolx and 82 km north of the Port of Prince Rupert (Figure 1.1 and Figure 1.2). To support Project planning to deliver natural gas to the Ksi Lisims LNG Facility, PRGT has identified routing changes in portions of Nass Bay, Iceberg Bay, Nasoga Gulf, and Portland Inlet that would be necessary for delivery. As such, PRGT is requesting an amendment to EAC #E14-06 in accordance with section 32(1) of the BC *Environmental Assessment Act* (2018) for the Marine Route Alternative.

1.1 Amendment Overview

The Marine Route Alternative Amendment comprises two key components: 1) Nass Bay Route, and 2) Ksi Lisims LNG Pipeline Connection. Both components occur outside the scope of the Certified Project Description (CPD; Schedule A to EAC #E14-06). With the submission of the Amendment application (the Amendment), PRGT is requesting an amendment to the CPD pursuant to section 32(1) of the *Environmental Assessment Act* (2018) to add the following two changes (Figure 1.1):

1) Nass Bay Route: This change adds the option for PRGT to use a 9.4 km reroute of the pipeline corridor with a deviation of up to approximately 1.5 km from the established Certified Pipeline Corridor (CPC). The proposed route provides several anticipated benefits, which are discussed in Section 2. The Nass Bay Route includes a small (0.2 hectare [ha]) terrestrial expansion of the CPC just prior to where the pipeline would enter the marine environment at Nass Bay. The small expansion is referred to as the Nass Bay Approach and is necessary to accommodate pipeline routing within the CPC.
2) Ksi Lisims LNG Pipeline Connection: This change adds the option for PRGT to reroute the pipeline such that is terminates at the Ksi Lisims LNG Facility rather than at Lelu Island in the Port of Prince Rupert. This change would reroute the marine pipelines northward through Portland Inlet and Portal Canal to a new terminal point that makes landfall at Wil Milit at the northern end of Pearse Island. A Proposed Pipeline Connection Area is identified as part of this change to provide flexibility for planning, detailed design, and constructability. This component also includes a fiber optic cable that will be co-located with the marine pipelines and a receipt meter station within the footprint of the Ksi Lisims LNG Facility.

Similar to previous amendments to the Project, the changes included in the Marine Route Alternative Amendment would be added to the CPD. Where two options are certified, only one will be constructed, not both. The Amendment changes are discussed in more detail in Section 2.

Based upon a review of the *Amendments to Environmental Assessment Certificates and Exemption Orders - Guidance for Holders* (EAO 2024), the Amendment is anticipated to be classified as a typical amendment. The proposed changes are material but result in a reduced environmental footprint. The Amendment includes the following items to address the requirements outlined for a typical amendment:

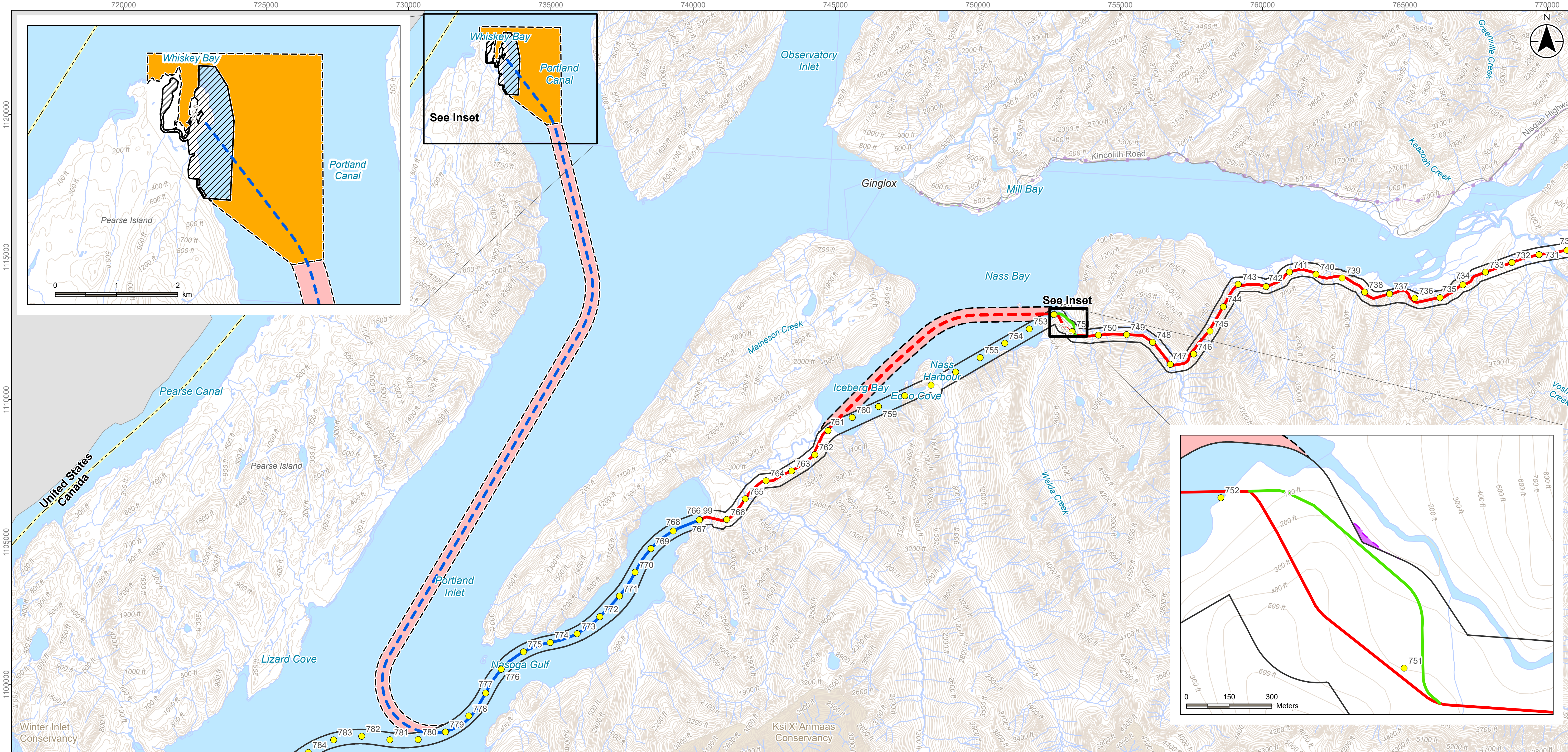
- Rationale for amendment
- Description of project change
- Analysis of valued components (VCs) and section 25(2) *Environmental Assessment Act* (2018) matters including proposed mitigation measures
- Description of amendment interactions with Indigenous interests including proposed mitigation measures
- A summary of Indigenous nation consultation and feedback
- A summary of public consultation and feedback

The proposed amendments are primarily within Nisga'a Nation Treaty Lands and the Nass Area between Gingolx and Wil Milit as well as the area around Nass Bay. Additionally, the Nisga'a village of Gingolx is in proximity to the proposed route changes.

The effects assessment provided in the Amendment includes consideration of the interests of Nisga'a Lisims Government (NLG), Lax Kw'alaams Band, Metlakatla First Nation, Kitsumkalum First Nation, Kitselas First Nation, and Gitxaała Nation, as well as six VCs (i.e., marine resources, vegetation and wetland resources, wildlife and wildlife habitat, human health, heritage and archaeological resources, and water quality).

PRGT is committed to information sharing and ongoing consultation with affected Indigenous nations and relevant stakeholders. This will occur through telephone calls, in-person meetings, and written communications. The intent of this consultation is to facilitate open discussions and collaboration with potentially affected parties. This may include identification of potential Project effects and mitigation measures to address Indigenous interests.

Pursuant to section 31 of the *Energy Resources Activities Act*, PRGT will require an amendment to its permits for Sections 6 and 7 of the pipeline from the BC Energy Regulator (BCER) for the proposed changes identified in the Amendment. PRGT anticipates filing this permit amendment with BCER in 2024, following completion of the EAC Amendment process. PRGT will also pursue required federal authorizations and permits under the *Fisheries Act* and *Canadian Navigable Waters Act* in 2024 (see Section 1.3.2 for additional permitting needs).



Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

Basemap Components
- KP Markers 9003
- Waterbody
- Watercourse
- International Boundary

Approved Project Components
- Certified Pipeline Corridor (CPC)
- Marine Centreline
- Nass Bay Approach Centreline
- Terrestrial Centreline

Marine Route Alterative Amendment Components
- Ksi Lisims LNG Pipeline Connection
- Nass Bay Route
- Nass Bay Approach
- Proposed CPC
- Proposed Pipeline Connection Area

Proposed Ksi Lisims LNG Project
- Ksi Lisims Project Footprint

0 2.5 5 km

1:140,000 (at original document size of 11x17)

Stantec

Project Location	Project Number 123514388
Nass Bay, Kitimat - Stikine Regional District, British Columbia	Prepared by EHERTZMAN on 20230828 Requested by LMACMILLAN on 20230828 Checked by FKLOTZ on 20231123

Client/Project/Report

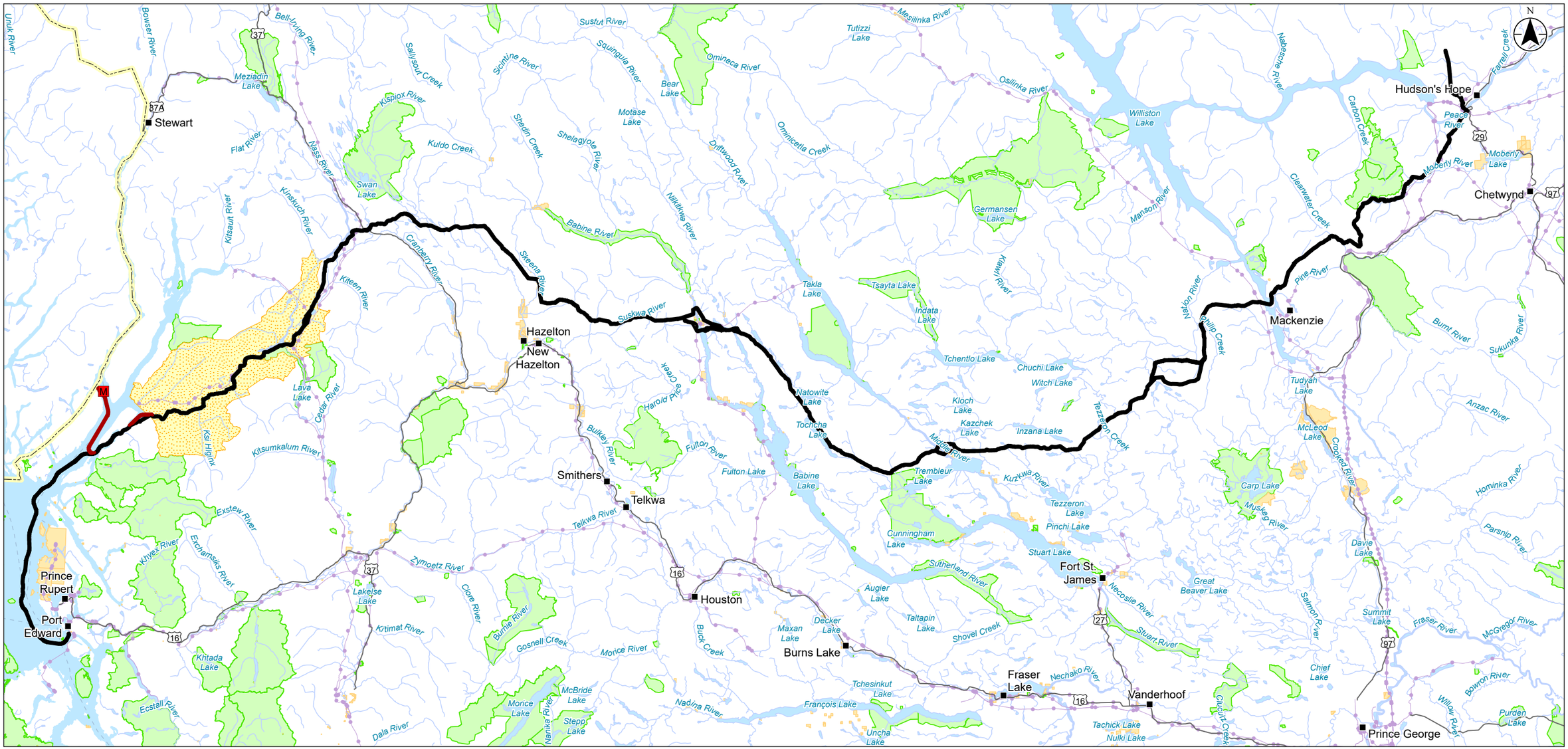
Prince Rupert Gas Transmission Ltd.

Figure No.

1.1

Title

Proposed Changes to the Prince Rupert Gas Transmission Project



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

0 30 60 km

1:1,500,000 (at original document size of 11x17)

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

Stantec

Project Location: British Columbia
Project Number 123514678
Prepared by TQUILICHINI on 20240620
Requested by AGRANT on 20240620
Reviewed by AGRANT on 20240620

Client/Project/Report

Prince Rupert Gas Transmission Ltd.

Figure No.
1.2

Title
Proposed Marine Route Alternative Amendment Overview

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1.2 Amendment Background

The Amendment is for the sixth amendment to EAC #E14-06. Table 1.1 provides a summary of previous amendments for this EAC. The previous amendments were completed under the former *Environmental Assessment Act* (2002).

Table 1.1 Previous PRGT Amendments

Amendment Number	Date Approved	Changes
1	December 16, 2015	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. Specific infrastructure additions in Amendment #1 included: • Material offloading facilities at Iceberg Bay, Nass Harbour, and Nass Bay • Barge landing sites at Monkley Creek and Welda Creek • A jetty at Nass Harbour • A dock at Nasoga Gulf
2	May 26, 2016	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 KP208 and rejoining at KP235.
3	May 26, 2016	Included the Nass Camp Route Alternative which changes the pipeline route at approximately KP662 and rejoins it at KP668.
4	December 20, 2017	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.
5	June 6, 2017	Included the Ksi Mat'in River Amendment which expanded the CPC to include a crossing of the Ksi Mat'in River.

Note:
The Nass Bay Route was considered in 2016 and a draft Amendment application was prepared. The 2016 draft Amendment and associated routing were shared with the EAO and Indigenous nations for feedback but the application was not finalized prior to the Project going on-hold following the cancellation of the PNW LNG Project.

1.3 Regulatory Setting

The Project was approved under the former *Environmental Assessment Act* (2002). The Amendment will be reviewed under the current *Environmental Assessment Act* (2018), which brings additional assessment matters that were not previously required. In accordance with the *Amendments to Environmental Assessment Certificates and Exemption Orders - Guidance for Holders* (EAO 2024), these assessment matters, per section 25 of the *Environmental Assessment Act* (2018), must be considered in the Amendment and are discussed further in Sections 4.2 and 4.9.

1.3.1 Applicable Legislation

Table 1.2 identifies the federal and provincial legislation that are applicable to the proposed changes identified in the Amendment.

Table 1.2 Summary of Applicable Legislation

Legislation	Legislative Relevance
Federal	
Fisheries Act	Sections 34 and 35 of the *Fisheries Act* 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.
Canadian Environmental Protection Act	Section 127(1) of the *Canadian Environmental Protection Act* allows for the issuance of permits for the disposal of waste at sea. Loss of sediments during marine trenching activities may be considered Disposal at Sea and require permitting.
Species at Risk Act	Section 32 of the *Species at Risk Act* 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.
Migratory Birds Convention Act, 1994	Section 5.1 of the *Migratory Birds Convention Act, 1994* 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.
Migratory Birds Regulations under the *Migratory Birds Convention Act, 1994*	Section 5 of the Migratory Birds Regulations prohibits the disturbance or destruction of birds and eggs as well as the nests of specific bird species year-round and bird's nests that are occupied and in use.
Canadian Navigable Waters Act	Section 3 of the *Canadian Navigable Waters Act* (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.

Legislation	Legislative Relevance
Provincial	
Environmental Assessment Act (2018)	Section 32 of the *Environmental Assessment Act* (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.
Land Act	Section 39 of the *Land Act* requires a permit to enter, occupy and use unoccupied Crown land to carry out permitted Project activities.
Environmental Management Act	Section 6 of the *Environmental Management Act* regulates air and effluent emissions from oil and gas facilities.
Energy Resource Activities Act	Section 4 of the *Energy Resource Activities Act* allows the 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.
Water Sustainability Act	Section 6 of the *Water Sustainability Act* prohibits the diversion/use of ground or surface water unless prior authorization is obtained. Sections 9 and 11 allow for use or diversion of water and changes in and about a stream with prior authorization respectively.
Wildlife Act	Section 9 of the *Wildlife Act* 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.
Heritage Conservation Act	The *Heritage Conservation Act* 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/or Approvals

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

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

License, Permit, and/or Approval	Legislation	Regulator	Purpose
EAC Amendment	*Environmental Assessment Act*	EAO	Amendment to EAC #E14-06
Pipeline Permit Amendment	*Energy Resource Activities Act*	BCER	Amendment to BCER Legacy Permit #9708462 and #9708463
Approval for Changes in and About a Stream	*Water Sustainability Act*	BCER	Authorization for changes in and about a stream
Request for Review Authorization for a harmful alteration, disruption or destruction of fish habitat	*Fisheries Act*	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 *Fisheries Act*. A *Fisheries Act* authorization would be necessary if DFO determines proposed activities are likely to result in HADD.
Approvals under the *Canadian Navigable Waters Act*	*Canadian Navigable Waters Act*	Transport Canada	Approval to obstruct navigable waters
Disposal at Sea Permit	*Canadian Environmental Protection Act*	ECCC	Permit to deposit dredged material in the ocean
Waste Discharge Permit	*Environmental Management Act*	BC ENV	Permit to discharge hydrostatic test water
Heritage Inspection Permit	*Heritage Conservation Act*	BCER	Required for Archaeological Impact Assessment (AIA) and archaeological chance find response, prerequisite for Alteration permit
Alteration Permit	*Heritage Conservation Act*	BCER	Permit for construction activities within recorded archaeological site boundaries

Notes:

BCER = British Columbia Energy Regulator; BC ENV = British Columbia Ministry of Environment; DFO = Fisheries and Oceans Canada; EAO = Environmental Assessment Office; ECCC = Environment and Climate Change Canada.

1.4 Relevant Technical Studies

Technical studies and assessments completed for the Project EAC Application and prior amendments are summarized in Table 1.4. These technical studies and assessments provide information about existing conditions of VCs, potential effects in the assessment areas, and were used to support the Amendment.

Table 1.4 Relevant Technical Studies and Assessments

Document Title	Reference
PRGT Project: Application for an Environmental Assessment Certificate	PRGT 2014a
Water Quality Technical Data Report for PRGT Project (Appendix H-1)	PRGT 2014a
Freshwater Aquatic Resources: Proposed Watercourse Crossing Locations, Fish Bearing Status, and Stream Class for PRGT Project (Appendix K-1)	PRGT 2014a
Marine Resources: Intertidal and Shallow Subtidal Surveys for PRGT Project (Appendix L-2 and L-3)	PRGT 2014a
Soils Technical Data Report for PRGT Project (Appendix M)	PRGT 2014a
Wildlife Technical Data Report for PRGT Project (Appendix P)	PRGT 2014a
PRGT Technical Memo Update for Marine Bird Vessel Surveys	PRGT 2014b
PRGT Technical Memo: Sufficiency of Information Regarding Identification of Unprotected Cultural Heritage Sites	PRGT 2014e
Archaeological Impact Assessment of the Intertidal Study Area for the Proposed Ksi Lisims Natural Gas Export Facility Project	Bond et al. 2023a
Archaeological Impact Assessment of the Terrestrial Study Area for the Proposed Ksi Lisims Natural Gas Export Facility Project	Bond et al. 2023b
Archaeological Impact Assessment – Final Report: PRGT Project	Hossack and Streeter 2018
Archaeological Overview Assessment – PRGT Project	Rohdin et al. 2014
Archaeological Impact Assessment – Final Report: PRGT Project	Streeter et al. 2015
Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project: Application for an Environmental Assessment Certificate	Ksi Lisims LNG 2023b
Section 07.09A Technical Data Report – Marine Resources. Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project	Ksi Lisims LNG 2023c
Section 7.09 Marine Resources. Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project	Ksi Lisims LNG 2023d
Section 07.08A Technical Data Report – Freshwater Fish and Fish Habitat. Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project	Ksi Lisims LNG 2023h
Section 07.07A Technical Data Report—Wildlife and Wildlife Habitat. Ksi Lisims LNG – Natural Gas Liquefaction Facility and Marine Terminal	Ksi Lisims LNG 2023f

In addition to the studies summarized in Table 1.4, the following baseline studies were completed and reviewed by qualified biologists and are described in Section 4.3.1:

- a subtidal remotely operated vehicle (ROV) survey in Nass Bay and Iceberg Bay (2015);
- an intertidal survey in Nass Bay, Iceberg Bay, and Nasoga Gulf (2023) and;
- a remote sensing survey that sought to identify kelp distribution in several locations in proximity of the Project (2023).

A multi-disciplinary survey of the Nass Bay Route exit and entry points and the Nass Bay Approach was also completed (2023), which assessed existing conditions for vegetation and wetland resources and wildlife and wildlife habitat VCs. Results of this survey are included in Sections 4.4.1 and 4.5.1.

Specific data obtained as a result of these studies is not publicly available at this time; however, results obtained were found to verify the conclusions presented in the 2014 Application and were included in the Amendment where applicable. A description of the methods, timing, and results of the intertidal survey is included in Section 4.3.1.

2 Proposed Changes to the EAC

PRGT is proposing changes to the Project to improve constructability and to supply natural gas to the Ksi Lisims LNG Facility at Wil Milit on Pearse Island. As part of this planning, two changes to the Project that are not included in the CPD of EAC #E14-06 are proposed (see Figure 1.1 and Figure 1.2):

1) Nass Bay Route – this change provides PRGT with the option of following a 9.4 km marine reroute of the pipeline corridor (compared to the current 8.7 km route) that includes a deviation of up to 1.5 km outside of the CPC in the marine environment, and a 0.2 ha expansion of the CPC prior to entering the marine environment (referred to as the Nass Bay Approach). Changes associated with the Nass Bay Route and Nass Bay Approach have several environmental benefits: 1) avoids crossing the isthmus between kilometre post (KP) 756 and 757 resulting in the construction of approximately 1 km less terrestrial pipe; 2) removes the requirement for the Nass Harbour Jetty; 3) reduces the number of wetlands intersected, heritage sites affected, and area of intertidal marine habitat disturbed during construction, and; 4) reduces the duration of construction in Nass Bay. The Nass Bay Route also avoids a parcel of land at the isthmus owned by Nisga'a Lisims Government (defined in the Nisga'a Final Agreement as the Echo Cove Fee Simple Site, Category B lands). The Nass Bay Route would reroute the pipeline around Nass Harbour, which will avoid terrestrial works in this area while extending the marine footprint. The section of pipeline associated with the Nass Bay Route will lay within water depths of 0 m to 75 m. A single 48-inch diameter pipe will be installed in Nass Bay and Iceberg Bay within open-cut trenches at two shore transitions (a 5.4 km long trench in Nass Bay at KP 752 and a 0.8 km long trench in Iceberg Bay at KP 761). A 3.2 km portion of the Nass Bay Route will not be trenched and will lay on the surface of the subtidal seafloor in Iceberg Bay. Following pipeline installation, trenches will be backfilled with trench material and/or engineered rock from a quarry.

2) Ksi Lisims LNG Pipeline Connection – this proposed change comprises adding the option to reroute the marine pipelines from the entrance to Nasoga Gulf to a new terminus at the proposed Ksi Lisims LNG Facility on Pearse Island. The route is planned to follow the approved route out of Nasoga Gulf (12.8 km within the CPC) and then curve northward after entering Portland Inlet. The precise landfall location will be determined during detailed design, and so a Proposed Pipeline Connection Area is included for planning, design, and construction flexibility. This component also includes a fiber optic cable that will be co-located with the marine pipelines and a receipt meter station that will be located within the footprint of the Ksi Lisims LNG Facility and may be constructed wholly or in part by PRGT. The Ksi Lisims LNG Pipeline Connection route is approximately 27 km long, inclusive of about 14.2 km that approximates a portion of the Kitsault Marine Route that was included in the Westcoast Connector Gas Transmission Project (WCGT) assessment. The EAO concluded there were no significant adverse effects associated with the submarine pipeline aspects of the WCGT (EAO 2014b). The Ksi Lisims LNG Pipeline Connection would result in construction of approximately 100 km less marine pipe.

2.1 Proposed Changes to the Certified Project Description

In the CPD, Section 1.0 would need to be revised to include the potential endpoint on Pearse Island.

In the CPD, Section 2.1. (Location), paragraph two 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 the proposed Amendment.

Section 4.1 of the CPD reads:

> "*The meter station location at KP 878.2 (54.197092 N, -130.28151 E), and is a maximum 0.8 ha in size, as shown on Mapsheet 1-194*"

This paragraph would be revised to include revised coordinates on Pearse Island and associated Mapsheet.

3 Consultation

3.1 Early Indigenous Nation Consultation

The territories of Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation would be overlapped by the Marine Route Alternative. The Marine Route Alternative is also within the Nass Area,[1] and the Gitxaała Nation territory includes an eulachon (oolichon; *Thaleichthys pacificus*) fishing station on the Nass River (Ksi Lisims LNG 2023a).

The following provides a summary of early consultation activities undertaken with respect to the Amendment. PRGT had commenced consultations on the Nass Bay Route included in the Amendment in 2016, including provision of the 2016 draft Amendment for the Nass Bay Route. PRGT however did not move forward with the Amendment because of a lack of commercial support for the Project at that time. Feedback from affected Indigenous nations has been considered and integrated into the Amendment.

3.1.1 Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation

On November 29, November 30, and December 1, 2016, PRGT held meetings with Lax Kw'alaams Band, Gitxaała Nation, Metlakatla First Nation, Kitsumkalum First Nation, and Kitselas First Nation to discuss the 2016 draft Amendment for the Nass Bay Route. PRGT provided presentations containing information on the 2016 draft Amendment, which included a map of the CPC and Nass Bay Route, the rationale for the proposed Amendment, construction methods, supporting assessments, and related nation-specific traditional land use (TLU) study reviews. PRGT advised that the Amendment would be shared with Indigenous nations.

On May 24 and May 25, 2017, PRGT met with Kitsumkalum First Nation and Kitselas First Nation respectively and advised that the 2016 draft Amendment for the Nass Bay Route would be provided to the EAO once Indigenous nations' reviews were complete. Kitsumkalum First Nation provided feedback to PRGT in 2017, which influenced the Amendment (see Section 5.1.7.1).

[1] The Nass Area is a broad term encompassing the area within which potential effects on Nisga'a Treaty rights and interests may be experienced. The area may include Nisga'a Lands, the Nass Wildlife Area, the Nass Area, Nisga'a Category A and B Lands, and Nisga'a Villages (Ksi Lisims LNG 2023a).

3.1.2 Nisga'a Nation

Consultation with Nisga'a Nation, represented by NLG, began in October 2015 and has subsequently involved in-person meetings and information exchange. PRGT has provided presentations and information on the proposed Marine Route Alternative Amendment components, including an explanation of anticipated positive residual effects and environmental benefits associated with the changes. PRGT also provided relevant Project data to NLG including bathymetric and survey data, as well as anticipated construction methods. Concerns identified by NLG regarding the Project have been identified and discussed during in-person and virtual meetings.

On November 27, 2018, PRGT and NLG met for an Implementation Committee meeting during which a presentation that included an update on the 2016 draft Amendment for the Nass Bay Route was provided. PRGT noted that consultation on the Amendment had commenced in 2016 including provision of the 2016 draft Amendment [to NLG] but that PRGT would not be moving forward with the Amendment until commercial support for the Project had been re-established.

Primary concerns identified through consultation with NLG include the potential effect of Project activities on the local marine environment and ecology (see Section 5.2.3).

Potential Project-related impacts on crab populations/habitat as well as impacts on local fishers were specifically raised. In response to concerns regarding marine ecology and impacts on crab populations, PRGT has committed to the development and implementation of a Crab Movement Mitigation and Monitoring Plan. PRGT is committed to ongoing and proactive communication with local fishers as well as the development of a Marine Access and Traffic Management Plan. Communication with NLG commencing early in the construction phase combined with the inclusion of the pipeline on marine navigational maps is anticipated to mitigate concerns around vessel traffic and local fishers. Additionally, PRGT will develop a Fisheries Interaction Plan that will address compensation for potentially damaged NLG fishing equipment resulting from interactions with the Project. The plan will be developed in consultation with NLG.

3.2 2023-2024 Indigenous Nation Consultation

The section below outlines consultation carried out in 2023-2024 with the affected Indigenous nations and identified issues/concerns regarding the Marine Route Alternative Amendment. Feedback from affected Indigenous nations has been considered and integrated into the Amendment.

3.2.1 Gitxaała Nation

On December 1, 2023, PRGT sent an email to Gitxaała Nation, advising of PRGT's intention to apply to the BC EAO pertaining to the Marine Route Alternative Amendment. PRGT included a letter, map, and shapefile with the email notification.

On December 13, 2023, PRGT sent an email to Gitxaała Nation, providing a draft copy of the Marine Route Alternative Amendment application and shapefile, and requested any feedback by January 31, 2024. PRGT also offered to meet with Gitxaała Nation and provide any additional requested information.

On December 13, 2023, PRGT met with Gitxaała Nation to discuss various topics, including the Marine Route Alternative Amendment. Gitxaała Nation expressed concerns pertaining to construction, monitoring, tanker traffic, and potential impacts to fishing and wildlife. Gitxaała Nation requested to be fully included in the Marine Route Alternative Amendment discussion, to ensure protection of marine waters including culturally sensitive areas, such as the eulachon camp, eulachon run, commercial fishing impacts, and the potential impact on whales.

On December 13, 2023, PRGT sent an email to Gitxaała Nation, acknowledging the Nation's request for inclusion on the Marine route amendment and continued consultation on the topics Gitxaała Nation raised.

On December 14, 2023, PRGT sent an email to Gitxaała Nation, requesting to schedule a meeting with the Nation for January 24, 2024, to further discuss Gitxaała Nation's interests in the Marine Route Alternative Amendment.

On December 15, 2023, PRGT sent an email to Gitxaała Nation, to provide a draft copy of the regulatory workplan and schedule.

On March 18, 2014, Gitxaała Nation provided PRGT with a table of comments and questions regarding the draft Amendment application.

On April 14, 2024 PRGT responded to Gitxaała Nation's comments. PRGT's responses are included in Table 3.1.

3.2.2 Kitselas First Nation

On December 1, 2023, PRGT sent an email to Kitselas First Nation, advising of PRGT's intention to apply to the BC EAO pertaining to the Marine Route Alternative Amendment. PRGT included a letter, map, and shapefile with the email notification.

On December 14, 2023, PRGT sent an email to Kitselas First Nation, providing a draft copy of the Marine Route Alternative Amendment application and shapefile, and requested any feedback by January 31, 2024. PRGT also offered to meet with Kitselas First Nation and provide any additional requested information.

On December 15, 2023, PRGT sent an email to Kitselas First Nation, to provide a draft copy of the regulatory workplan and schedule.

On January 17, 2024, PRGT sent an email to Kitselas First Nation, requesting a meeting with the Nation to discuss the Marine Route Alternative Amendment, while also providing a draft copy of the Amendment.

On February 6, 2024, PRGT met with Kitselas First Nation to discuss the Marine Route Alternative Amendment. Kitselas First Nation expressed concerns pertaining to salmon, cumulative effects, climate change, noise and air emissions, as well as human population increase to the surrounding area because of the Project. Kitselas First Nation advised the Project's socio-economic report should be updated.

PRGT's responses to Kitselas First Nation's comments are included in Table 3.1.

3.2.3 Kitsumkalum First Nation

On December 1, 2023, PRGT sent an email to Kitsumkalum First Nation, advising of PRGT's intention to apply to the BC EAO pertaining to the Marine Route Alternative Amendment. PRGT included a letter, map, and shapefile with the email notification.

On December 12, 2023, PRGT wrote to Kitsumkalum First Nation, requesting a meeting to discuss the Marine Route Alternative Amendment. Kitsumkalum First Nation responded by suggesting a meeting in January 2024. PRGT proceeded with sending a meeting invite for January 10, 2024.

On December 14, 2023, PRGT sent an email to Kitsumkalum First Nation, providing a draft copy of the Marine Route Alternative Amendment application and shapefile, and requested any feedback by January 31, 2024. PRGT also offered to meet with Kitsumkalum First Nation and provide any additional requested information.

On December 15, 2023, PRGT sent an email to Kitsumkalum First Nation, to provide a draft copy of the regulatory workplan and schedule.

On January 10, 2024, PRGT met with Kitsumkalum First Nation to discuss the Marine Route Alternative Amendment. Kitsumkalum First Nation expressed concerns regarding impacts to ground and commercial fishing, as well as the potential for impacts the Amendment may have on their ability to continue fishing. PRGT acknowledged the Nation's concerns and stated they would continue to work together throughout the process to address their concerns.

On February 15, 2024, PRGT wrote to Kitsumkalum First Nation noting that PRGT would value receiving any additional comments on the Amendment by February 29, 2024.

3.2.4 Lax Kw'alaams Band

On December 1, 2023, PRGT sent an email to Lax Kw'alaams Band, advising of PRGT's intention to apply to the BC EAO pertaining to the Marine Route Alternative Amendment. PRGT included a letter, map, and shapefile with the email notification.

On December 13, 2023, PRGT sent an email to Lax Kw'alaams Band, providing a draft copy of the Marine Route Alternative Amendment application and shapefile, and requested any feedback by f January 31, 2024. PRGT also offered to meet with Lax Kw'alaams Band to discuss any feedback.

On December 15, 2023, PRGT sent an email to Lax Kw'alaams Band, to provide a draft copy of the regulatory workplan and schedule.

On January 5, 2024, PRGT sent an email to Lax Kw'alaams Band, to request a meeting with the Nation's Lands Director and Culture & Heritage Coordinator to discuss the Marine Route Alternative Amendment. Included in the email was the Amendment letter, map, shapefile, and proposed work plan.

On January 15, 2024, PRGT sent a follow-up email to Lax Kw'alaams Band, requesting a meeting to discuss the Marine Amendment.

On January 25, 2024, PRGT sent a follow-up email to Lax Kw'alaams Band, requesting a meeting to discuss the Marine Amendment.

On January 29, 2024, Lax Kw'alaams Band sent an email to PRGT, confirming they have received a copy of the Marine Route Alternative Amendment for review and consultation.

On February 15, 2024, PRGT wrote to Lax Kw'alaams Band noting that PRGT would value receiving any comments on the Amendment by February 29, 2024.

At the time of filing, PRGT has not received any comments, questions or feedback from Lax Kw'alaams Band on the Amendment application.

3.2.5 Metlakatla First Nation

On December 1, 2023, PRGT sent an email to Metlakatla First Nation, advising of PRGT's intention to apply to the BC EAO pertaining to the Marine Route Alternative Amendment. PRGT included a letter, map, and shapefile with the email notification.

On December 13, 2023, PRGT sent an email to Metlakatla First Nation, providing a draft copy of the Marine Amendment application and shapefile, and requested any feedback by January 31, 2024.

On December 14, 2023, PRGT sent an email to Metlakatla First Nation, requesting a meeting with the Nation mid-January 2024.

On December 15, 2023, PRGT sent an email to Metlakatla First Nation to provide a draft copy of the regulatory workplan and schedule.

On January 22, 2024, Metlakatla First Nation requested to meet with PRGT on February 9, 2024, regarding the Amendment. PRGT responded the same day confirming Metlakatla First Nation's request for a meeting on February 9, 2024.

On February 9, 2024, PRGT met with Metlakatla First Nation who expressed concern of a very busy schedule with competing projects.

On February 28, 2024, Metlakatla First Nation provided PRGT with comments on the draft Marine Alternative Route Amendment application.

On April 1, 2024 PRGT responded to Metlakatla First Nation's comments. PRGT's responses are included in Table 3.1.

3.2.6 Nisga'a Lisims Government

On November 30, 2023, PRGT sent an email and location map to NLG, advising of PRGT's intention to apply to the British Columbia Environmental Assessment Office (BC EAO) pertaining to the Marine Route Alternative Amendment.

On December 1, 2023, PRGT sent an email to NLG, providing a copy of the Marine Route Alternative Amendment shapefile.

On December 8, 2023, NLG responded via email expressing their preference for the Nass Bay Route, which avoids the nearshore areas of Nass Harbour and Echo Cove, rather than the approved route. NLG also requested additional context regarding the rationale for the Amendment.

On December 12, 2023, PRGT sent an email to NLG, acknowledging NLG's December 8 email request for additional context regarding rationale for the Marine Amendment, advising they would provide the requested information shortly.

On December 13, 2023, PRGT sent an email to NLG, providing a draft copy of the Marine Route Alternative Amendment application and shapefile, and requested any feedback by January 31, 2024. PRGT also offered to meet with NLG to discuss any feedback.

On December 15, 2023, PRGT sent an email to NLG, providing a draft copy of the regulatory workplan and anticipated schedule.

On January 18, 2024, PRGT received a letter from NLG, advising that NLG was pleased to see the Marine Route Alternative Amendment included PRGT's commitment to developing and implementing a Crab Development Mitigation and Monitoring Plan, as well as the development of a Marine Access and Traffic Management Plan. NLG also shared a report depicting the location of Eelgrass in the Iceberg Bay area, titled "Baseline Implementation of the Ecosystem Health and Fish Habitat Monitoring Plan for the Nass River Estuary: Marsh and Eelgrass Mapping (Year 2)".

On January 22, 2024, PRGT sent an email to NLG, thanking NLG for providing the Eelgrass Report with mapping. PRGT committed to reviewing and considering the report when developing Project Management Plans.

On January 24, 2024, PRGT sent an email to NLG, responding to NLG's request on December 8, 2023, asking for additional context pertaining to the rationale for the Marine Route Alternative Amendment. PRGT advised rationale behind the Amendment included construction optimization, reduced environmental effects, and reduced duration of construction with the marine environment. The Nass Bay route would reduce the amount of trenching from 7 km to 6.2 km, the number of intertidal transitions from four to two, the number of wetlands intersected from five to one, and the intertidal pipeline length from 3.6 km to 2.6 km. The Nass Bay Route would also avoid the need to clear the isthmus (land area) and construct the Nass Harbour Jetty, reducing the number of heritage sites affected from 30 to one.

On February 14, 2024, NLG wrote to PRGT confirming that NLG has no further comments and generally supports the Amendment.

3.2.7 Summary of Indigenous Nations' Feedback on the Marine Route Alternative Amendment

Table 3.1 Provides a summary of the feedback received by Indigenous nations on the Marine Route Alternative 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) are indicated.

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

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Gitxaała Nation	October 24, 2023	Gitxaała Nation expressed that Nass Bay marine mammals and fish are of interests to the Nation.	PRGT responded to the Nation that PRGT is committed to the protection of marine mammals and acknowledges the importance of these species to Gitxaala Nation. The Marine Mammal Monitoring Plan has been completed and approved by the Environmental Assessment Office which, when implemented, will serve to further protect sensitive marine mammals during the Construction phase of the Project. Amendment-related effects on marine resources are assessed in Section 4.3 and Table 4.5.
Gitxaała Nation	December 13, 2023	Gitxaała Nation requested to be fully involved in the Marine Route Alternative Amendment discussion to ensure the protection of the marine waters including culturally sensitive areas such as, an eulachon camp, eulachon run, commercial fishing impacts, tanker traffic and potential for accidents.	PRGT replied to Gitxaała Nation on January 24, 2024 and acknowledged their request. PRGT is working to set up a follow-up meeting with Gitxaała Nation to discuss site-specific interests and mitigation measures. Regarding the interests raised by Gitxaała Nation, the timing of marine works will be refined through the *Fisheries Act* Authorization (FAA) process, which will include consideration of sensitive life stages of eulachon. There will be opportunities to consult directly with PRGT as well as through the FAA process. Potential effects on fishing have been considered in the Marine Route Alternative Amendment, including access to harvesting areas and resources relied upon for harvesting. Potential effects on commercial fishing will be addressed in the Marine Access and Traffic Management Plan, per Condition 5 of the Environmental Assessment Certificate, and will also address the requirements for a Fisheries Interaction Plan per Condition 6 of the Environmental Assessment Certificate. LNG tanker traffic is outside of the scope of the PRGT project but is considered within the Ksi Lisims Project. See Section 4.3 for Amendment-related effects on marine resources.
Gitxaała Nation	March 18, 2024	Gitxaała Territorial Management Agency (GTMA) provided the following comment on the draft Marine Route Alternative Amendment: Table 1.4 indicates PRGT has not completed any technical studies or assessments since 2014. This is inconsistent with Section 4.3.1, which describes intertidal surveys and the collection of remote sensing images in 2023. This table should be updated to include all relevant data collection by PRGT.	On April 14, 2024 PRGT responded: Table 1.4 is a list of reports used to support the Amendment. PRGT has made revisions to Section 1.4 of the Amendment to make this more clear.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] Section 3.1.1 should be updated to include the most recent consultation activities that were undertaken during 2023. As drafted this section is largely referring to consultation on the 2016 amendment that was not taken forward and it is unclear what happened between that consultation and now. Further it does not include any reference to the verbal feedback GTMA staff provided to the PRGT team during 2023, including but not limited to concerns related to Project impacts on marine ecosystems, species and habitats, a lack of current baseline data, and questions related to construction methods and risks and preparation for accidents and malfunctions. GTMA is of the view that source data for biological VCs that is older than 5 years is outdated and should be reinforced by more recent data collection.	On April 14, 2024PRGT responded: This section has been updated to include Gitxaala's 2023 comments. The extensive studies completed for the 2014 Application supported the assessment of potential impacts and development of mitigation measures. Additional surveys to support provincial permitting and construction planning will be conducted closer to construction to refine site-specific changes that may have occurred since 2017.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] Section 4.3 indicates the Amendment "includes an updated description of existing conditions based on data collected since the original baseline studies were completed"; however, we note Section 4.3.1 - Existing Conditions (Marine Resources) includes general narrative updates with no references provided for any technical studies resulting from field studies conducted in "three areas of interest" in 2023 as described on p. 29. As previously requested, GTMA is interested in understanding the locations, methods and findings of all PRGT's primary data collection efforts, particularly the intertidal survey in Nass Bay, Iceberg Bay and Nasoga Gulf.	On April 14, 2024 PRGT responded: Baseline studies that were completed to support the Amendment focused on environmental components including riparian, intertidal and subtidal habitat, marine sediment, water quality, and oceanographic surveys. Section 4.3.1 includes a description of these baseline studies including 1) the 2015 subtidal ROV survey in Nass Bay and Iceberg Bay; 2) the 2023 intertidal survey in Nass Bay, Iceberg Bay, and Nasoga Gulf, and; 3) the 2023 remote sensing survey that sought to identify kelp distribution in several locations in proximity of the Project. A description of the methods, timing, and results of the intertidal survey is included in Section 4.3.1.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] There are three paragraphs on p. 27 [Section 4.3.1], regarding engagement with NLG, Kitsumkalum and Lax Kw'alaams in 2015-16 that would fit more appropriately in Section 3 – Consultation than in the Marine Resources Existing Conditions section.	On April 14, 2024 PRGT responded: Thank you for the comment. The Amendment has been updated. A section called "Influence of Consultation and Engagement" has been added to each relevant VC chapter, which incorporates the three paragraphs mentioned into the Marine Resources chapter.

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] P. 32 [Section 4.3.3.1] notes the subtidal and intertidal pipeline placement at the landfall location on Pearse Island "is not included in the activities assessed in the Ksi Lisims LNG Project Application". This is problematic as the site is also outside of the original Marine Resources RAA for PRGT. GTMA is of the view that at a minimum all construction activity associated with the marine entry/exit point must be accounted for in this Amendment application as they relate to the residual effects of the Project on Marine Resources. Please confirm these activities have been considered in this assessment. As an example, the potential need for blasting in Nass Bay should be noted in Table 4.4 in the column 'Change in Potential Effects', similarly to how the potential blasting-related mitigation is noted in the adjacent column. GTMA requires further engagement on the construction plans and associated mitigations as Gitxaała Nation is concerned about underwater noise related impacts on marine resources, particularly whales, in the Marine Resources RAA.	On April 14, 2024 PRGT responded: PRGT is open to future engagement with GTMA on the construction plans and associated mitigations as they relate to underwater noise related impacts on marine resources, particularly whales. The Marine Resources RAA has been expanded to include the full extent of the Ksi Lisims Pipeline Connection so as to fully account for potential Project and cumulative effects of the Marine Route Alternative (Section 4.3). As such, anticipated effects within the updated RAA have been considered and assessed in the Amendment. Activity associated with the marine entry/exit point at Pearse Island has been assessed in the Amendment. Alterations to the potential effects of the Project as presented in the Application are encompassed by the Amendment. Table 4.4 includes a summary of changes in effects from what was presented in the Application. The Amendment is not anticipated to result in a change in effects as a result of blasting (given the implementation of mitigation measures as noted in the table). As such, there is no need to identify a potential change in effect in the table. PRGT is committed to the protection of marine mammals and acknowledges the importance of these species to the Gitxaała Nation. Per the Amendment, it is expected that the Marine Route Alternative will not result in new residual effects for marine mammals, however, PRGT will continue to engage with the Gitxaała Nation as the Project develops. In addition, the Marine Mammal Monitoring Plan has been completed and approved by the Environmental Assessment Office which, when implemented, will serve to further protect sensitive marine mammals during the Construction phase of the Project.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] GTMA acknowledges the project footprint is approximately 70% smaller than the existing permitted footprint and will avoid the predicted effects from the Application near the Port of Prince Rupert and appreciates that PRGT is not suggesting changes to the conclusions in the EAO's Assessment Report. However, GTMA is concerned that the assessment does not appropriately account for the increase in localized effects at the marine exit point at the Ksi Lisims LNG Facility as it is outside of the Marine Resources RAA shown on Figure 1.1.	On April 14, 2024 PRGT responded: The RAA has been expanded to include the full extent of the Ksi Lisims Pipeline Connection so as to fully account for potential Project and cumulative effects of the Marine Route Alternative Amendment application for the Marine Resources Valued Component.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] In the 'Magnitude' row in Table 4.5, there is a note indicating "undetected sponge reefs" may exist in the Marine Route Alternative. Will additional surveys be conducted to confirm presence/absence of glass sponge reefs?	On April 14, 2024 PRGT responded: Field Surveys will be conducted along the route to refresh marine data including sub-sea geology and topography. If glass sponge reefs are present along the pipeline RoW they will be identified during this field work. Previously identified glass sponge locations have been designated as "No Go" areas.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] In the 'Duration: Habitat Alteration' row in Table 4.5, please explain how habitat disturbance was determined to be medium term when the pipeline will remain in place longer than 2 years following construction.	On April 14, 2024 PRGT responded: Table 4.5 is copied directly from the 2014 EAO Assessment Report with the exception of the final (right) column (Change to the Residual Effects Characterization). Table 4.5 identifies the effect of habitat alteration as "short-term to long-term" which reflects the anticipated operational lifespan of the pipeline. As outlined by the EAO in Table 4.5, the effect of habitat disturbance is anticipated to continue for up to two years following construction before returning to baseline conditions once construction ceases, however residual effects may occur in the long-term. Habitat affected by the proposed pipeline is anticipated to be recolonized by the same species assemblage to what was identified as existing conditions after construction ceases. PRGT does not anticipate deviations from the assessment made by the EAO as a result of the Amendment regarding the duration of habitat alteration.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] Regarding the 'Reversibility' row in Table 4.5, please provide PRGT's view of what 'return to baseline conditions' post construction means when there's now a pipe in that environment?	On April 14, 2024 PRGT responded: As defined in Table 4.1, "Reversibility pertains to whether or not the residual effect on the VC can be reversed once the physical work or activity causing the disturbance ceases." As outlined in Table 4.1, a reversible change will recover to baseline condition after Project operation. A return to baseline conditions means a return to the conditions portrayed in the Existing Conditions sections of the Amendment (4.3.1) and the Application (11.3). [Table 4.1 - Characterization of Effects as referred to in this response has been removed from the Amendment since PRGT responded to GTMA's comment. Definitions of the standard criteria used to characterize residual effects can be found in section 4.1.3 of the EAO Assessment Report (EAO 2014a).]
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] GTMA recommends a more fulsome update to Section 4.3.2.4 [now Section 4.3.3.4] including a table that clarifies which Projects are considered in this updated cumulative effects assessment, and which Projects that were considered in the Application are no longer applicable.	On April 14, 2024 PRGT responded: The Ksi Lisims LNG Project was identified after PRGT was approved and therefore Ksi Lisims LNG was required to consider PRGT in its cumulative effects assessment. The Ksi Lisims LNG Project was the only project change from the Application.

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] GTMA is of the view that the changes to the EAA require a more robust assessment of the effects of the Project on Indigenous Nations and their s. 35 Rights (s. 25(1) of the EAA) than the assessment of the effects of the Project on the meaningful exercise of rights that were assessed under the EAA 2002. GTMA requires additional engagement with the EAO to discuss the adequacy of the updated assessments in this Amendment.	PRGT will share these concerns with EAO and suggest EAO follow-up with Gitxaała Nation on this matter.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] Regarding row 25(2)(c) in Table 4.16 [now Table 4.21], GTMA notes that if there have been any changes to planned pipeline materials, construction and/or maintenance methods, there must be an updated assessment of accidents and malfunctions in this Amendment.	On April 14, 2024 PRGT responded: The Marine Route Alternative Amendment is not expected to result in any new accidents or malfunctions not considered in the Application. PRGT have committed to a suite of Emergency Response and contingency plans including: Spill Contingency Plan, Adverse Weather Contingency Plan, Fire Suppression Contingency Plan, Flood and Excessive Flow Contingency Plan, Plant Species and Ecological Communities of Concern Contingency Plan, Heritage or Palaeontological Resource Discovery Contingency Plan, and Wildlife Species of Concern Discovery Contingency Plan that will be included in the Marine Construction Environmental Management Plan to be developed for the pipeline, and are included in the Marine Ancillary Facilities Construction Environmental Management Plan. PRGT will engage with Gitxaała on the development of these plans as marine pipeline construction planning progresses.
Gitxaała Nation	March 18, 2024	GTMA provided the following comment on the draft Marine Route Alternative Amendment: [1] Regarding row 25(2)(h) in Table 4.16 [now Table 4.21], GTMA is interested to understand from the EAO, if the GHG assessment in this Amendment requires an update to meet new legislated requirements around GHG assessment, reporting and monitoring.	PRGT will share these concerns with EAO and suggest EAO follow-up with Gitxaała Nation on this matter.
Kitselas First Nation	February 6, 2024	Kitselas First Nation expressed concerns regarding potential impacts to salmon. Kitselas First Nation also expressed concerns about cumulative effects, climate change, noise and air emissions and population increase in the area. Kitselas First Nation noted that the socio-economic report will need to be updated.	Regarding potential effects of the Project on salmon, the timing of marine works will be refined through the Fisheries Act Authorization (FAA) process, which will consider sensitive life stages of salmon. There will be opportunities to consult directly with PRGT as well as through the FAA process. Amendment-related effects on salmon are assessed in Section 4.3.3 and Table 4.5. Potential effects on noise and air emissions associated with the Marine Route Alternative Amendment are limited to effects during construction and are expected to be less than if the currently approved route to Prince Rupert was constructed because of the reduction in overall length and less trenching required. The Social and Economic Effects Management Plan that was developed for the Project will be updated, and Kitselas First Nation will have an opportunity to review it and to provide feedback prior to construction of the Marine Route Alternative. Climate change is considered within the Marine Route Alternative Amendment. Climate change generally is predicted to increase sea level, affect the severity and frequency of storms on the north coast, and increase the intensity of dry and wet periods. These changes may exacerbate the effects of the environment on the Project, which were assessed in Section 10.2 of the EAO's Assessment Report. Engineering design of the pipeline has included consideration of effects of climate change. With respect to the proposed changes to the Project, coastal areas of northern British Columbia are expected to be some of the areas least affected by climate change. Cumulative effects for Indigenous interests are expected to be lower for the Marine Route Alternative Amendment than for the approved Project. With this Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)" (Ksi Lisims LNG 2023b). PRGT will continue to work with Indigenous nations to address Project-specific issues related to cumulative effects on 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. Information will be reviewed as it is received by Kitselas First Nation to determine if additional mitigation measures are needed.

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Kitsumkalum First Nation	January 10, 2024	Kitsumkalum First Nation has expressed concerns regarding impacts to ground and commercial fishing and their ability to continue to fish.	During the meeting PRGT responded acknowledging the concerns and stated that we will work together throughout the process to address Kitsumkalum First Nation's concerns. Regarding the concerns raised by Kitsumkalum First Nation about potential effects on ground and commercial fishing, potential effects on fishing has been considered in the Marine Route Alternative Amendment, including access to harvesting areas and resources relied upon for harvesting. Potential effects on commercial fishing will be addressed in the Marine Access and Traffic Management Plan, per Condition 5 of the Environmental Assessment Certificate, and will also address the requirements for a Fisheries Interaction Plan per Condition 6 of the Environmental Assessment Certificate. With respect to ground fishing, PRGT has developed a Crab Movement Mitigation and Monitoring Plan as part of satisfying Condition 8 of the Environmental Assessment Certificate. Amendment-related effects on fish are assessed in Section 4.3.3 and Table 4.5. Amendment-related effects on commercial fishing are addressed in the Marine Access and Traffic Management Plan.
Kitsumkalum First Nation	February 1, 2024	Kitsumkalum First Nation has expressed the need to finalize a capacity funding agreement prior to reviewing any PRGT documents.	PRGT responded on February 7, 2024, noting that PRGT would also like to have a capacity funding agreement in place to ensure the community is able to consult, provide feedback and recommendations regarding the application on the Marine Route Alternative. PRGT had provided a response to Kitsumkalum First Nation's requested capacity funding agreement changes on January 31, 2024. PRGT added it was able to provide an extended date of February 16, 2024, for the Nation's initial feedback on the Amendment. PRGT noted that if review of the entire draft Amendment by Kitsumkalum is not possible within the requested time, PRGT would value feedback on any site-specific concerns along the route.
Lax Kw'alaams Band	January 29, 2024	Lax Kw'alaams Band wrote to PRGT confirming the receipt of the draft Marine Route Alternative Amendment documents for review and consultation.	PRGT responded to Lax Kw'alaams Band's email on January 29, 2024 thanking the Nation for the update and requested to receive any comments, questions, or feedback from the Nation on the draft Amendment by February 12, 2024.
Metlakatla First Nation	February 3, 2024	Metlakatla Stewardship Society requested more time to review and respond to PRGT's application regarding the Marine Route Alternative Amendment due to recent office closures and personal circumstances.	On February 3, 2024, PRGT responded to Metlakatla Stewardship Society's request by providing an extended date for comments and noting that PRGT is open to working with the Nation to incorporate their feedback into the application. PRGT would value feedback on the Amendment by February 16, 2024. PRGT later followed up with Metlakatla Stewardship Society by providing a new extended date of February 29, 2024 for the Nation's comments or feedback.
Metlakatla First Nation	February 9, 2024	Metlakatla First Nation expressed concern of a very busy schedule with competing projects, and would like to discuss capacity funding.	PRGT acknowledged the concern and offered to meet with the Nation to discuss on the raised concerns on February 22, 2024.
Metlakatla First Nation	February 28, 2024	Metlakatla Stewardship Society provided the following comment on the draft Marine Route Alternative Amendment: [1] While the EAC amendment application process primarily focuses on the implications of proposed changes to the certified project, it also provides an opportunity to consider changing conditions and circumstances since the EAC was issued. Ten years has elapsed since the original EAC was issued. In this time, there may have been advances in pipeline technology and best practices that could mitigate effects. Please include a discussion of any relevant advances in pipeline technology since the EAC #E14-06 was issued and how these advances are being incorporated into project design.	On April 1, 2024 PRGT responded: The route has undergone constructability reviews with consideration of fish and aquatic resources, intertidal zones and advancements in pipeline technologies. As a result, we have changed the route through the Nass and Iceberg Bays to progress through the center of the bays and avoid the coastline. This will result in a smaller terrestrial footprint along the shoreline and the installation of the pipeline will be done using a shallow pipelayer rather than a sequence of shoreline pulls.
Metlakatla First Nation	February 28, 2024	Metlakatla Stewardship Society provided the following comment on the draft Marine Route Alternative Amendment: [1] The assessment does not provide sufficient rationale to justify exclusion of the Land and Resource Use VC from further assessment. While effects on recreational and commercial fisheries in Portland Inlet, Portland Canal and Nass Bay were considered with respect to the RAA in the 2014 Application, the scale of this spatial area is such that direct project impacts were not considered. The proposed new location of the route may pose unique effects to commercial and recreational fishing that were not considered int the original assessment, due to the unique conditions, methods and species targeted in the area. Please include Land and Resource Use in the assessment or provide sufficient rationale for why this VC does not require additional analysis.	On April 1, 2024 PRGT responded: Potential effects of the Marine Route Alternative are expected to be similar to those of the Application, if not reduced compared to the approved, longer route to Prince Rupert. The EAO Report concluded that the project was not likely to have significant adverse residual effects on land and resource use and predicted low to moderate magnitude effects on Land and Resource use, and Fishing in particular. In comparison to the approved route, the Marine Route Alternative would result in construction of approximately 100 km less marine pipe and will reduce the duration of construction required. To mitigate potential effects on commercial fishing, PRGT will be developing the Marine Access and Traffic Management Plan for Pipelines, as well as the Fisheries Interaction Plan in accordance with Conditions 5 and 6 of the Certificate. PRGT will engage with Metlakatla on the development of these plans as marine pipeline construction planning progresses. PRGT also has an approved Marine Access and Traffic Management Plan for Marine Ancillary Facilities to mitigate potential effects from these facilities on commercial fishing.

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
Metlakatla First Nation	February 28, 2024	Metlakatla Stewardship Society provided the following comment on the draft Marine Route Alternative Amendment: [1] The Amendment assesses the revised project's impacts on marine mammals. Whales are noted in the Amendment to have a low to moderate resilience to underwater noise or pressure waves which may result in changes to behavioural patterns. However, the Amendment does not draw on the most recent knowledge on this emerging area of science or consider whether there are unique acoustic or other properties within the amended pipeline route for marine mammals that would result in different effects relative to the 2014 Application. Considering the cultural importance of marine mammal species to Metlakatla First Nation, it is essential that PRGT undertakes more through assessment of project changes on marine mammals. Please consider whether the 2014 Application's conclusions regarding impacts on marine mammals remain accurate given advancing knowledge regarding marine impacts on marine mammals and consider whether any additional mitigation measures are required.	On April 1, 2024 PRGT responded: PRGT is committed to the protection of marine mammals and acknowledges the importance of these species to the Metlakatla First Nation and the ecosystem. Section 11.5.4.5 of the Application concluded that "pressure waves or underwater noise during construction could result in moderate changes in marine mammal behaviour. Adverse effects on population viability will be very unlikely…change in behaviour is expected to be moderate in magnitude and short term…". While recent scientific advancements in the fields of underwater noise and marine mammal behaviour have been substantial, the conclusions presented in the Application have been reviewed by a qualified professional and are anticipated to be consistent with the Amendment given the mitigation measures outlined therein. In addition, the Marine Mammal Monitoring Plan has been completed and approved by the Environmental Assessment Office which, when implemented, will serve to further protect sensitive marine mammals during the Construction phase of the Project. If the Metlakatla First Nation has specific information to provide, PRGT will be happy to discuss further.
Metlakatla First Nation	February 28, 2024	Metlakatla Stewardship Society provided the following comment on the draft Marine Route Alternative Amendment: [1] The assessment does not update existing conditions for the VC of Human Health, instead, it reflects the conditions that were established in the initial application in 2014. It is essential that the Amendment also update the baseline conditions for Human Health to reflect the changing social conditions in the areas since EAC # E14-06 was granted. Moreover, the concerns raised by Metlakatla in the 2014 Application regarding the adequacy of baseline information pertaining to the types and utilization of traditionally significant foods and water sources, which are integral to the assessment of Human Health VC, must be duly considered when using the baseline information from that Application for the Amendment Application. Please update baseline conditions for the VC of Human Health to reflect any changes in the area and allow for a more accurate evaluation of potential impacts on the project on Human Health.	On April 1, 2024 PRGT responded: The assessment of human health applies the provincial and federal assessment methods for conducting a human health risk assessment (HHRA). The HHRA evaluates biophysical health that is related to exposure to Project-related emissions of environmental pollutants. Based on the 2014 Application, there were no identified Project-related emissions to the marine environment that could contaminate seafood. There was also no evidence of existing marine contamination because there is no prior history of industrial activity as a pollutant source. For this reason, the assessment of human health related to contamination of marine country foods was characterized as an inoperable pathway. The Amendment route is not anticipated to traverse through a contaminated site, and not anticipated to change the characterization of this pathway as inoperable. The harvesting and utilization of marine country foods is a social determinant of health, not a biophysical determinant related to chemical contamination. Section 5.1.8 of the Amendment considers Metlakatla First Nation's concerns for health as it pertains to the types and utilization of traditionally significant foods and water sources. This section of the Amendment has been updated accordingly.
Metlakatla First Nation	February 28, 2024	Metlakatla Stewardship Society provided the following comment on the draft Marine Route Alternative Amendment: [1] The Amendment mentions that an assessment of accidents and malfunctions was conducted as part of the Application and it is not discussed further in the context of the Amendment. Given the change in the pipeline route, and the connection of the pipeline to Ksi Lisims LNG, there may be additional accidents and malfunction risks that have to be considered, including emergency response capabilities in this location. Multiple communities, including Metlakatla First Nation, have raised concerns about the risk of accidents in the territory due to the pipeline. Please include a comprehensive review of accidents and malfunctions, considering the changed conditions and community feedback, to accurately evaluate and mitigate potential risks associated with the revised project.	On April 1, 2024 PRGT responded: The Marine Route Alternative Amendment is not expected to result in any new accidents or malfunctions not considered in the Application. PRGT have committed to a suite of Emergency Response and contingency plans including: Spill Contingency Plan, Adverse Weather Contingency Plan, Fire Suppression Contingency Plan, Flood and Excessive Flow Contingency Plan, Plant Species and Ecological Communities of Concern Contingency Plan, Heritage or Palaeontological Resource Discovery Contingency Plan, and Wildlife Species of Concern Discovery Contingency Plan that will be included in the Marine Construction Environmental Management Plan to be developed for the pipeline, and are included in the Marine Ancillary Facilities Construction Environmental Management Plan. PRGT will engage with Metlakatla on the development of these plans as marine pipeline construction planning progresses.
NLG	December 8, 2023	NLG responded to PRGT's November 30, 2023 Marine Route Alternative Amendment letter noting that, from NLG's perspective, the Nass Bay Route, which avoids the nearshore areas of Nass Harbour and Echo Cove, is preferable to the approved route. NLG also requested to receive additional information regarding the rationale for the Amendment.	In response to NLG's request on December 8, 2023, PRGT emailed NLG to provide a detailed rationale behind the Marine Route Alternative Amendment including the following: The rationale for the Nass Bay Route is for construction optimization, reduced environmental effects, and reduced duration of construction within the marine environment. Compared to the approved route, the Nass Bay Route would reduce the amount of trenching from 7 km to 6.2 km, the number of intertidal transitions from four to two, the number of wetlands intersected from five to one, and the intertidal pipeline length from 3.6 km to 2.6 km. The Nass Bay Route would also avoid the need to clear the isthmus (land area) and construct the Nass Harbour Jetty, and reduce the number of heritage sites affected from 30 to one.

Indigenous Nation	Date Received	Summary of Feedback	PRGT's Response
NLG	January 18, 2024	NLG emailed PRGT advising that NLG was pleased to see that the Marine Route Alternative Amendment included PRGT's commitment to developing and implementing a Crab Movement Mitigation and Monitoring Plan, as well as the development of a Marine Access and Traffic Management Plan. NLG also shared a report with PRGT entitled "Baseline Implementation of the Ecosystem Health and Fish Habitat Monitoring Plan for the Nass River Estuary: Marsh and Eelgrass Mapping (Year 2)" depicting the location of Eelgrass in the Iceberg Bay area.	PRGT replied to NLG on January 22, 2024 thanking the Nation for providing the eelgrass report and mapping to PRGT, and that PRGT is committed to reviewing and considering the report when developing the Project's Management Plans.

Note:

[1] Comments received on the draft Marine Route Alternative Amendment may no longer directly align with current sections of the Amendment.

3.3 Public Consultation

On December 20, 2016, PRGT included information regarding the 2016 draft Amendment for the Nass Bay Route as part of the Project Activity Update #35 newsletter. The update featured a map of the 2016 Nass Bay Route along with information highlighting the proposed changes. Engagement with local government then re-started in January 2024 across the Project, with participation in the British Columbia Natural Resources Forum in Prince George used as an opportunity to re-socialize the Project with local government stakeholders. A mail-out regarding the Marine Route Alternative Amendment was provided to the District of Port Edward, the City of Prince Rupert, North Coast Regional District (NCRD) and the Regional District of Kitimat-Stikine (RDKS) in early February 2024. Meetings were also held with the City of Prince Rupert Mayor and NCRD Chief Administrative Officer and Economic Development Officer on February 27, 2024. To date, PRGT has not received any questions, comments, or concerns regarding the proposed Amendment from those contacted.

4 Assessment of Relevant Valued Components and Assessment Matters

This section provides the VC assessment methods, identifies interactions of the proposed Amendment with VCs, and assesses potential effects and whether there are material changes to the conclusions of the Assessment Report.

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), the Amendment takes into consideration Assessment Matters identified in section 25 of the *Environmental Assessment Act* (2018). Many of these factors were prescribed in the Project's Application Information Requirements (EAO 2014c), considered as part of PRGT's 2014 Application, and relevant findings were presented in the EAO's Assessment Report. A summary of these matters and how they are considered in the context of the Amendment is included in Table 4.21 in Section 4.9.

4.1 Valued Component Assessment Methods

The VC assessment methods for the Amendment generally follow those used for the PRGT EAC Application (the Application) submitted to the EAO in 2014 (Section 3 [PRGT 2014a]), and thus the conclusions presented herein are comparable. For each relevant VC, a description of changes to baseline information or Project activities (if applicable) associated with the Amendment are included. Similarly, additional mitigation measures because of Project changes covered by the Amendment are included where relevant. The mitigation measures proposed are based on industry best practices, regulatory requirements, and the professional experience of the assessment team. Following the implementation of mitigation measures, potential changes to residual effects and cumulative effects because of the changes proposed in the Amendment are compared against the findings of the EAO Assessment Report (EAO 2014a). The methods followed in the Amendment will differ from the Application in that the Amendment will not make significance determinations for potential project effects, consistent with the EAO's Effects Assessment Policy Version 1.0 (EAO 2020a).

4.2 Potential Interaction of the Proposed Amendment with Valued Components

Potential interactions that the proposed Amendment could have with 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 the 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 application.

Table 4.1 Potential Interactions of the Proposed 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	5.0	n/a	1	No	The predicted effects on air quality along the pipeline corridor will not change from those presented in the Application and considered in the Assessment Report. During construction, potential air emissions sources include vehicle and equipment operation. During operation, air emissions would be primarily generated by the proposed compressor stations. The proposed changes in the Amendment do not affect the construction activities along most of the pipeline route and do not alter the number or configuration of compressor stations. As a result, **air quality effects from construction and operation are anticipated to be comparable to what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Greenhouse gases	6.0	n/a	1	No	The predicted effects on greenhouse gas (GHG) emissions from the Project will not change from those presented in the Application and considered in the Assessment Report. The primary source of GHG emissions during construction would be due to land clearing, while the primary source of GHG emissions during operations would be from the combustion of natural gas to power compressor stations and transport natural gas through the pipeline. The proposed changes in the Amendment do not materially affect the total area of clearing for the Right of Way (RoW). The proposed changes would result in a small reduction of GHG emissions during operation due to the shorter distance of submarine pipeline between Nasoga Gulf and Pearse Island, in comparison to the distance of submarine pipeline between Nasoga Gulf and Lelu Island. Despite this reduction, the **GHG emissions from construction and operation are anticipated to be comparable to what was previously assessed, and the conclusions in the Assessment Report remain unchanged**. Greenhouse Gases are not considered a VC requiring assessment under section 25(2)(a) the *Environmental Assessment Act* (2018), rather they are required to be considered under section 25(2)(h) of that Act, see Section 4.9.

Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Acoustics	7.0	n/a	1	No	The predicted effects on the acoustic environment along the pipeline corridor will not change from those presented in the Application and considered in the Assessment Report. During construction, potential noise sources include helicopter traffic, blasting, drilling, grading, pipe delivery, installation and backfilling. During operation, noise would be primarily generated by proposed compressor stations. The proposed changes in the Amendment do not affect the construction activities along most of the pipeline route and do not alter the configuration of compressor stations. As a result, **noise effects from construction and operation are anticipated to be comparable to what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Marine water quality	8.0	4.8	2	Yes	Potential changes in water quality are limited to the marine environment as the Nass Bay Route does not cross additional freshwater watercourses and will eliminate the crossing of Flewin Creek and four wetlands. Construction activities for the Nass Bay Route and Ksi Lisims LNG Pipeline Connection have the potential to disturb sediments in areas that were not considered in the Application.
Freshwater quality, Hydrology	8.0, 9.0	n/a	1	No	The water VC considered surface water hydrology, water quality (in the freshwater environment), metal leaching and acid rock drainage. Key indicators that were assessed included metal leaching and acid rock drainage potential using pH as a proxy, surface water quality including TSS, temperature, turbidity, metals and organic pollutants, as well as surface water flows and drainage patterns. The proposed changes in the Amendment primarily occur in the marine environment (which is not considered as part of this VC) and eliminate the crossing of Flewin Creek and four wetlands. As a result, **effects from construction and operation of the Project on freshwater quality are anticipated to be comparable to what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.

Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Freshwater fish and fish habitat	10	n/a	1	No	The Marine Route Alternative has a negligible interaction with fish and fish habitat and eliminates one crossing. The Nass Bay Route does not cross additional fish-bearing watercourses and would avoid the crossing of Flewin Creek and four wetlands. The trajectories at the entrance and exit locations do not result in changes to interactions with freshwater habitats in these areas. Based on a review of the Nass Bay Route, the proposed changes will result in a reduction in the magnitude of predicted effects on fish and fish habitat. The landfall of the PRGT pipeline at the Ksi Lisims LNG Facility is expected to be within the footprint of the facility and no additional effects of the construction of the Ksi Lisims LNG Pipeline Connection on freshwater fish or fish habitat are expected. As a result, **the effects from construction and operation of the Project on freshwater fish and fish habitat are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Marine resources	11	4.3	2	Yes	The Nass Bay Route enters and exits the marine environment on a different trajectory than the route presented in the Application submitted to the EAO in 2014. The Ksi Lisims LNG Pipeline Connection takes a different route than was evaluated in the Application. These two changes may lead to potential differences in changes to effects on habitat, harm (defined as physical injury or mortality) to fish, marine mammals, or species at risk, and change in behaviour of fish, marine mammals, or species at risk due because of pressure waves or underwater noise than presented in the Application.

Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Soil	12	n/a	1	No	The Nass Bay Route includes the Nass Bay Approach which is a small terrestrial expansion (0.2 ha) of the CPC within an area that is not zoned for agricultural use. There are no additional or new terrestrial geohazards and no change in risk of seismic events associated with the change. The shift in the route adds new lands that will be affected but reduces the area of land to be affected within the CPC. The lands in this area are generally forested and the reclamation suitability of forest soils is generally consistent. As a result, **the effects from construction and operation of the Project on soils and terrain are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Vegetation and wetland resources	13	4.4	2	Yes	The Nass Bay Route includes the Nass Bay Approach which is a terrestrial expansion that will result in 0.2 ha of clearing outside of the CPC that was not considered in the Application assessment. The Nass Bay Route would not require development on the isthmus and would eliminate crossing of Flewin Creek and four wetlands. Furthermore, a red-listed Sitka spruce salmonberry community and two-subpopulations of flowering quillwort *(Lilaea scilloides*) (at approximately KP 756 in the CPC) would be avoided. These works may affect vegetation species or communities at risk and/or wetlands.
Wildlife and wildlife habitat	14	4.5	2	Yes	The Nass Bay Route enters and exits the marine environment on a different trajectory than the route presented in the Application, including the Nass Bay Approach which is a small terrestrial expansion of the CPC. The Ksi Lisims LNG Pipeline Connection takes a different route than that evaluated in the Application. These changes may lead to potential differences in habitat affected for terrestrial wildlife and marine bird indicators, and potential differences in change in movement and change in mortality risk for terrestrial wildlife and marine bird indicators.

Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Employment	17	n/a	1	No	The predicted effects on employment from the Project will not change from those presented in the Application and considered in the Assessment Report. The regional economy in relation to employment can be considered vulnerable. The LAA has a declining population and labour force, and unemployment rates remain high. As mentioned in the Assessment Report, the Project presents potential for positive and adverse effects in employment during construction, but not during operation when the labour-force requirement would be minimal. While there would be a reduction in the period of work for the marine pipelay, this is a specialized construction method and the contractor for this would likely be from outside of Canada. Construction and operation of the amendments are not anticipated to measurably change the size of the remaining labour force, wage rates, the training requirements, or the in-migration and stability of the labour force compared with the effects presented in the Application and the proposed mitigations/commitments remain sufficient. As a result, **the effects from construction and operation of the Project on employment are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.

Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Community infrastructure and services	20	n/a	1	No	The predicted effects on community infrastructure and services from the Project will not change from those presented in the Application and considered in the Assessment Report. The primary concerns raised during Application Review regarding Project-related adverse effects on community infrastructure and services focused on the following key indicators: accommodation, emergency and protection services, health care services, and water and waste management infrastructure. No major concerns were raised about education services and community recreation and leisure activities. Construction and operation of the amendments would not affect new communities and/or require additional worker camps. Therefore, no measurable changes to the effects presented in the Application are anticipated and the proposed mitigations/commitments remain sufficient. As a result, **the effects from construction and operation of the Project on community infrastructure and services are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Transportation	21	n/a	1	No	The predicted effects on transportation from the Project will not change from those presented in the Application and considered in the Assessment Report. The Nass Bay Route and Ksi Lisims LNG Pipeline Connection deviate from the transportation local assessment area presented in the Application. However, this will not affect the baseline description provided in the Assessment or the predicted effects summarized in the EAO's Assessment Report. Construction and operation of the amendments would not affect any new major roads or highway infrastructure, railways and airports. As a result, **the effects from construction and operation of the Project on transportation are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.

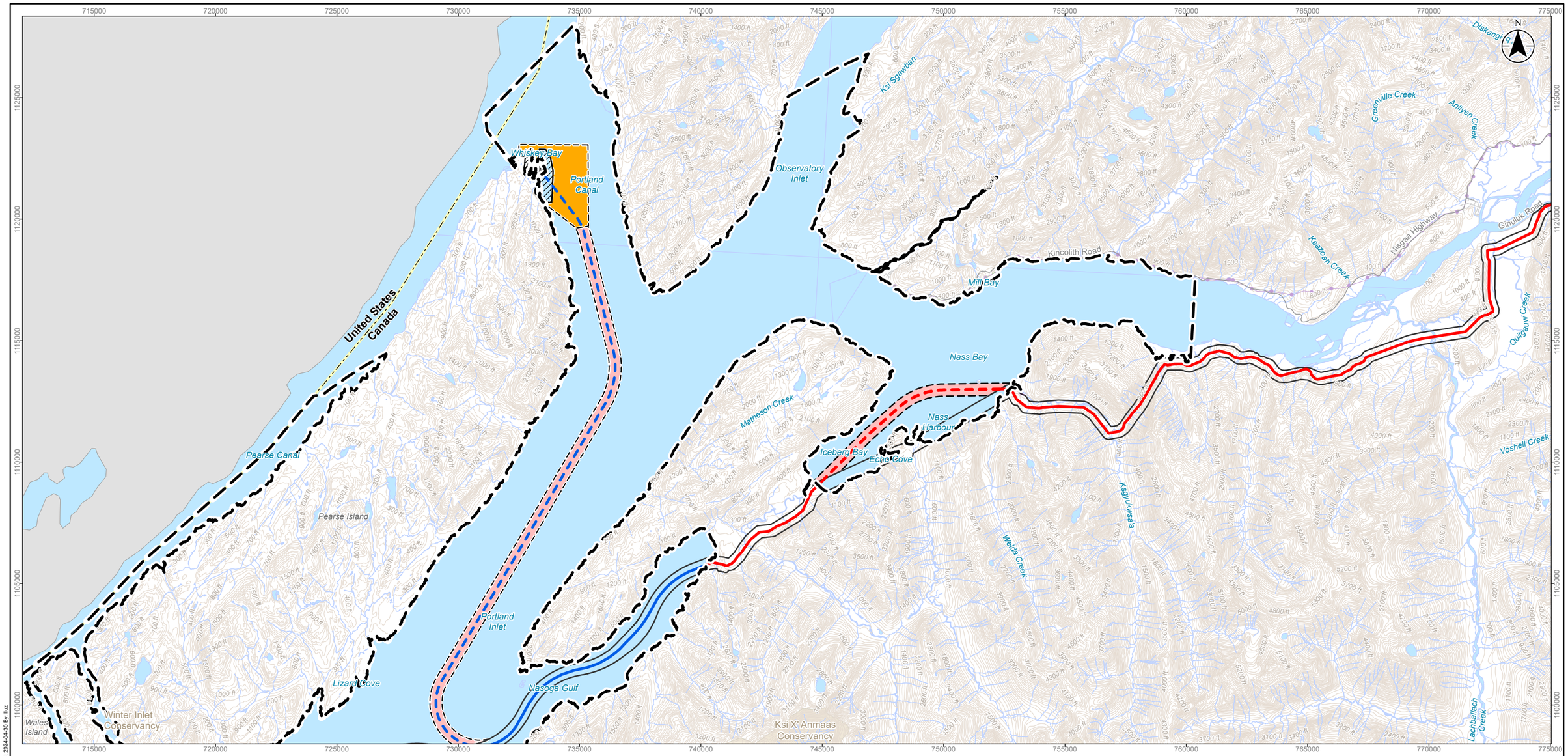
Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Visual quality	22	n/a	1	No	The predicted effects on visual quality from the Project will not change from those presented in the Application and considered in the Assessment Report. The components of the Amendment are within the area previously assessed. Multiple viewpoints have been considered as part of the assessment in the Application. There has been consideration of viewpoint in the Nisga'a Lands along the Nass River upstream of the Amendment area. Mitigating strategies will focus on meeting a post-project established visual quality objective of Partial Retention. As a result, **the effects from construction and operation of the Project on visual quality are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Land and resource use	23	n/a	1	No	The Ksi Lisims LNG Pipeline Connection component diverts the proposed pipeline through three additional trapline concessions where there was no previous interaction in the Application (i.e., TR0614T018, TR0614T048, and TR0614T079). The proposed mitigations/commitments for change in guide outfitting and commercial trapping activities will be applied to these additional concession holders. Mitigation for outdoor recreation use and commercial fishing activity will apply to Nass Bay, Portland Inlet and Portland Canal. As a result, **the effects from construction and operation of the Project on land and resource use are anticipated to be the same as what was previously assessed, and the conclusions in the Assessment Report remain unchanged**.
Heritage and archaeological resources	25, 26, 27	4.7	2	Yes	The Nass Bay Route enters and exits the marine environment on a different trajectory than presented in the Application, and the Ksi Lisims LNG Pipeline Connection takes a different route than presented in the Application. These changes may lead to additional areas of high archaeological potential or submerged sites being intersected.

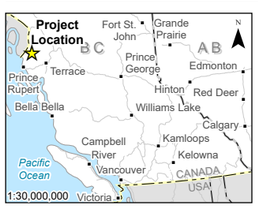
Valued Component	EAC Application Section	Amendment Application Section	Interaction Identified	Carried Forward for Further Assessment (Yes/No)	Rationale for Inclusion or Exclusion
Human health	29	4.6	2	Yes	The Nass Bay Route enters and exits the marine environment on a different trajectory than presented in the Application, and the Ksi Lisims LNG Pipeline Connection takes a different route than presented in the Application. These changes may lead to the temporary suspension of sediments and associated elevated metals. This would expose marine life to these chemicals of concern and consequently affect the quality of marine traditional and country foods.

Note:
TSS = total suspended solids

4.3 Marine Resources

Marine resources were identified as a VC in the Application Information Requirements for the Application due to anticipated Project interactions with the marine environment and in recognition of its economic, cultural, and ecological significance to local Indigenous nations. The Amendment includes an updated description of existing conditions based on data collected since the baseline studies for the Application were completed and includes expanded spatial boundaries that reflect the proposed Project changes in the Amendment. In the context of marine resources, the Local Assessment Area (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 marine resources VC, this encompasses the area 500 m on either side of the centreline of the marine portions of the pipeline. The Regional Assessment Area (RAA) is defined as the area that establishes the context for determining the significance of Project-specific effects in the LAA. The extent of the updated marine resources RAA is shown in Figure 4.1.





Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

Basemap Components
- Waterbody
- Watercourse
- International Boundary

Approved Project Components
- Certified Pipeline Corridor (CPC)
- Marine Centreline
- Terrestrial Centreline
- Marine Resources and Marine Birds RAA

Marine Route Alterative Amendment Components
- Ksi Lisims LNG Pipeline Connection
- Nass Bay Route
- Nass Bay Approach
- Proposed CPC
- Proposed Pipeline Connection Location

Proposed Ksi Lisims LNG Project
- Ksi Lisims Project Footprint

0 3 6 km

1:160,000 (at original document size of 11x17)

Stantec

Project Location
Nass Bay, Kitimat - Stikine Regional District, British Columbia

Project Number <123514388>
Prepared by EHERTZMAN on 20231023
Requested by NBENEDICTUS on 20231020

Client/Project/Report
Prince Rupert Gas Transmission Ltd.

Figure No.
4.1

Title
Marine Resources Assessment Area

Revised: 2024-04-30 By: lluz
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4.3.1 Existing Conditions

The Nass Bay Route and Ksi Lisims LNG Pipeline Connection are predominantly within the marine resources RAA assessed in the 2014 Application and EAO Assessment Report. The existing conditions within that RAA are described in detail in Section 11 of the Application (PRGT 2014a). The marine resources RAA for the Amendment has been expanded to include the northernmost extent of the Ksi Lisims LNG Pipeline Connection. In this expanded area, as well as in parts of the Application marine resources RAA, Ksi Lisims LNG completed several baseline studies to support the environmental assessment of the Ksi Lisims LNG Facility. These studies comprised subtidal, intertidal, riparian, marine sediment, marine water quality, and oceanographic surveys. The results of these baseline studies have been reviewed and incorporated into the effects assessment presented in the Amendment. The Nass Bay Approach component of the Amendment will require terrestrial works and is not anticipated to interact with the marine environment. As such, it is not discussed further in this chapter. In recognition that existing conditions may have changed since the Application was approved, and that the marine resources RAA for the Amendment has expanded, this section presents updated information on the existing conditions where relevant to the Amendment.

Since the Application, bocaccio rockfish (*Sebastes paucispinis*), which was assessed in the Application, has had had its conservation status changed from threatened to endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; COSEWIC 2013). No additional marine species have been added to the list of species of conservation concern as presented in the Application (PRGT 2014a). The proposed Ksi Lisims LNG Pipeline Connection will cross Portland Inlet to reach the terminal point at the Ksi Lisims LNG Facility and in doing so will cross Fisheries and Oceans Canada (DFO) designated Important Areas (IAs) for eulachon, pollock (*Theragra chalcogramma*), and tanner crab (*Chionoecetes bairdi*) (Rubidge et al. 2018). Important Areas do not have specific regulatory protections or other status but reflect the value of the areas for these species. These IAs were not considered in the 2014 Application because they had not been established at that time. Neither the Ksi Lisims LNG Pipeline Connection nor the Nass Bay Route are anticipated to overlap with designated marine critical habitat at the time of this assessment (DFO 2022).

Table 4.2 presents a summary of baseline conditions within the RAA for the proposed changes in the Amendment. This information is from the 2014 Application with updates where relevant.

Table 4.2 Summary of Baseline Information on Marine Resources in Nass Bay, Portland Inlet and Portland Canal

Proposed Amendment Component	Location	Project Activity	Dominant Biological Features	Habitat Features
Nass Bay Route	Nass Bay (reroute includes avoidance of overland placement near Nass Harbour)	Marine pipeline placement	• Salmon (*Oncorhynchus spp.*) rearing and migration habitat • Pacific eulachon (*Thaleichthys pacificus*) migration route • Dungeness crab (*Metacarcinus magister*) habitat • Harbour porpoise (*Phocoena phocoena*), killer whale (*Orcinus orca*), Steller sea lion (*Eumetopias jubatus*) and harbour seal (*Phoca vitulina*) habitat	• Area dominated by bioturbated mud • Some areas of rocky shoreline • Rockweed (*Fucus spp.*) mats
Ksi Lisims LNG Pipeline Connection	Portland Inlet (includes the area just outside of Nasoga Gulf to Alaska border near the north end of Portland Canal where the amended route deviates from the CPC) (Figure 4.1)	Marine pipeline placement	• Salmon and eulachon migration route • Humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), Dall's porpoise (*Phocoenoides dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), killer whale, harbour porpoise, Steller sea lion (*Eumetopias jubatus*), and harbour seal habitat • DFO IAs for eulachon, pollock (*Theragra chalcogramma*), tanner crab (*Chionoecetes bairdi*)	• Coastal fjord ecosystem with water depths up to 500 m • Predominantly fine-grained muddy sediments and bioturbated mud

Additional field studies were undertaken to support the Amendment. In 2015, subtidal remotely operated vehicle (ROV) surveys were conducted in Nass Bay and Iceberg Bay and sediment samples were collected in Nass Bay to evaluate conditions along the amended pipeline route. Results of these surveys were consistent with those observed for the Application with the exception that some potential for hard bottom substrates was observed in Nass Bay during the ROV survey.

In addition, an intertidal survey was undertaken between August 30 and September 1, 2023 in Nass Bay, Iceberg Bay, and Nasoga Gulf to verify that results presented in the Application are still valid. Transect and quadrat-based intertidal surveys were completed in the three areas of interest. Information was collected on substrate and invertebrate presence within the quadrats and compared with data from 2013/2014 surveys. Results of this survey indicate that the results of 2013/2014 surveys are still valid.

Another analysis that was completed to support the Amendment was the collection of remote sensing images on October 25, 2023, to evaluate kelp distribution along the Ksi Lisims LNG Pipeline Connection route. Results of this analysis identified kelp in East Portland Canal, East Portland Inlet, Nasoga Gulf, and Nass Bay in nearshore areas and at depths shallow enough for photosynthesis to occur (approximately 30 m). No kelp was identified near proposed marine entry and exit points associated with the Amendment.

4.3.2 Influence of Consultation and Engagement

PRGT has consulted, and continues to consult with, Indigenous nations to discuss the Project and the proposed amendments, including the Marine Route Alternative Amendment. Since filing the Application, Indigenous nations have shared interests and concerns through the Project-specific consultation program, including Project-specific TLU studies related to marine resources. Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, Metlakatla First Nation, and NLG each identified an interest in harvesting marine resources (Calliou Group 2014a; CCRM 2014a; DMCS and MFN 2014; PRGT 2014a; Pulla 2014). This feedback has been considered and summarized in Table 4.3 and has been integrated into the marine resource effects assessment, as outlined therein.

Table 4.3 Summary of Consultation Feedback Related to Marine Resources

Comment	Sources	PRGT Response
Gitxaała Nation expressed concern about effects on eulachon, whales, commercial fishing, and tanker traffic and the potential for accidents.	Marine Route Alternative Amendment consultation feedback	• The use of tankers is not a component of the Amendment. • Amendment-related effects on eulachon and whales are assessed in Section 4.3.3 and Table 4.5. • Amendment-related effects on the potential for accidents are assessed in Sections 4.9 and 5. • Potential interactions of the Project with commercial fishing are addressed in the Marine Access and Traffic Management Plan.
Gitxaała Nation previously reported concerns about navigational safety along important travel routes as a result of the Project, effects of noise on the experience of 'sense of place' in the marine environment and on orca and fish behaviour, and effects on crab migration and on other shellfish.	Calliou Group 2014a	• Amendment-related effects of underwater noise are assessed in Section 4.3.3 and Table 4.5. • Amendment-related effects on navigational safety are addressed in Section 5. • PRGT has developed a Crab Movement Mitigation and Monitoring Plan which manages the risk of crab migration inhibition.
Gitxaała Nation previously expressed concerns about seaweed as it may be affected by wakes, especially during sensitive harvesting periods.	Calliou Group 2014a	• The use of tankers is not a component of the Amendment. • Amendment-related effects on kelp are assessed in Section 4.3.3 and Table 4.5.
Additional concerns previously expressed by Gitxaała Nation include the potential for chemicals to release from underwater pipes, including pipeline coating, cement mix, and rust, which could contaminate water and the marine ecosystem.	Calliou Group 2014a	• Amendment-related chemical release from underwater pipes is not anticipated to occur. • Section 6.3 of the CEMP outlines mitigation measures associated with concrete/cement.
Kitselas First Nation expressed concerns about effects on salmon.	Marine Route Alternative Amendment consultation feedback	• Amendment-related effects on salmon are assessed in Section 4.3.3 and Table 4.5.
Kitselas First Nation previously identified a eulachon fishery on Nass River and reported that the mouth of Nass River below Greenville and above Kincolith as an important part of the traditional economy.	Pulla 2014	• Amendment-related effects on eulachon are assessed in Section 4.3.3 and Table 4.5.

Comment	Sources	PRGT Response
Kitselas First Nation previously reported concern about the potential for increased commercial shipping traffic and the potential effects of anchoring large ships on commercial, food, and recreational harvesters, resource sustainability, and navigation routes.	Pulla 2014	• Commercial shipping is not a component of the Amendment. • Amendment-related effects on navigational safety are addressed in Section 5. • Amendment-related effects on commercial fishing are addressed in the Marine Access and Traffic Management Plan.
Kitsumkalum First Nation advised that the Nass Bay area is used for crab and halibut harvesting for both food and commercial purposes. They also advised that it contains eulachon habitat. Kitsumkalum First Nation is interested in additional discussions on the potential changes to these resources, including migration, mating, and harvest, and the mitigation measures that will be applied in response.	Consultation on 2016 draft amendment for the Nass Bay Route	• Amendment-related effects on crab, halibut, and eulachon are assessed in Section 4.3.3 and Table 4.5. • The CEMP outlines specific mitigations which manage these Project interactions and their associated risk.
Kitsumkalum First Nation expressed concern about potential effects on ground and commercial fishing and the nation's continued ability to fish.	Marine Route Alternative Amendment consultation feedback	• Amendment-related effects on fish are assessed in Section 4.3.3 and Table 4.5. • Amendment-related effects on commercial fishing are addressed in the Marine Access and Traffic Management Plan.
Kitsumkalum First Nation previously expressed concern about declines in abalone populations, which the nation attributed to mismanagement of marine resources by commercial fisheries and other industrial factors. Kitsumkalum First Nation stated that the potential environmental effects of concern include effects on navigation and on fish and fish habitat, potential for whale and marine vessel collisions, Project materials disposal, and change in noise and visual aesthetics.	CCRM 2014a; CCRM 2014b	• Legislation associated with materials disposal at sea is outlined in Table 1.2. • Amendment-related effects on abalone are assessed in Section 4.3.3 and Table 4.5. • Changes to the Application in noise levels and on visual aesthetics are discussed in Section 5.
Kitsumkalum First Nation previously identified a eulachon fishery on Nass River. Portland Inlet and Nass River were identified as important habitat for multiple harvested marine resources.	CCRM 2014a	• Amendment-related effects on eulachon are assessed in Section 4.3.3 and Table 4.5.

Comment	Sources	PRGT Response
Kitsumkalum First Nation previously reported that the potential environmental effects of greatest concern include effects resulting from disposal of dredged material at sea, effects on navigation, and effects on fish and fish habitat. Additional concerns were expressed related to on-site land disposal and effects on whales from vessel collisions. Kitsumkalum First Nation is also concerned that the large scale of the liquid natural gas industry on the northwest coast will affect the use and access to coastal areas for future generations.	CCRM 2014a	• Legislation associated with dredging, trenching, and materials disposal is outlined in Table 1.2. • Amendment-related effects on fish are assessed in Section 4.3.3 and Table 4.5. • Amendment-related effects on navigational safety are assessed in Section 5.
Lax Kw'alaams Band stated that the original route proposed connecting to Lelu Island had the potential for affecting eelgrass beds during construction activities and Flora Bank could be affected by the route combined with other infrastructure projects in the area. Lax Kw'alaams Band expressed interest in understanding whether the Marine Alternative Route will avoid effects on the eelgrass beds near Lelu Island. During a meeting on February 26, 2015, Lax Kw'alaams Band also identified concerns about effects on fish from the Lelu Island LNG facility and trenching activities, as well as general effects on salmon, eulachon, eelgrass beds, crab, and halibut.	CEMP consultation feedback	• This Amendment avoids activities at Lelu Island and Flora Bank (Figure 4.1).
Lax Kw'alaams Band previously reported concerns about the decline in supply, quality, and access to marine resources. Concerns were also raised by Lax Kw'alaams Band about potential spills into the marine environment, which would negatively affect marine resources for generations.	ATTLK 2004	• Amendment-related effects on marine resources are assessed in Section 4.3.3 and Table 4.5. • Amendment-related effects on the risk of accidents are assessed in Sections 4.9 and 5.
Metlakatla First Nation previously reported concerns about increased marine traffic through important water transportation routes, fishing, and marine resource harvesting areas as well as access to these areas.	DMCS and MFN 2014	• Amendment-related effects on navigation are addressed in the Marine Access and Traffic Management Plan.

Comment	Sources	PRGT Response
Metlakatla First Nation previously reported that the islands throughout Chatham Sound and Portland Inlet provide the nation with a variety of harvested shellfish, plants, fish, mammals, and other food resources. Metlakatla First Nation previously identified that several harvested marine resources are traditionally harvested within, or in close proximity to, the Amendment route, including: eulachon, salmon, and seal in the Nass Bay area; salmon (spring, pink, coho, sockeye, chum), Pacific halibut, eulachon, clam, and black cod in the Nasoga Bay Gulf area; and salmon (sockeye, chum, coho, pink), Pacific halibut, killer whale, crab, seal, clam, porpoise, and black cod, throughout Portland Inlet and Portland Canal.	DMCS and MFN 2014	• Amendment-related effects on marine species are assessed in Section 4.3.3 and Table 4.5.
NLG expressed interest in avoiding the Nass Estuary located at the mouth of the Nass River, because it is an important habitat and migration site for salmon, halibut, eulachon, and crab. NLG have expressed their view to PRGT that the proposed marine route amendment is a preferable route to the CPC because it avoids the Nass Estuary, and nearshore areas of Nass Harbour and Echo Cove. NLG stated it is pleased there is a commitment to develop and implement a Crab Movement Mitigation and Monitoring Plan.	Consultation feedback on the 2016 draft amendment for the Nass Bay Route and the Marine Route Alternative Amendment	• Figure 4.1 outlines the spatial extent of the Amendment. • Amendment-related effects on salmon, halibut, eulachon, and crab are assessed in Section 4.3.3 and Table 4.5. • PRGT has developed a Crab Movement Mitigation and Monitoring Plan which manages the risk of crab migration inhibition.

4.3.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, additional mitigation measures (to those outlined in the 2014 EAC), 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 assessments. Figure 4.1 shows the proposed changes in the context of the marine resources VC. The spatial boundaries used are those in the Application plus a marine resources RAA expansion to cover the northernmost portion of the Ksi Lisims LNG Pipeline Connection in order to assess potential and cumulative effects on the marine resources VC (Figure 4.1 and Figure 11-1 in Section 11 of the Application). The spatial boundaries used are those in the Application plus a marine resources RAA expansion to cover the northernmost portion of the Ksi Lisims LNG Pipeline Connection in order to assess potential and cumulative effects on the marine resources VC (Figure 4.1 and Figure 11-1 in Section 11 of the Application). For the expansion area, PRGT has used information from the assessment of potential effects on marine resources for the proposed Ksi Lisims LNG Project.

In addition to the effects characterization presented here, an application for an authorization under the *Fisheries Act* will be submitted to Fisheries and Oceans Canada (DFO) prior to construction if it is determined to be necessary following a Request for Review. This application will include details on the potential effects to fish and fish habitat and will propose offsetting measures for harmful alteration, disruption, or destruction of fish or fish habitat, as appropriate.

4.3.3.1 Potential Effects and Mitigation Measures

The Application considered three potential effects on marine resources: 1) change in fish habitat; 2) harm (defined as physical injury or mortality) to fish, marine mammals, or species at risk, and; 3) change in behaviour of fish, marine mammals, or species at risk due to pressure waves or underwater noise. Based on the content of the Application and the information gathered during the Application review, the EAO's Assessment Report considered these potential effects on marine resources plus temporary effects to marine water quality due to the resuspension of contaminated sediments. This additional effect was associated with the burial of the submarine portion of the pipeline as it approached the Pacific NorthWest LNG Project site on Lelu Island in the Port of Prince Rupert.

The Nass Bay Route and Ksi Lisims LNG Pipeline Connection amendment components are anticipated to cause changes in fish habitat, injury/mortality risk, and behaviour consistent with the effects assessment in the Application. Project effects from the Amendment are anticipated to be reduced compared to the Application because the amended Project marine route is approximately 100 km shorter than the marine route presented in the Application. The amended route also substantially reduces the amount of excavation required at the marine landing point (~300,000 m^3 listed in the Application) thereby reducing potential effects on water quality (through the resuspension of suspended sediment) and avoiding the disturbance of potentially contaminated sediments near the Port of Prince Rupert. The Amendment will adhere to existing mitigation measures, as described in the Construction Environmental Management Plan(s) (CEMP) for the Project (PRGT 2016a, PRGT 2017). Table 4.4 summarizes the changes to potential effects and mitigation measures that are anticipated as a result of the Amendment, with

additional details for the Nass Bay Route and Ksi Lisims LNG Pipeline Connector in the following sections.

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 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. The assessment of potential effects to marine resources in the Amendment uses the current terminology but does not change the overall assessment.

The anticipated effects of the Amendment relative to the characterization in the Application is presented in Sections 4.3.3.1.1 and 4.3.3.1.2 below. A summary of these changes is outlined in Table 4.4.

Table 4.4 Summary of Changes to Potential Effects and Mitigation Measures – Marine 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
Nass Bay Route	Construction	Yes (marine route through Nass Bay and Iceberg Bay area)	No change	Yes (If blasting is required, use temporary rock platform and low tide timing)	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (shorter marine route; new landfall location including trenching at the Ksi Lisims LNG Facility)	Potential effects in the RAA for the northernmost area of the pipelines and marine exit at the Ksi Lisims LNG Facility	No change	No change
	Operations	No change	No change	No change	No change

4.3.3.1.1 The Nass Bay Route

The Nass Bay Route will involve a localized increase in marine footprint where the pipeline extends out into Nass Bay and turns southwest through Iceberg Bay. However, as discussed for the Ksi Lisims LNG Pipeline Connection below, the overall Marine Route Alternative will be approximately 100 km shorter than what was proposed in the Application. Project activities that are anticipated to be undertaken for the Nass Bay Route are unchanged from those in the Application and will include site preparation (onshore clearing and grubbing, blasting, infilling, and under pipe support), marine entry and exit (trenching, dredging, pipeline armouring, and horizontal directional drilling [HDD]), and marine pipe placement (pipe lowering, under-pipe support, and pipeline armouring).

A ROV survey completed in 2015 found some potential for hard bottom substrates in Nass Bay that may require blasting during construction. As a result, the following two additional mitigation measures are proposed:

- If blasting is required for trenching (because of potential presence of shallow rock substrate in a portion of Nass Bay), a temporary rock platform will be installed over the substrate using cleaned excavated material from the land-based trench. The temporary rock platform will be built to a height above high water to allow blasting to occur in the dry. Blasting in the dry is expected to generate sound pressure levels of lower intensity than would be generated through in-water blasting.
- Blasting will be timed to occur during low tides to further reduce sound pressure levels in the waters surrounding the temporary rock platform.

The activities associated with the Nass Bay Route will occur within the RAA from the Application, but outside of the CPC. A localized increase in potential effects in the Nass Bay and Iceberg Bay areas is predicted, but the overall extent of effects along the marine pipeline route will be reduced from what was presented in the Application as a result of the Amendment.

4.3.3.1.2 The Ksi Lisims LNG Pipeline Connection

The Ksi Lisims LNG Pipeline Connection involves a reroute of the pipelines from their approved southerly route to the Port of Prince Rupert as it leaves Nasoga Gulf to a northerly route to the Ksi Lisims LNG Facility. At the entrance to Nasoga Gulf, the new route turns north and follows a new trajectory through Portland Inlet before turning northwest up Portland Canal to the Ksi Lisims LNG Facility; this section is approximately 27 km long. Approximately 12 km of the Ksi Lisims LNG Pipeline Connection is aligned with the approximate routing of the Kitsault marine pipeline alignment that was assessed for the Westcoast Connector Gas Transmission Project, for which an environmental assessment certificate was issued on November 25, 2014. The reroute of the pipeline for the Ksi Lisims LNG Pipeline Connection will occur within the expanded marine resources RAA for the Amendment (Figure 4.1).

Project activities that are anticipated to be undertaken for the Ksi Lisims LNG Pipeline Connection are unchanged from those presented in the Application and will include site preparation (clearing, grubbing, blasting, infilling, and under pipe support), marine entrance/exit (trenching, dredging, pipeline armouring, and HDD), and marine pipe placement (pipe lowering, under-pipe support, and pipeline armouring). Benthic habitat mapping completed for the Application included areas of Portland Inlet and Nasoga Gulf, with results indicating soft seafloor characteristics and relatively level, smooth seafloor over much of the channel where the pipeline would be laid (McGregor Geosciences Ltd. 2014). Hard substrate was predicted to be present only in the steep channel wall areas. Similarly, seabed mapping for the portion of the new route that overlaps with the Westcoast Connector Kitsault pipeline alignment shows seabed habitats to be predominantly fine-grained sediments with some medium-grained sediment (Westcoast Connector Gas Transmission Ltd. 2014). Remotely operated vehicle surveys completed for the Ksi Lisims LNG Facility also indicate a majority soft-bottom substrate at depth in Pearse Canal near the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023c). Remote sensing analysis conducted for the Project did not identify any kelp beds at the new marine entry and exit points. As a result of the findings of these baseline studies and the current understanding of activities associated with the Amendment, no additional potential effects are anticipated from the proposed Marine Route Alternative. Additional marine surveys may be undertaken if DFO determines that a *Fisheries Act* authorization is needed for the marine pipelay.

In addition to pipeline route considerations, the marine exit is in a different location than proposed in the Application (PRGT 2014a). In the Application, the landing at Lelu Island required approximately 300,000 m^3 of marine sediment to be excavated from a 4-km lead-up to the landing. For the Marine Route Alternative, Portland Canal is 3.2 km wide near the proposed landing location. The pipe is planned to be laid within the proposed CPC associated with the Ksi Lisims LNG Pipeline Connection in a fashion that will limit the extent of excavation leading up to the Ksi Lisims LNG Facility. The extent of the excavation will be dependent on final design of the connection to the Ksi Lisims LNG Facility and ocean depth. In addition to channel width, the composition of Portland Canal differs from the Lelu Island landing by having overall deeper water and steeper walls near the shoreline. The pipeline would not be buried along the steep walls that contain hard substrates, but instead would be limited to shallower waters (e.g., up to 30 m deep). As the depth of water within the portion of Portland Canal that overlaps the Ksi Lisims LNG Pipeline Connection route ranges between 125 m and 350 m not far from shore (because of steep walls), excavation for the pipeline within the Portland Canal would be limited. The Application considered mitigation measures and residual effects as a result of the proposed construction methods and alternative means of construction (e.g., blasting) and there is no planned change to these methods with the Amendment. As a result, there are no additional anticipated changes in potential effects from the marine exit point at the Ksi Lisims LNG Facility.

The landfall of the PRGT pipeline at the Ksi Lisims LNG Facility is expected to be within the footprint of that facility, however, the subtidal and intertidal pipeline placement in the nearshore environment near the landfall location is not included in the activities assessed in the Ksi Lisims LNG Facility application. This activity is anticipated to be similar to the other marine entry and exit points of the marine pipeline route (e.g., trenching, dredging, pipeline armouring, HDD, pipe lowering, under-pipe support and pipeline armouring). As such, no additional effects of constructing the Ksi Lisims LNG Pipeline Connection on marine resources are expected.

4.3.3.2 Residual Effects

As stated in the Application, potential effects include a change in fish habitat, harm to fish, marine mammals, or species at risk, and change in behaviour of fish, marine mammals, or species at risk due to pressure waves or underwater noise. These effects, including residual effects associated with the Ksi Lisims LNG Facility where the Ksi Lisims LNG Pipeline Connection would make landfall, will be of a lower magnitude than the residual effects stated in the Application because of the reduced Project footprint and, by extension, reduced construction efforts and spatial extent of maintenance and inspection activities during operation.

4.3.3.3 Changes to Characterization of Residual Effects

No changes to the Application's residual effects characterization are anticipated based on:

- Baseline information from the Application
- Recent baseline information from the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023d)
- Field studies completed in support of the Amendment
- Existing mitigation measures, as described in the Construction Environmental Management Plan(s)[2] (CEMP) (PRGT 2016a, PRGT 2017).

Predicted residual effects on marine resources were determined to be low to moderate in magnitude, short-term to long-term in duration, and mostly restricted to the Project footprint. The amended route includes an overall reduction in submarine pipeline by approximately 100 km which further reduces the potential for residual effects to marine species such as crabs where the pipeline (if unburied) has the potential to act as a barrier to movement. The amended route also substantially reduces the amount of excavation required at the marine landing point (~300,000 m^3 listed in the Application) thereby reducing residual effects on water quality and avoiding the disturbance of potentially contaminated sediments near the Port of Prince Rupert. Overall, the types of residual effects identified in the Amendment are consistent with those in the Application. However, these effects will occur over a Project footprint that is approximately 70% smaller, meaning there is an overall reduction in the magnitude of the residual effects.

In consideration of the predicted effects on marine resources, the conclusions presented in the EAO's Assessment Report remain consistent with the proposed changes in the Amendment. An in-depth comparison of the conclusions from the EAO Assessment Report and proposed Amendment residual effects is presented in Table 4.5 below.

[2] Condition 36 of the EAC requires the development of a construction environmental management plan. This condition has been partially satisfied through development of the Marine Ancillary Facilities CEMP and the terrestrial CEMP. The marine CEMP is in development and will be implemented during marine pipeline construction.

Table 4.5 Changes to EAO Assessment Report Characterization of Residual Effects – Marine Resources

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Context	**Habitat Alteration:** Moderate to High	**Nearshore habitat:** The nearshore marine environment at the landfall sites can be sensitive to effects relating to disruption of benthic habitats and interference with critical life history stages for fish species. Nearshore habitats sensitive to disturbance including eelgrass and salt marsh which provide important habitat for juvenile salmon and other species have been avoided to the extent possible and mitigated. Many invertebrates have a high resiliency, while juvenile salmon have a moderate resiliency. Species and habitats in the nearshore and construction footprint have a moderate to high resiliency. **Offshore habitat:** Most of the seabed (over 95%) along the pipeline route is formed of mud substrates that are considered to be resilient to disturbance. Sensitive habitats such as rocky and glass sponge areas are avoided and mitigated.	**Nearshore habitat:** No change. No kelp beds identified at the new entry or exit locations. **Offshore Habitat:** Substrate composition within Portland Inlet along the Marine Route Alternative are anticipated to be consistent with what was presented in the EAO Assessment Report (primarily mud substrates).
	Species: Low to medium	**Crab:** Dungeness crab are relatively abundant throughout the RAA with important harvesting areas and habitat along the proposed Project route in Chatham Sound and Iceberg Bay. The population of Dungeness crab in Chatham Sound has been subject to previous disturbance from human activity including historic and current harvest pressure in CRA fisheries[1] and seabed habitat disturbances, including ground trawl fisheries, trenching and disposal at sea activities in Chatham Sound. The resiliency of crab species to potential barrier effects and habitat fragmentation of the proposed pipelines on the seabed in offshore areas is expected to be low, particularly where the pipelines may not be partially or fully buried in areas overlapping with important crab nursery habitat. However, it is not expected to result in a population level effect or a decrease in habitat productivity for crab species within the RAA.	**Crab:** No change except that Chatham Sound would not be affected by the Marine Route Alternative as it would if the section of the approved route was used. **Other species:** Project residual effects on critical life history stages of eulachon and salmonids are anticipated to be decreased from the characterization presented in the EAO Assessment Report because the amended route will no longer enter Chatham Sound in proximity to the spawning/rearing habitat associated with the Skeena River estuary.

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Context (cont'd)	Species: Low to medium (cont'd)	**Other species:** Overall, most marine species within the RAA are expected to have a low to moderate resiliency. The residual effect occurs in areas considered undisturbed (i.e., relatively unaffected by human activity or known to be ecologically fragile) and disturbed (i.e., areas previously disturbed by human activity or known to be ecologically resilient). Marine species may be sensitive to effects relating to alteration of habitats and disturbance during critical life history stages. Juvenile salmon and eulachon within critical estuary habitat have a low to moderate resiliency. Many invertebrates have a high resiliency, while species at risk (e.g., Northern abalone) have a low resiliency. Marine mammals may be temporarily displaced or affected during construction and operation. Marine species may be sensitive to effects relating to noise or pressure waves. With mitigation, many species have a high resiliency to noise, while whales have a low to moderate resiliency.	
Magnitude	**Habitat Alteration:** Low to Moderate	**Nearshore habitat:** Alteration or loss of marine habitat, as well as disturbance, injury or mortality of marine life would be of low magnitude based on anticipated reclamation and restoration plans, and associated mitigation which is expected to effectively reduce the effects on nearshore habitat. **Offshore habitat:** For most of the route, the pipe would lay on soft sediments, resulting in an increase in hard seabed habitat due to the concrete coated pipe surface overlying the seabed sediments, and would result in a negligible, and possibly positive effect on overall habitat value and function. In areas lacking rocky substrate, positive effects are expected from increased habitat complexity, invertebrate colonization on the pipe surface and an increase in productive habitat for a variety of fish and invertebrate species. Areas subject to seabed modification (trenching, blasting or rock fill) may result in a moderate loss of habitat value and could require habitat offsetting and *Fisheries Act* authorization by DFO for permanent alteration of habitat resulting in serious harm to fish.[1]	**Nearshore habitat:** An overall reduction in excavation at the marine landing point is anticipated, which will reduce the magnitude of residual effects of the Project on nearshore habitats. The magnitude of residual effects is anticipated to be consistent with what is presented in the EAO Assessment Report (low). **Offshore habitat:** Known glass sponge reef complexes in Chatham Sound will not be affected by use of the Marine Route Alternative, however smaller undetected sponge reefs within Portland Inlet for the Marine Route Alternative may exist and be affected. Overall conclusions presented in the EAO Assessment Report in this section are anticipated to remain unchanged.

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Magnitude (cont'd)	**Species:** Low to Moderate (*Crabs: Moderate*)	**Crab:** The pipeline could create a barrier to crab movement on the seabed in offshore areas (> 20 m deep) where the pipeline is not buried or does not settle into the seabed, which may result in a moderate effect on crab movement and habitat fragmentation in localized areas within and between important crab nursery areas in Iceberg Bay and Chatham Sound. The proposed route would go through approximately 40 km of important crab habitat in Chatham Sound and approximately 3 km in Iceberg Bay. The area of seabed habitat alteration from the proposed pipelines within the RAA would be relatively small, and in some areas the pipe's hard surface would create a positive effect for marine invertebrates including crab, due to increased habitat complexity and colonization. Monitoring and mitigation would be implemented to address the barrier effects to crab; however, there are some uncertainties regarding location and effectiveness for proposed mitigation measures, requiring effectiveness monitoring and adaptive management measures. The magnitude of residual effects on crab species are therefore expected to be moderate, however is not expected to result in any population level effects or a decrease in habitat productivity for crab species within the RAA. **Other species:** Direct harm from construction and operation is predicted to be low in magnitude for fish and benthic invertebrates. Direct harm from construction and operation is predicted to be low in magnitude for marine mammals and species at risk, except at the pipeline construction footprint where it could be moderate for some species if mitigation is not effective. Impacts due to construction sound levels would be moderate, and at or near the construction site they would approach levels known to evoke behavioural response in some fish species. Sound levels during construction would approach and exceed documented thresholds for behavioural response in marine mammals but would not exceed thresholds considered to possibly harm or injure marine mammals. During operation effects are expected to be negligible to low.	**Crab:** The overall reduction in the pipeline footprint is anticipated to reduce the magnitude of residual effects on crab species (Dungeness crab in particular). Important crab nurseries and habitat in Chatham Sound would not be affected by Project activities that use the Marine Route Alternative. The mechanisms and pathway of effects to crab species resultant from the Amendment are anticipated to be consistent with what is characterized in the EAO Assessment Report. **Other species:** No change
Extent	**Habitat Alteration:** Project footprint	Direct habitat effects from trenching would be limited within the Project footprint and potential indirect effects from sediment deposition on adjacent habitat in the immediate vicinity at shoreline transition sites.	No change. The Marine Route Alternative will be shorter by approximately 100 km compared to the approved marine route.

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Extent (cont'd)	**Species:** Project footprint to regional	The displacement and disturbance of marine life would largely be within the LAA. Effects on marine species are not predicted to extend beyond the immediate vicinity of the pipeline LAA, with the possible exception of underwater sound interactions with whales and movement of crabs, both of which have the potential to extend further within the RAA.	No change.
Duration	**Habitat Alteration:** Short-term to long-term	**Habitat Alteration:** Direct habitat disturbance would be limited to construction and would occur over the medium-term (effect continues for up to two years following construction before returning to baseline conditions) except for construction related activities resulting in increased TSS levels which are short- term (effect limited to construction phase before returning to baseline conditions) and blasting activities where residual effects may occur over the long-term (effect continues for more than two years after construction phase, or continues during operational phase but is not permanent).	**Habitat Alteration:** No change
	Species: Short- to long- term	Disturbance to marine life would be limited to construction period. Operational disturbance due to pipeline noise may be long-term. With monitoring and mitigation, the potential impacts to crab movements are expected to be of short to medium duration.	The characterization presented in the EAO Assessment Report is anticipated to be unchanged by the Amendment.
Reversibility	Reversible	All effects would be fully reversible.	No change
Frequency	Isolated to Continuous	The effects to habitat would be isolated (construction) to continuous (barriers to crab), while displacement and disturbance impacts would be isolated. The effects to seabed habitat and crab movement would be continuous, while construction disturbance impacts would be isolated.	No change
Likelihood	There is a high likelihood that residual effects to landfall and near shore marine habitats and ecosystems would occur from the proposed Project. There is a high likelihood of effects to habitat due to seabed modification and disturbance to marine life due to construction activities (e.g. trenching, noise, and blasting). There is a moderate likelihood of effects on crab movement due to unburied pipeline sections acting as a barrier, as mitigation and monitoring are unproven in reducing the residual effect.		No change

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Significance	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. EAO considered the low-moderate magnitude impact to marine resources, the generally short--term duration and reversibility of effects to the marine environment. EAO considered the mitigation and monitoring measures identified by the Proponent and the proposed conditions requiring the development and implementation of the EMP, a Crab Movement Mitigation and Monitoring Plan, Marine Sediment Management and Monitoring Plan, and a Marine Mammal Monitoring Plan. EAO concludes that the proposed Project would not have significant residual effects the marine environment VC's.		-
Confidence	Moderate to High 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. The significance determination and likelihood for marine resources is determined with moderate to high confidence. EAO believes that there is a good understanding of Project VC- interactions, effectiveness of proposed mitigation measures, and regulatory requirements associated with various legislations, regulations and guidelines related to protection of the marine environment. However, as acknowledged by the Proponent, there is some uncertainty regarding the effectiveness of the proposed mitigation and monitoring measures, particularly related to crab barrier effects and underwater noise disturbance to marine mammals.		No change

Notes:

[1] This subscript is not in the EAO Assessment Report. It is used here to clarify that the terminology in the EAO Assessment report, as indicated by the subscript, is no longer relevant because of updates to the *Fisheries Act* that have occurred since the EAO Assessment Report was prepared. The original EAO Assessment Report text has been retained verbatim for accurate comparison.

EMP = Environmental Management Plan

TSS = total suspended solids

Source: EAO 2014a

4.3.3.4 Cumulative Effects

Cumulative effects on marine resources are predicted to be lower with the proposed changes outlined in the Amendment than for the approved Project as presented in the Application and EAO Assessment Report. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively given the proposed changes. As well, with the Amendment, there would no longer be an interaction with existing or future projects or activities that are further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. As stated in Ksi Lisims LNG Facility application for an Environmental Assessment Certificate, in respect of an amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

The proposed Amendment is anticipated to have less interaction with past, present, and reasonably foreseeable projects and activities compared to the Application. As such, cumulative effects on marine resources because of the Amendment are conservatively predicted to be consistent with the EAO's Assessment Report and the characterization presented in the Application is anticipated to remain valid.

4.3.3.5 Risks and Data Uncertainty

The proposed Amendment reduces the magnitude of adverse effects on marine resources through two means: 1) a reduction in overall marine pipeline length, and; 2) a reduction in the amount of excavation required for the approved pipeline landing at Lelu Island. Information from the Westcoast Connector Gas Transmission Project EAC application (Westcoast Connector Gas Transmission 2014) and the Ksi Lisims LNG Facility baseline programs (Ksi Lisims LNG 2023d) were reviewed, and results were consistent with results from amendment specific surveys and previous studies to support PRGT. While limited data are available for the Portland Canal portion of the Ksi Lisims LNG Pipeline Connection, navigational charts indicate the seabed materials are consistent with those present in Portland Inlet. Geophysical surveys are planned for the net-new portion of the revised marine route between Nasoga Gulf and Pearse Island, including Portland Inlet and Portland Canal, which are intended to validate the existing available information from third-party sources.

In addition to the studies to be completed in support of engineering design, PRGT will submit a Request for Review to DFO to obtain a regulatory decision on the aspects of the marine pipeline that will constitute a harmful alteration disruption or destruction of fish habitat and require a paragraph 35(2)(b) *Fisheries Act* authorization. Where DFO determines that an authorization is needed, a fish habitat offset plan will be prepared to offset the impacts to fish habitat.

The level of uncertainty for predicted effects on marine resources, including uncertainty for the Ksi Lisims LNG Facility with regard to where the Ksi Lisims LNG Pipeline Connection would make landfall, is considered low to moderate. This characterization is due to the low level of uncertainty regarding existing conditions of benthic marine resources along the Marine Route Alternative, but moderate uncertainty due to the early stage of engineering design.

4.4 Vegetation and Wetland Resources

Vegetation and wetland resources were identified as a VC in the Application Information Requirements for the Application due to anticipated project interactions with vegetation and wetlands and in recognition of their economic, cultural, and ecological significance to local Indigenous nations, their role to ecosystem health, function, and overall biodiversity. The Amendment includes an updated description of existing conditions based on data collected since the baseline studies for the Application were completed and includes expanded spatial boundaries that reflect the proposed Project changes in the Amendment. In the context of vegetation and wetland resources, the Local Assessment Area (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 the area that establishes the context for determining the significance of Project-specific effects in the LAA. The extent of the LAA and RAA are shown in Figure 4.2. The width of the LAA and RAA for vegetation and wetland resources is the same as presented in the Application.

4.4.1 Existing Conditions

Existing conditions for vegetation and wetland resources within the Nass Bay Approach component (0.2 ha area shown in Figure 1.1; see Section 1.1) were evaluated using the vegetation and wetlands baseline data compiled as part of the Application (PRGT 2014a), review of recent aerial imagery, data collected in 2023 as part of multi-disciplinary reconnaissance survey, and baseline data collected for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023c, 2023d). The 2023 reconnaissance survey focused on the Nass Bay Route exit and entry points, and the Nass Bay Approach. The Ksi Lisims LNG Pipeline Connection was not surveyed.

Prior to field assessment, a desktop review was completed, and terrestrial ecosystem mapping was updated using recent imagery. The presence of provincially red- and blue-listed ecological communities, federal and provincial listed plant species, and potential supporting habitat intersected by the proposed Project Amendment were also evaluated. The HabitatWizard map tool was used to evaluate existing and historical recorded occurrences of red- and blue-listed ecological communities (BC ENV 2023a). The BC Conservation Data Centre (CDC) was queried to identify at-risk ecological communities and plant species with the potential to occur in the intersected biogeoclimatic variant (Coastal Western Hemlock very wet maritime; CWHvm1; BC CDC 2023). Based on the BC CDC query, five red-listed and 11 blue-listed communities are known for CWHvm1, including upland forest, wetlands, and estuarine communities. Seventy-five red- or blue-listed plants, including 54 bryophyte, 15 vascular plant, and five lichen species are known to occur in CWHvm1.

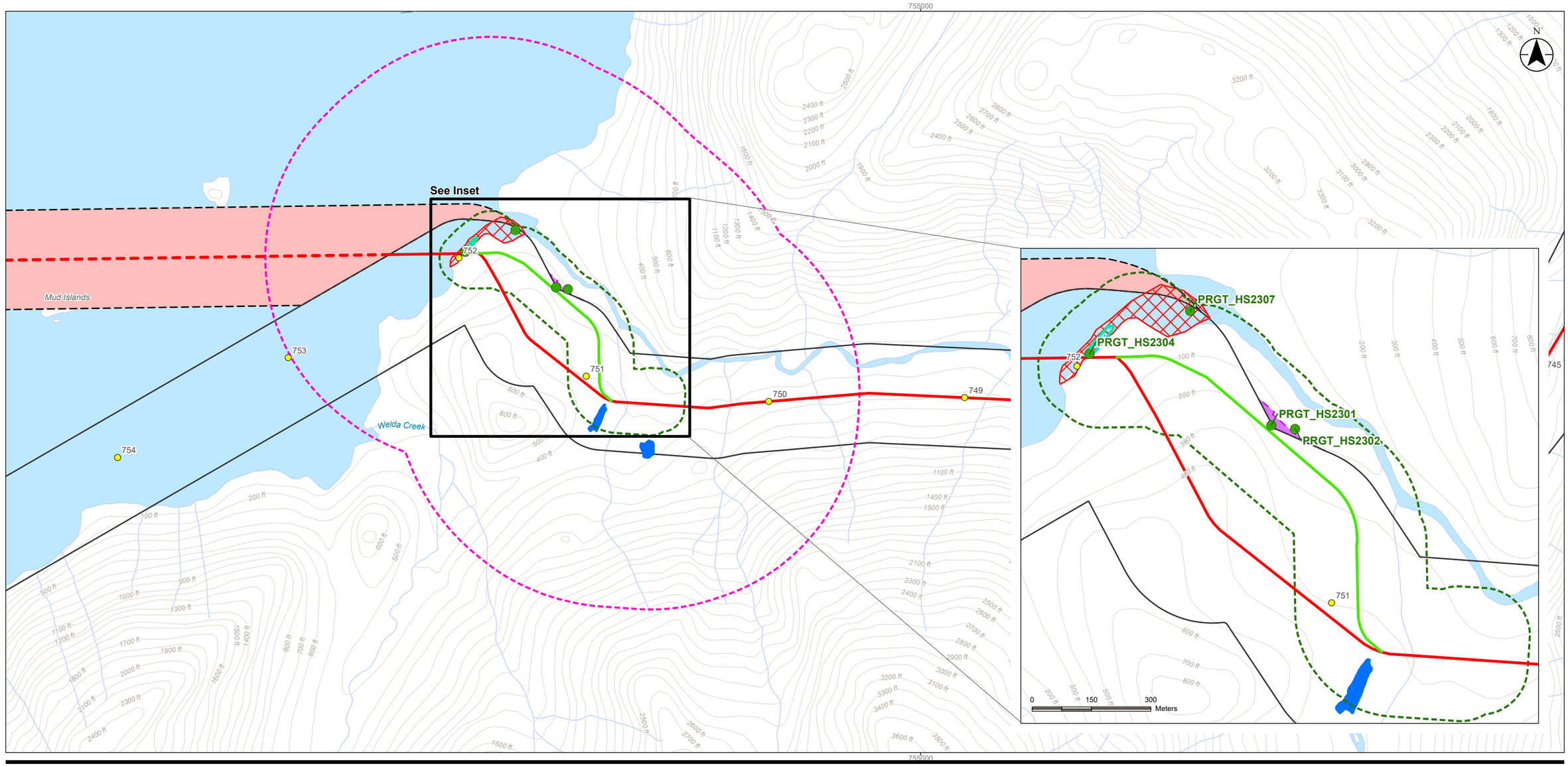
Results from 2023 vegetation and wetlands surveys indicate that the Nass Bay Route overlaps with an estuarine marsh occurring along the shore of Nass Bay. The estuarine marsh was classified as Em05 – Lyngbye's sedge (*Carex lyngbyei*) (MacKenzie and Moran 2004) and is a provincially red-listed ecological community wetland type. This community type characteristically has low species diversity and is subject to constant tidal water level fluctuations. The surveyed area was dominated by sedges, including Lyngbye's sedge (*Carex lyngbyei*). In addition, at the Nass Bay Approach, a blue-listed ecological

community, Wb50 Labrador tea – bog laurel – peat moss bog (*Rhododendron groenlandicum – Kalmia microphylla – Sphagnum*) was identified in a 2014 survey.

The Ksi Lisims LNG Pipeline Connection consists of upland coniferous forest (48%), floodplain (1%), sparsely vegetated (2%) and wetland (50%) communities (Ksi Lisims LNG 2023e). Four red- and two blue-listed ecological communities are known in the Ksi Lisims LNG Pipeline Connection.

One red-listed wetland ecological community is intersected by the Marine Route Alternative Amendment footprint, including both components. A total of 12 red-listed (eight upland and four wetland) and 34 blue-listed ecological communities (13 upland and 21 wetland), are intersected by the Project footprint over the full length of the Amended route. The proposed Marine Route Alternative Amendment avoids two red-listed ecological communities (one upland and one wetland), three blue-listed upland ecological communities (one upland and two wetland), and one yellow listed wetland relative to the route included in the Application. The avoided areas are in the Nass Bay Approach component intersected by the approved route.

No provincial red- or blue-listed plants, federal species at risk plants, or plants listed by COSEWIC were observed during the 2023 multi-disciplinary survey of the Nass Bay Route exit and entry points, and the Nass Bay Approach. Supplemental surveys will be undertaken prior to construction to evaluate the presence of rare plants. No noxious weeds were observed during the 2023 multi-disciplinary survey. Three occurrences of the red-listed plant species arctic daisy (*Arctanthemum arcticum* ssp. *arcticum*) were observed within the Ksi Lisims facility footprint (Ksi Lisims LNG 2023e). The landfall location of the PRGT pipeline on Pearse Island is expected to be within the Ksi Lisims LNG Facility footprint; potential effects of a pipeline connection were accounted for in the Ksi Lisims LNG Facility application (see Figure 1.3-1 in Ksi Lisims LNG 2023b). As such, no additional effects of constructing the Ksi Lisims LNG Pipeline Connection on this rare plant occurrence are expected.



Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

Basemap Components

- KP Markers 9003
- Watercourse
- International Boundary
- Waterbody

Approved Project Components

- Certified Pipeline Corridor (CPC)
- Terrestrial Centreline
- Nass Bay Approach Centreline

Marine Route Alterative Amendment Components

- Nass Bay Route
- Proposed CPC
- Proposed Pipeline Connection Area
- Nass Bay Approach

Vegetation and Wetlands Components

- Vegetation Survey Location (2023)
- Blue-Listed Ecological Community
- Red-Listed Ecological Community
- Vegetation and Wetlands Local Assessment Area
- Vegetation and Wetlands Regional Assessment Area
- Rare Plant Location

0 0.4 0.8 km

1:20,000 (at original document size of 11x17)

Stantec

Project Location	Project Number 123514388
Nass Bay, Kitimat - Stikine Regional District, British Columbia	Prepared by TQUILICHINI on 20231127 Requested by NDECARLO on 20231127

Client/Project/Report

Prince Rupert Gas Transmission Ltd.

Figure No.

4.2

Title

Vegetation and Wetland Resources Assessment Area

4.4.2 Influence of Consultation and Engagement

PRGT has consulted, and continues to consult with, Indigenous nations to discuss the Project and the proposed amendments, including the Marine Route Alternative Amendment. Since filing the Application, Indigenous nations have shared interests through Project-specific TLU studies related to vegetation and wetland resources. Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, Metlakatla First Nation, and NLG each identified an interest in harvesting plants (Calliou Group 2014a; CCRM 2014a; DMCS and MFN 2014; PRGT 2014a; Pulla 2014). At least fourteen plants identified as culturally important by the engaged Indigenous nations were observed at survey locations for the Nass Bay Route. These included Alaskan blueberry (*Vaccinium alaskaense*), deer fern (*Struthiopteris spicant*), false azalea (*Menziesia ferruginea*), oval-leaved blueberry (*Vaccinium ovalifolium*), western hemlock (*Tsuga heterophylla*), and western redcedar (*Thuja plicata*).

The vegetation species of importance identified by potentially affected Indigenous nations have been reviewed and considered in the Application's assessment of vegetation species which includes assessment of direct loss and alteration of plant species from vegetation clearing, ground disturbance, and introduction and spread of weeds found in Section 4.4.3.1.

The results of the vegetation and wetland resources assessment have also informed the assessments of potential effects on Indigenous interests (Section 33 of PRGT 2014a).

4.4.3 Amendment Effects Assessment

This section outlines the anticipated potential effects, any additional mitigation measures beyond those committed to in the 2014 EAC required to manage those effects, 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 assessments. Figure 4.2 shows the proposed changes in the context of the vegetation and wetland resources assessment areas, including a small extension of the LAA northward.

4.4.3.1 Potential Effects and Mitigation Measures

The Application considered two potential effects on vegetation and wetland resources: 1) change in abundance of plant species of interest, and 2) change in abundance or condition of ecological communities of interest. Based on the content of the Application and the information gathered during the Application review, the EAO's Assessment Report considered these potential effects within the CPC.

The Nass Bay Route (and Nass Bay Approach) and Ksi Lisims LNG Pipeline Connection have the potential to cause a change in the abundance of plant species of interest, including traditional-use plants and invasive species, and abundance or condition of ecological communities of interest, including red- and blue-listed ecological communities. The assessment of potential effects on vegetation and wetlands for the Amendment is consistent with the approach used in the Application (PRGT 2014a), except that a qualitative approach is used because the Amendment components will result in a substantially smaller footprint than the footprint presented in the Application (PRGT 2014a), and the new terrestrial area potentially affected is just 0.2 ha (i.e., the Nass Bay Approach).

Ecosystem communities and community attributes (e.g., structural stage, disturbances, old growth forest) were quantified in the Application. The Marine Route Alternative Amendment overlaps the Nisga'a Lands planning unit, which in the Application comprised 17,060 ha of the LAA. Therefore, the 0.2 ha of terrestrial vegetation and wetlands associated with the Nass Bay Approach would, at most, account for a change of approximately 0.001% within that planning unit, or the LAA (32,078 ha), for a given ecosystem community or community type attribute, and less than 0.001% of the RAA (166,466 ha).

The Nass Bay Route is primarily in the marine environment but includes the Nass Bay Approach that overlaps 0.2 ha in the terrestrial environment outside of the CPC, that was not previously considered in the Application. The Nass Bay Route intersects one red-listed ecological community, an estuarine marsh at the entrance and exit of the bay, and the Nass Bay Approach intersects a blue-listed ecological community. Clearing of vegetation is the primary pathway for change in vegetation and wetland resources. The Nass Bay Route will avoid clearing, grading and blasting along the isthmus at Nass Harbour and would avoid the crossing of Flewin Creek and four wetlands. The Nass Bay Route will also avoid a red-listed Sitka spruce salmonberry community and two sub-populations of flowering quillwort (*Lilaea scilloides*) that were identified near Nass Harbour at approximately KP 756 in the CPC.

The landfall of the PRGT pipeline at the Ksi Lisims LNG Facility is expected to be within the footprint of that facility, and as such no additional effects of constructing the Ksi Lisims LNG Pipeline Connection on vegetation and wetlands are expected.

Table 4.6 summarizes potential effects and mitigation for vegetation and wetland resources. Compared to the portion of the Project that the Amendment components would replace, residual effects are predicted to be lower. The primary driver for reduced residual effects is the smaller spatial terrestrial extent of the Amendment components relative to what is approved (i.e., the Nass Bay Route would reroute the pipeline around Nass Harbour, avoiding approximately 1 km of terrestrial works in this area). This smaller footprint also reduces the Project's contribution to potential cumulative interactions with past, present, and reasonably foreseeable projects and activities that are nearer to the Port of Prince Rupert (see Section 4.4.3.3). Although new red- and blue-listed ecological community locations were identified, these locations would also be affected by the currently approved route. Mitigation measures identified in the CEMP (PRGT 2016a) are appropriate to mitigate the effects of the proposed route changes on vegetation and wetland resources, no additional mitigation is proposed.

Table 4.6 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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (reduced terrestrial route)	No	No	No
	Operations				
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new landfall location at Ksi Lisims LNG Facility)	No	No	No
	Operations				

4.4.3.1 Residual Effects

Residual effects of the Amendment on vegetation and wetland resources are predicted to be of lower magnitude when compared to the portion of the approved alignment that the Amendment components would replace because the Amendment would lessen the overall Project footprint, and the spatial extent of maintenance and inspection activities during operation. Residual effects continue to include a change in the abundance of plant species of interest, including traditional-use plants and invasive species, and abundance and condition of ecological communities of interest, including red- and blue-listed ecological communities, as a result of construction. In consideration of the predicted effects on vegetation and wetland resources, the conclusions presented in the EAO's Assessment Report remain valid with the proposed changes.

4.4.3.2 Changes to Characterization of Residual Effects

Based on a desktop review of new information on vegetation and wetland resources for the Amendment, and the results from the 2023 multi-disciplinary surveys, a reduction in the overlap of the Project with terrestrial and wetland resources, and mitigation as described in the CEMP (PRGT 2016a), a change to the characterization of residual effects in the EAO Assessment Report is not warranted. Project residual effects on vegetation and wetland resources were previously characterized as being low to moderate in magnitude (EAO 2014a). Although the extent of the route will be reduced, a new red-listed community was identified from field survey in 2023. This community type, Em05 – Lyngbye's sedge (*Carex lyngbyei*), has not been documented elsewhere in the RAA and greater than 5% will be altered during project construction. However, this community occurs in an area common to the approved alignment and proposed amended alignment. With the Amendment, project effects on vegetation and wetland resources are predicted to be lower because of the reduced terrestrial route length. More than 5% of the red-listed Em05 – Lyngbye's sedge (*Carex lyngbyei*) will be altered, but with mitigation, this community will be re-established following construction. The Amendment would also avoid interaction with Flewin Creek, four wetlands, a red-listed Sitka spruce salmonberry community, and two sub-populations of flowering quillwort at approximately KP 756 in the CPC. In consideration of the predicted effects on vegetation and wetland resources, the conclusions presented in the EAO's Assessment Report remain valid with the

proposed changes. A comparison of the conclusions from the EAO Assessment Report and proposed Amendment residual effects is presented in Table 4.7 below.

Table 4.7 Changes to EAO Assessment Report Characterization of Residual Effects – Vegetation and Wetland Resources

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Context	Low to High Sensitivity	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.	No change
Magnitude	Low to Moderate	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. 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.	No change
Extent	Local	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.	No change
Duration	Short- to Long-Term	The regeneration of vegetation and wetland resources varies by species or type of ecological community and site-specific conditions. Residual effects to species at risk are medium- term in duration, due to the possible need for translocation. 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. Re-establishment of other types of vegetation such as shrubs and forbs would occur in the short- to medium-term. 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.	No change

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Reversibility	Reversible/Irreversible	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. 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.	No change
Frequency	Once to Periodic	The main disturbance would occur during the construction phase, and repeated periodic disturbance would occur during operations from vegetation management on the ROW.	No change
Likelihood	The proposed Project is highly likely to result in residual adverse effects to vegetation and wetlands.		No change
Significance	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. 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.		-
Confidence	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. 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.		No change

Notes:

EMP = Environmental Management Plan; TEM = terrestrial ecosystem mapping

Source: EAO 2014a

4.4.3.3 Cumulative Effects

Cumulative effects for vegetation and wetland resources are expected to be lower with the Amendment than for the approved project. Although the Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project it would interact cumulatively; however, with the Amendment, there would no longer be an interaction with existing or future projects or activities that are further south along the approved alignment in the vicinity of the Port of Prince Rupert and Lelu Island. As stated in Ksi Lisims LNG Facility application for an Environmental Assessment Certificate, in respect of an amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

With the proposed Amendment, which will have less interaction with past, present, and reasonably foreseeable projects and activities as compared to the Application, cumulative effects on vegetation and wetland resources are predicted to be consistent with the conclusions of the EAO's Assessment Report and remain valid.

4.4.3.4 Risks and Data Uncertainty

The proposed Amendment reduces adverse effects on vegetation and wetland resources relative to the portion of the Project it replaces. The level of uncertainty for predicted effects on vegetation and wetland resources is considered moderate due to limited field survey of the amended route. 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.

4.5 Wildlife and Wildlife Habitat

Wildlife and wildlife habitat were identified as a VC in the Application Information Requirements for the Application 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 project and cumulative effects of the Marine Route Alternative Amendment for the wildlife and wildlife habitat VC. Information presented in this section is consistent with the Application and updated where necessary and relevant. The LAA and RAA for terrestrial wildlife are the same as presented in the Application; for marine birds the LAA and RAA for the Amendment have been expanded to account for the full extent of the Ksi Lisims LNG Pipeline Connection (Figure 4.1). The landfall location on Pearse Island will overlap with the Ksi Lisims LNG Facility footprint; potential effects of a pipeline connection were accounted for in the Ksi Lisims LNG Facility application (see Figure 1.3-1 in Ksi Lisims LNG 2023b) and therefore landfall of the Ksi Lisims LNG Pipeline Connection is not considered further.

4.5.1 Existing Conditions

Existing conditions for the assessment of effects on wildlife and wildlife habitat in the Amendment are supported by the 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 Amendment (e.g., marine bird surveys for the Ksi Lisims LNG Facility [Ksi Lisims LNG 2023f]).

In the Application (Section 14.3.2 [PRGT 2014a]), 54 species of conservation concern had potential to interact with the Project. This list of species, including changes that have occurred since the Application was approved (i.e., taxonomy updates and species status additions, deletions, or changes), includes 45 species/subspecies with potential to interact with the Amendment (Table 4.8).[3] 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 Species at Risk Act (SARA) (SRPR 2023)
- Designated as Extinct, Endangered, Threatened or Special Concern by COSEWIC (COSEWIC 2023)
- Red- or Blue-listed by the Province of BC Conservation Data Centre (BC CDC 2023)

Table 4.8 Wildlife Species of Conservation Concern Known or Likely to Overlap with the Amendment Components

Species[1]	Conservation Status		
	SARA [2]	COSEWIC [3]	CDC List [4]
Mammals			
Eastern Red Bat	-	E	Unknown
Fisher			
Grizzly Bear[5]	1-SC	SC	Blue
Hoary Bat	-	E	Blue
Little Brown Myotis	1-E	E	Blue
Mountain Goat	-	-	Blue
Northern Myotis	1-E	E	Blue
Silver-haired Bat	-	E	Yellow
Wolverine (*luscus* subspecies)[5]	1-SC	SC	Blue
Yuma Myotis	-	-	Blue

[3] Latin names for species are provided in Attachment A and Attachment B of Appendix P: Wildlife and Wildlife Habitat Technical Data Report. Applicable changes to Latin names are addressed in Table 4.8 of the Amendment.

Species[1]	Conservation Status		
	SARA [2]	COSEWIC [3]	CDC List [4]
Birds			
Ancient Murrelet	1-SC	SC	Blue
Band-tailed Pigeon	1-SC	SC	Blue
Bank Swallow[5]	1-T	T	Yellow
Barn Swallow[5]	1-T	SC	Yellow
Black-legged Kittiwake	-	-	Red
Black Scoter	-	-	Blue
Black Swift	1-E	E	Blue
Brandt's Cormorant	-	-	Red
Brant	-	-	Blue
California Gull	-	-	Red
Caspian Tern	-	-	Blue
Cassin's Auklet[5]	1-SC	SC	Red
Common Murre	-	-	Red
Common Nighthawk[7]	1-SC	SC	Blue
Double-crested Cormorant		NAR	Blue
Great Blue Heron (*fannini* subspecies)	1-SC	SC	Blue
Horned Grebe[5]	1-SC	SC	Yellow
Kildeer	-	-	Blue
Lesser Yellowlegs	-	T	Blue
Long-tailed Duck	-	-	Blue
Marbled Murrelet	1-T	T	Blue
Northern Goshawk (*laingi* subspecies)	1-T	T	Red
Olive-sided Flycatcher[7]	1-SC	SC	Yellow
Peregrine Falcon (*anatum* subspecies)[8]	-	NAR	Red
Peregrine Falcon (*pealei* subspecies)	1-SC	SC	Blue
Red-necked Phalarope[5]	1-SC	SC	Blue
Short-billed Dowitcher	-	-	Red
Short-eared Owl	1-SC	T	Blue
Surf Scoter	-	-	Blue
Tundra Swan	-	-	Blue
Wandering Tattler	-	-	Blue
Western Grebe[5]	1-SC	SC	Red
Western Screech-Owl (*kennicottii* subspecies)	1-T	T	Blue
Yellow-billed Loon	-	NAR	Blue

Species[1]	Conservation Status		
	SARA [2]	COSEWIC [3]	CDC List [4]
Amphibians[9]			
Western Toad	1-SC	SC	Yellow

Notes:

1 Species downlisted since the Application and no longer satisfying the criteria for species of conservation are excluded. These include long-eared myotis (see Note 6), cackling goose, and sooty grouse.

2 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).

3 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).

4 BC CDC list status: 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.

5 Added to Schedule 1 of the *Species at Risk Act* since the Application.

6 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.

7 Olive-sided Flycatcher and Common Nighthawk were downlisted from Threatened in 2023.

8 Peregrine Falcon (*anatum* subspecies) delisted from SARA as Threatened in 2023.

9 Coastal Tailed Frog was included in the Application as a conservative measure but was not expected to occur in the Local Assessment Area based on available range maps. No observations were made during Project-specific field surveys and no occurrences were discovered during a desktop review to support the Amendment.

A primary source of new information on wildlife in the vicinity of the Amendment components are the marine bird surveys from the proposed Ksi Lisims LNG Facility. The Ksi Lisims LNG Facility marine bird survey overlaps a large portion of the Ksi Lisims LNG Pipeline Connection component and is proximal to the northern portion of the Nass Bay Route. The Ksi Lisims LNG Facility marine bird survey replicated similar surveys that were completed to support the PRGT Application. Species and numbers of birds observed during Ksi Lisims LNG Facility spring and fall migration surveys were not substantially dissimilar to surveys completed by PRGT in 2013 and 2014 (PRGT 2014b, Ksi Lisims LNG 2023f). For the Ksi Lisims LNG Facility, 1,082 birds comprising 24 species were observed during fall migration, and 1,521 birds comprising 22 species were observed during spring migration (which coincided with eulachon spawning). Observations of species of conservation concern included California gull, long-tailed duck, surf scoter, common murre, marbled murrelet, western grebe, red-necked phalarope, and yellow-billed loon.

A secondary source of information on birds is eBird (www.ebird.org). A query of eBird for bird species of conservation concern occurring in proximity to the Amendment components since the Application was approved (i.e., 2014-2023) was completed. The following species, reported almost entirely from the village of Gingolx, were confirmed as present: band-tailed pigeon (Gingolx, June 2021), barn swallow (Gingolx, 2022-2023), black scoter (Gingolx 2021), California gull (Gingolx, 2017, 2018, 2020, 2021,2023), common murre (Gingolx, 2016, 2018), great blue heron (Gingolx, 2017, 2018, 2020, 2021, 2022, 2023; Nasoga Gulf 2015), horned grebe (Gingolx, 2018), long-tailed duck (Gingolx 2017, 2022),

marbled murrelet (Gingolx, 2017, 2018, 2021), peregrine falcon (Gingolx 2020), short-billed dowitcher (Gingolx, 2017), surf scoter (Gingolx, 2016, 2017, 2018, 2022, 2023), and western grebe (Gingolx 2017, 2018, 2021, 2023).

Mapping of geographic location polygons that may contain the biophysical attributes of terrestrial critical habitat for marbled murrelet was used in the development of the Marbled Murrelet Mitigation and Monitoring Plan for the approved Project. No federal updates to that mapping (circa 2014) have occurred for the areas overlapping the Amendment components since the Application was approved. No geographic location polygons that may contain the biophysical attributes of terrestrial critical habitat overlap with the 0.2 ha of terrestrial habitat associated with the Nass Bay Approach. In January 2023 the federal recovery strategy for marbled murrelet was amended to include marine critical habitat (ECCC 2023). No marine critical habitat has been identified as overlapping the marine components of the Amendment. A Project-specific habitat suitability model prepared for the Application and included in the Marbled Murrelet Mitigation and Monitoring Plan indicates that the terrestrial portions of the Amendment are rated as 'nil' for marbled murrelet (PRGT 2016b).

The Nass Bay Approach overlaps with the Khutzeymateen Grizzly Bear Population Unit but does not overlap an approved Wildlife Habitat Area or Ungulate Winter Range; Pearse Island is not within a Grizzly Bear Population Unit and also does not overlap with a Wildlife Habitat Area or Ungulate Winter Range. The Nass Bay Route and the Ksi Lisims LNG Pipeline Connection do not overlap with, or occur within 1 km of, a marine bird breeding colony or Important Bird Area.[4]

4.5.2 Influence of Consultation and Engagement

PRGT has consulted, and continues to consult with, Indigenous nations to discuss the Project and the proposed amendments, including the Marine Route Alternative Amendment. Since filing the Application, Indigenous nations have shared interests and concerns through the Project-specific consultation program, including Project-specific TLU studies related to wildlife and wildlife habitat. Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, Metlakatla First Nation, and NLG each identified an interest in harvesting wildlife (Calliou Group 2014a; CCRM 2014a; DMCS and MFN 2014; PRGT 2014a; Pulla 2014). Site-specific information provided by Indigenous nations since filing the Application is summarized in Table 4.9. Table 4.3 and has been integrated into the wildlife and wildlife habitat effects assessment.

[4] 1 km is the distance within which mitigation for vessel operations would apply near marine bird colonies.

Table 4.9 Summary of Consultation Feedback Related to Wildlife and Wildlife Habitat

Comment	Sources	PRGT Response
Metlakatla First Nation previously identified terrestrial hunting areas throughout Portland Inlet.	DCMS and MFN 2014	• Species hunted in Portland Inlet by Metlakatla First Nation are considered in the assessment of potential effects, either directly as an indicator species or species group, or as a proxy to an indicator. Applicable marine bird indicators include diving ducks, dabbling ducks, loons and cormorants, and alcids (e.g., murres, murrelets, and auklets). Applicable terrestrial indicators include grizzly bear, marten, moose, mountain goat, northern goshawk, band-tailed pigeon, western screech-owl, common nighthawk, olive-sided flycatcher, marbled murrelet, the old forest, young forest, grassland and shrubland, and wetland songbird communities, western toad, and pond-dwelling amphibians.
Lax Kw'alaams Band previously identified wildlife species of importance along the coastal rainforests of their territory including deer and mountain goat in the Kts'm'atiin Inlet Cultural and Natural Area (KICNA) and mountain goat in the Kwa'ka-pal (Nass Bay) Special Management Area (KSMA).	ATTLK 2004	• Wildlife species identified as important to Lax Kw'alaams Band were included and considered in the Application, including affecting the selection of wildlife indicators. Mountain goat was selected as an indicator and deer were not. Deer were not selected as an indicator because "a potential change in habitat, movement, or mortality risk as a result of the Project is not expected to adversely affect the regional population" (PRGT 2014c)

4.5.3 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 and Application effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessments. Figure 1.1 shows the proposed changes, which in their entirety are relevant to the wildlife and wildlife habitat VC. The spatial boundaries used in the Application to assess project and cumulative effects on the wildlife and wildlife habitat VC (Figures 14.1 to 14.3 in the Application) encapsulate all but the northernmost portion of the Ksi Lisims LNG Pipeline Connection (applicable to marine birds). For this area, PRGT expanded the LAA and RAA for marine birds and used information from the Ksi Lisims LNG Facility effects assessment to support the assessment of potential effects of the Marine Route Alternative on marine birds (Section 7 [Ksi Lisims LNG 2023g]).

4.5.3.1 Potential Effects and Mitigation Measures

The Application considered three potential effects on wildlife and wildlife habitat: 1) change in habitat; 2) change in mortality risk, and; 3) change in movement. Based on the content of the Application and the information gathered during the Application review, the EAO's Assessment Report considered the same potential effects on wildlife and wildlife habitat. The Application and EAO's Assessment Report assessed potential project effects on wildlife and wildlife habitat using key indicators comprising terrestrial wildlife (e.g., mammals, birds, and amphibians), marine birds (i.e., diving ducks, dabbling ducks, loons and cormorants, and alcids [e.g., murres, murrelets, auklets]), and their habitats.

The Marine Route Alternative Amendment components have the potential to cause a change in habitat, change in movement, and change in mortality risk that can affect terrestrial wildlife and marine birds. The assessment of potential effects on wildlife for the Amendment is consistent with the approach used in the Application (PRGT 2014d), except that a qualitative approach is used because the Ksi Lisims LNG Pipeline Connection is substantially shorter than the section of the approved Project it would replace, and the Nass Bay Approach increases the spatial extent by just 0.2 ha. Quantitative wildlife habitat suitability models were provided in the Application for several terrestrial wildlife indicator species and summarized by planning units. The Marine Route Alternative Amendment overlaps the Nisga'a Lands planning unit, which in the Application comprised 17,060 ha of the LAA. Therefore, the 0.2 ha of terrestrial habitat associated with the Nass Bay Approach would at most account for a change of approximately 0.001% within that planning unit for a given terrestrial wildlife indicator. Similarly, quantitative results were provided for grizzly bear mortality risk in the Application using grizzly bear assessment areas within corresponding grizzly bear population units. The Marine Route Alternative Amendment overlaps with the Khutzeymateen/Stewart grizzly bear assessment area, which in the Application comprised 19,229 ha. Therefore, the 0.02 ha of terrestrial habitat associated with the Nass Bay Approach would at most account for a change in the Khutzeymateen/Stewart grizzly bear assessment area of approximately 0.001%. Grizzly bear and moose mortality risk were also assessed using a linear density metric, to which the Marine Route Alternative Amendment has no pathway (i.e., no new linear development on terrestrial lands). A qualitative assessment of potential effects was provided in the Application for change in habitat for marine birds, and for change in mortality risk and change in movement for marine birds and other key indicators.

The Nass Bay Route is in the marine environment and will avoid approximately 10 ha of terrestrial habitat between Nass Harbour and Echo Cove that is in the CPC. The Nass Bay Approach is a small terrestrial area (approximately 0.2 ha) outside of the CPC near the pipeline entry into Nass Bay. The Nass Bay Approach is within the Nisga'a Lands administrative boundary, within which the following terrestrial wildlife key indicators may occur (PRGT 2014d): grizzly bear, marten, moose, mountain goat, northern goshawk, band-tailed pigeon, western screech-owl, common nighthawk, marbled murrelet, olive-sided flycatcher, old forest songbird community, young forest songbird community, grassland and shrubland songbird community, wetland songbird community, western toad, and pond-dwelling amphibians. Clearing of vegetation is the primary pathway for change in habitat, although the presence of equipment, human activity, and associated sensory disturbance may cause indirect effects such as avoidance of otherwise suitable habitat adjacent to the construction area. The primary pathway for change in mortality risk is vegetation clearing during key life phases (e.g., breeding season for birds and amphibians) and

potential collisions with vehicles and infrastructure. The primary pathway for change in movement is avoidance of human activity, particularly during construction. The Nass Bay Approach is small, and with the implementation of mitigation measures as described in the CEMP (PRGT 2016a), change in habitat, movement, and mortality risk for terrestrial wildlife key indicators are expected to be negligible. No new or modified mitigation measures are recommended for the Nass Bay Approach.

The landfall of the PRGT pipeline at the Ksi Lisims LNG Facility is expected to be within the footprint of that facility. The Application for the proposed Ksi Lisims LNG Facility included an assessment of a pipeline connection to the facility. No additional effects of constructing the Ksi Lisims LNG Pipeline Connection where it makes landfall on Pearse Island have been identified for terrestrial wildlife indicators and their habitat . Therefore, no further assessment of the pipeline landfall on Pearse Island is warranted.

The Nass Bay Route may affect marine bird key indicators, with effects arising mainly through displacement related to vessel traffic and indirect sensory disturbance (e.g., artificial lighting, odours, noise) associated with vessel operation and pipeline installation. Although some marine birds are expected to be temporarily displaced while vessels are present and construction occurs in the marine environment, some species may be attracted to the site opportunistically. No marine bird habitat is expected to be permanently lost and potential effects on change in movement and change in mortality risk are expected to be short term and reversible following construction of the Nass Bay Route. Potential effects of constructing the Nass Bay Route on nearshore species are expected to be less than the effects of constructing the approved route because the Nass Bay Route is on average farther from shore (up to approximately 1.5 km away). With the implementation of mitigation measures as described in the CEMP, a change in habitat, movement, and mortality risk for marine birds is expected to be negligible. No new or modified mitigation measures are recommended for the Nass Bay Route.

The Ksi Lisims LNG Pipeline Connection may affect marine bird key indicators, with effects arising mainly through displacement related to vessel traffic and indirect sensory disturbance (e.g., artificial lighting, odours, noise) associated with vessel operation and pipeline installation. Although some marine birds are expected to be temporarily displaced while vessels are present and construction occurs in the marine environment, some species may be attracted to the site opportunistically. No marine bird habitat is expected to be permanently lost and potential effects on change in movement and change in mortality risk are expected to be short term and reversible following construction of the Ksi Lisims LNG Pipeline Connection. Potential effects of constructing the Ksi Lisims LNG Pipeline Connection are expected to be reduced relative to the approved route because the Ksi Lisims LNG Pipeline Connection is much shorter (up to 100 km shorter) than the approved route that would have terminated at Lelu Island near the Port of Prince Rupert. With the implementation of mitigation measures as described in the CEMP, a change in habitat, movement, and mortality risk for marine birds is expected to be negligible. No new or modified mitigation measures are recommended for the Ksi Lisims LNG Pipeline Connection.

Table 4.10 summarizes potential effects, mitigation, and residual effects for wildlife and wildlife habitat. No new project effects (or effects pathways) were identified for the Amendment components. Compared to the portion of the approved Project that the Amendment components would replace, the magnitude of the residual effects are predicted to be reduced. The primary driver for reduced residual effects is the smaller spatial extent of the Amendment components relative to what is approved, which also reduces

potential cumulative interactions with past, present, and reasonably foreseeable projects and activities that are nearer to the Port of Prince Rupert. It is also expected that the temporal extent of potential effects, particularly during the construction phase, will be reduced concurrent with the reduced spatial extent. With the application of mitigation measures identified in the CEMP, no additional mitigation is proposed. Residual effects on terrestrial wildlife and marine bird key indicators are predicted to be negligible with the proposed Amendment.

Table 4.10 Summary of Potential Effects and Mitigation Measures – Wildlife and Wildlife Habitat

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (the Nass Bay Route would reduce the overlap with terrestrial habitat)	No	No	No
	Operations				
Ksi Lisims LNG Pipeline Connection	Construction	Yes (reduced length of marine pipeline and new alignment to connect with Ksi Lisims LNG Facility. Landfall on Pearse Island was assessed in the application for the proposed Ksi Lisims LNG Facility.)	No	No	No
	Operations				

4.5.3.2 Residual Effects

Residual effects of the Amendment on terrestrial wildlife and marine bird key indicators are predicted to be less than effects predicted for the portion of the approved alignment that the Amendment components would replace. 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 the Amendment would lessen the overall Project footprint, the duration of construction, and the spatial extent of maintenance and inspection activities during operation.

4.5.3.3 Changes to Characterization of Residual Effects

Based on a desktop review of new information on wildlife and wildlife habitat for the Amendment components, a reduction in the overlap of the Project with wildlife and wildlife habitat, and mitigation as described in the CEMP, no changes to the characterization of residual effects as presented in the EAO Assessment Report is warranted. Project residual effects on marine birds were previously characterized as being 'low/negligible' in magnitude and the effects associated with the Amendment are predicted to be lower based on a reduced alignment. Similarly, the terrestrial alignment would be reduced by the Amendment, albeit by a very small amount, and therefore the Amendment is likely to have a neutral or negligible reduction in residual effects compared to the approved route. The EAO Assessment Report concluded that project effects on wildlife and wildlife habitat are predicted to be not significant, except for caribou for which herd boundaries do not overlap with the Amendment components. In consideration of the predicted effects on wildlife and wildlife habitat, the conclusions presented in the EAO's Assessment Report remain valid with the proposed changes. A detailed comparison of the conclusions from the EAO Assessment Report and proposed Amendment residual effects is presented in Table 4.11.

Table 4.11 Changes to EAO Assessment Report Characterization of Residual Effects – Wildlife and Wildlife Habitat

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Context	**Grizzly bear:** High	Grizzly bear are highly sensitive to human disturbance. Existing average linear disturbance within the GBAAs in all but the westernmost GBAA currently exceeds or is approaching the recommended road density threshold of 0.6 km/km^2. The GBPUs that would be traversed by the Project are not considered threatened.	No change
	Caribou: High	Caribou 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.	Not applicable; the Marine Route Alternative does not overlap with a caribou herd range
	Moose: Moderate	Moose 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
	Mountain goat: Moderate	Mountain goats are highly sensitive to human caused disturbance, however mountain goat populations in the regions that would be traversed by the route are considered stable.	No change
	Marten: Low	Marten are not a species of conservation concern provincially or federally and have a low sensitivity to human caused disturbance.	No change
	Fisher: Moderate	Fisher 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
	Birds and amphibians: Low to high	The sensitivity of bird and amphibian 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
Magnitude	**Grizzly bear:** Moderate	The magnitude of potential effects to grizzly bear 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 GBAAs, and core security area would decrease by 0.8% to 4.2% in GBAAs.	No change

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Magnitude (cont'd)	**Caribou:** Moderate	The magnitude to caribou 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.	Not applicable; the Marine Route Alternative does not overlap with a caribou herd range
	Moose: Low to Moderate	The magnitude of residual effects to moose 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.	No change
	Mountain Goat: Low	The magnitude of residual effects to mountain goat is considered low. There is no direct disturbance to mountain goat UWR.	No change
	Marten and Fisher: Low	The magnitude of residual effects to marten and fisher 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.	No change
	Amphibians: Low **Birds:** Low/negligible	The magnitude of residual effects to amphibians and birds is considered low because the mitigation proposed to minimize habitat disturbance and fragmentation is expected to reduce the residual adverse effects.	No change
Extent	**Grizzly bear, caribou, moose, mountain goat, fisher, marbled murrelet:** Regional **Amphibians, birds, marten:** Local	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).	No change; the Marine Route Alternative does not overlap with a caribou herd range

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Duration	Medium- to long-term	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.	No change
Reversibility	Reversible	Effects to wildlife are expected to be reversible in the long term upon reclamation of the ROW.	No change
Frequency	Isolated to periodic, continuous	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.	No change
Likelihood	The proposed Project has a high likelihood of resulting in adverse effects by altering habitat, changing wildlife movement and increasing the risk of mortality.		No change
Significance	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. EAO considered the moderate magnitude of effects on grizzly bear, 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. EAO considered the moderate magnitude, long-term duration of residual effects on caribou. 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.		-

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Significance (cont'd)	EAO considered the low to moderate magnitude of residual effects on moose 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. EAO considered the low magnitude of residual effects on mountain goat, 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. EAO considered the low magnitude of residual adverse effects on the remaining wildlife species and short to long term duration. EAO concludes that residual effects would be not significant.		
Confidence	The level of confidence is determined by the availability of data, the understanding of the project-VC interaction and effectiveness of mitigation. Low to Moderate Confidence – There is low to moderate level confidence in the significance determination for grizzly bear. 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. Low Confidence – There is a low confidence in the significance determination for caribou. 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. Moderate to High Confidence – There is moderate to high confidence in the significance determination for moose, 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. High Confidence – There is high confidence in the significance determination for mountain goat based on a good understanding of the cause-effect relationship and availability of data for the proposed Project area.		No change

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Confidence (cont'd)	High Confidence – There is high confidence in the significance determination for marten and fisher based on a good understanding of the cause-effect relationship and data pertinent to the proposed Project area. Moderate to High Confidence – There is moderate confidence in the significance determination for amphibians, 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. High Confidence – There is high confidence in the significance determination for birds based on a good understanding of the cause-effect relationship and data pertinent to the proposed Project area.	

Notes:
GBAA = Grizzly Bear Assessment Area; GBPU = Grizzly Bear Population Unit; NWA = Nass Wildlife Area; UWR = Ungulate Winter Range
Source: EAO (2014a)

4.5.3.4 Cumulative Effects

Cumulative effects for wildlife and wildlife habitat are expected to be lower with the Amendment than for the approved Project. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. As well, with the Amendment, there would no longer be an interaction with existing or future projects or activities that are further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. As stated in the Ksi Lisims LNG Facility application for an Environmental Assessment Certificate, in respect of an amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

With the Amendment, which will have less interaction with past, present, and reasonably foreseeable projects and activities as compared to the Application, cumulative effects on wildlife and wildlife habitat are predicted to be consistent with the conclusions of the EAO's Assessment Report.

4.5.3.5 Risks and Data Uncertainty

The Amendment would reduce adverse effects on wildlife and wildlife habitat relative to the portion of the approved Project that would replace. There have been no projects developed in the Amendment component areas since 2014; the cumulative effects assessment for the proposed Ksi Lisims LNG Facility includes the approved Prince Rupert Gas Transmission Project and recognizes that a pipeline would need to connect to that facility. A desktop review of data on marine birds that has become available since 2014 confirms that the same kinds of species, and in similar abundance, occur in the Amendment component areas as were identified in the Application. As well, potential effects of the Amendment component areas on terrestrial wildlife and their habitat, including reviewing effects for the Ksi Lisims LNG Facility in the context of where the Ksi Lisims LNG Pipeline Connection would make landfall, are predicted to be marginally lower than assessed in the Application.

The level of uncertainty for predicted effects on wildlife and wildlife habitat is considered low based on 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 to avoid and mitigate effects on wildlife and wildlife habitat for the Project and other projects. As the uncertainty in this prediction is not high, no additional risk analysis is necessary.

4.6 Human Health

Human health was identified as a VC in the Application Information Requirements for the Application due to anticipated project interactions with human health. This section describes potential project and cumulative effects of the Marine Route Alternative Amendment for the human health VC. 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), 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.

4.6.1 Existing 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 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.

In the Human Health VC (Section 29.3.2.1 - Air Quality) of the Application, the environment encompassing the Amendment components is considered pristine. The air quality is very good and there are no existing industrial or commercial sources of air contaminants. Ambient concentrations of common air pollutants such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2), coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) are low, and below the BC provincial ambient air quality objectives. In the Human Health VC (Section 29.3.2.2 – Marine Sediment Quality), marine sediment samples collected in Iceberg Bay and Nasoga Gulf were analysed for metals and the results were compared to the Canadian Council of Ministers of the Environment (CCME) sediment quality guidelines for the protection of marine aquatic life and the soil quality guidelines for the protection of human health. This comparison confirmed that metal concentrations are below the levels where adverse biological effects exist. The sediment quality data supports the assumption that marine country foods (e.g., crabs, shellfish, and fish) in the region are not at risk from exposure to existing metal concentrations in the sediment. The portion of the pipeline affected by the Amendment does not traverse a known contaminated site.

4.6.2 Influence of Consultation and Engagement

PRGT has consulted, and continues to consult with, Indigenous nations to discuss the Project and the proposed amendments, including the Marine Route Alternative Amendment. Since filing the Application, Indigenous nations have shared interests and concerns through the Project-specific consultation program, including Project-specific TLU studies related to human health. This feedback has been considered and summarized in Table 4.12 and has been integrated into the human health effects assessment.

Table 4.12 Summary of Consultation Feedback Related to Human Health

Comment	Sources	PRGT Response
Gitxaała Nation previously reported that the majority of citizens' diet comes from the ocean, and expressed concerns about potential tanker accidents, and the potential subsequent effects on Gitxaała Nation daily life. Gitxaała Nation explained that chemicals have potential to release from pipes underwater, including pipeline coating, cement mix, and rust, which can contaminate the water and marine ecosystems.	Calliou Group 2014a	Prior to pipeline transport, natural gas is treated to remove impurities such as water, carbon dioxide, mercury, and sulphur compounds because they can build up in the pipe and cause damage. The resulting product is consumer-grade natural gas that is non-toxic. These simple hydrocarbons also do not bioaccumulate as they have a low solubility in lipids/fats and degrade rapidly in the environment. The scientific studies related to contamination from underwater pipelines are primarily related to abandoned pipelines releasing residual crude oil and other liquid petroleum products, and not from an intact operating pipeline.
Concerns were previously raised by Lax Kw'alaams Band about potential spills into the marine environment which would negatively affect marine resources for generations.	ATTLK 2004	Prior to pipeline transport, natural gas is treated to remove impurities such as water, carbon dioxide, mercury, and sulphur compounds because they can build up in the pipe and cause damage. The resulting product is consumer-grade natural gas that is non-toxic. These simple hydrocarbons also do not bioaccumulate as they have a low solubility in lipids/fats and degrade rapidly in the environment.

4.6.3 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 and Application effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessments.

4.6.3.1 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.

Air Quality and Human Health

For potential changes to human health linked to the inhalation of air pollutants, the Application examined whether emissions of sulphur dioxide, nitrogen dioxide, and volatile organic compounds to the atmosphere could pose an unacceptable health risk to people. These air pollutant emissions are generated from the operation of gas-fired compressor stations. The Application determined that concentrations of sulphur dioxide, nitrogen dioxide, and volatile organic compounds along the fence line of each compressor station would not pose an unacceptable health risk to people. Therefore, residents located further away from the compressor stations would be exposed to even lower concentrations of these air pollutants, and also experience no unacceptable health risk.

The Amendment does not include a change in compressor station locations, and there is no substantial increase in the emission inventory. Without a notable change in the location, air pollutant composition, and emission inventory for the Amendment, there is no expected change to human health related to inhalation exposure to air pollutants. This also means that there are no additional mitigation measures to reduce the human health risk from exposure to air pollutants.

Marine Country Foods and Human Health

For potential changes to human health linked to the consumption of marine country foods, the Application examined the potential for seafood contamination resulting from the resuspension of contaminated sediments.

This effect pathway applied only to the burial of the submarine portion of the pipeline as it approached the Pacific NorthWest LNG Project site on Lelu Island in the Port of Prince Rupert. Sediment-bound pollutants from past and present industrial activities in the marine waters of Prince Rupert and Port Edward could have been resuspended during pipeline installation, which could have increased pollutant concentrations in marine country foods.

However, marine sediment along the submarine portion of the pipeline for the Amendment is considered pristine with no history of commercial or industrial activity. Marine sediment quality for the portions affected by the Amendment is assumed to be representative of natural background conditions, meaning that disturbance of these sediments would not result in the re-suspension of chemical contaminants because they are not known to exist at this location. Since the pipeline route affected by the Amendment does not transect any known contaminated areas, there is no additional potential effect related to the consumption of marine country foods, and consequently no additional mitigation measures to address potential contaminants in marine country foods.

Table 4.13 summarizes the changes to the potential effects and mitigation measures for human health based on the proposed changes associated with the Marine Route Alternative Amendment.

Table 4.13 Summary of Potential Effects and Mitigation Measures – Human Health

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
Nass Bay Route	Construction	No (Compressor station locations and emission inventory are unchanged when considering inhalation health risk) Yes (Pipeline route adjustment at Nass Bay and Iceberg Bay for the consideration of marine country food consumption health risk)	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	No (Compressor station locations and emission inventory is unchanged when considering inhalation health risk) Yes (Shorter marine route for the consideration of marine country food consumption health risk)	No change	No change	No change
	Operations	No change	No change	No change	No change

4.6.3.2 Residual Effects

No new residual effects are expected as a result of the changes proposed in the Amendment. As stated in the Application, potential effects include a change in human health from exposure to air pollutants coming from compressor station operation and a change in human health from the consumption of marine country foods in potentially contaminated marine environments. Since the changes proposed in this Amendment do not affect air quality or chemical contaminant loads in marine country foods, there is no potential change in the residual effects.

4.6.3.3 Changes to Characterization of Residual Effects

The Assessment Report concluded that “given the analysis provided above related to the potential for adverse human health effects and given the mitigation provided in this and other sections of this Report to avoid and minimize contaminant availability in the environment, as well as recognizing the proposed conditions identified in the TOC, the federal and provincial permitting requirements, EAO concludes that the proposed Project would not likely result in any residual adverse effects on human health.” Based on a review of the Project changes associated with the Amendment, no changes to the Assessment Report’s conclusions are anticipated. The Amendment does not change the nature or types of potential human

health risks associated with the Project, and it does not change the degree or magnitude of potential human health risks to modify the existing characterizations. The residual effects characterization from the Application are presented in Table 4.14, as the Assessment Report did not provide a detailed characterization of residual effects to human health.

Table 4.14 Changes to Application's Characterization of Residual Effects – Human Health

Characterization of Residual Effects from the Application			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Context	Moderate to High	Moderate to high resilience. The area was moderately previously disturbed or not adversely affected by human activity.	No change
Magnitude	Negligible	Project-related human health exposure levels are below benchmarks established by regulatory agencies, and therefore would not result in a change in human health.	No change
Extent	Local Assessment Area	The extent of potential effects to human health is limited to within the local assessment area	No change
Duration	Long Term	Chronic chemical exposure period of 90 days or longer is defined as long term. Exposure to air pollutants expected last for duration of the project lifespan.	No change
Reversibility	Reversible	Changes to human health risk are reversible if the exposure ceases.	No change
Frequency	Continuous	Residual effect occurs continuously for the life of the project.	No change
Likelihood	There is a low likelihood of residual effects to human health. Exposure concentrations for air pollutants are several orders of magnitude below the benchmark for an unacceptable risk.		No change
Significance	Not significant - . Exposure concentrations for air pollutants are several orders of magnitude below the benchmark for an unacceptable risk.		-
Confidence	High Confidence – Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation, and assumptions made.		No change

4.6.3.4 Cumulative Effects

The cumulative effects to human health are expected to be lower with the Amendment than those stated in the Application. With the Amendment, there would no longer be an interaction with existing or future projects further south of the Ksi Lisims LNG Facility, including activities near Prince Rupert and Port Edward. There would be no cumulative effect to air quality near Prince Rupert and Port Edward, and there would be no potential to disturb sediment-bound contaminants in the marine environment near Prince Rupert and Port Edward.

With the proposed Amendment, which will have less interaction with past, present, and reasonably foreseeable projects and activities as compared to the Application, cumulative effects on human health are predicted to be consistent with the conclusions of the EAO's Assessment Report.

4.6.3.5 Risks and Data Uncertainty

The proposed Amendment reduces the degree of risk and data uncertainty relative to the Application. Risks and data uncertainty regarding human health risks from changes in air quality remain the same. There is no meaningful change in the predicted air quality and resulting health risk from the proposed Amendment. Since the pipeline route would no longer need to go towards Lelu Island near Prince Rupert and Port Edward, laboratory data regarding potential contaminants in the marine sediment is no longer applicable. The marine environment in the Nass Bay region of the route adjustment is still assumed to be pristine and representative of natural background conditions since there is no known history of commercial or industrial activities that would have introduced chemical contaminants.

4.7 Heritage and Archaeological Resources

Heritage and archaeological resources were identified as a VC in the Application Information Requirements for the Application due to anticipated project interactions with heritage and archaeological sites, and in recognition of their cultural value to local Indigenous nations. Through feedback received on the 2016 draft Amendment for the Nass Bay Route, Kitsumkalum First Nation expressed interest in the Nasoga Gulf, stating it is associated with traditional stories and used as a camp and resource collection area. The Amendment includes an updated description of existing conditions using data that has become available since the baseline studies for the Application were completed. This includes recorded archaeological and heritage site boundaries within the revised Project footprint addressed in the Amendment. In the context of heritage and archaeological 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 heritage and archaeological resources VC, this encompasses the CPC and the Proposed Pipeline Connection Area at the Ksi Lisims LNG Facility. The RAA used in the Application, plus an expansion of the RAA to include the northernmost extent of the Ksi Lisims LNG Pipeline Connection, is the area within which Project-specific effects to heritage and archaeological resources are assessed in this amendment.

4.7.1 Existing Conditions

Existing conditions for heritage and archaeological resources were determined through desktop reviews and a Project-specific archaeological field program. Desktop reviews included an examination of ortho-imagery, ArcGIS Earth, terrain, and other biophysical data available via iMapBC, historic trail maps and geological maps, and consultation of the following data sources:

- A keyword search of British Columbia's Provincial Archaeological Report Library, which includes digital reports on previous archaeological work undertaken within, and in the vicinity of, the CPC
- Remote Access to Archaeological Data application, a database maintained by the Archaeology Branch including recorded archaeological site data and information on the perceived potential of the affected lands to contain previously unrecorded heritage resource sites (archaeological site inventory data was obtained from the Remote Access to Archaeological Data application and reviewed to characterize the existing conditions for heritage resources)

- British Columbia's Important Fossil Areas Map (Government of British Columbia 2023a)
- Locations of previously recorded fossil sites, as documented in the Fossil Occurrence Database (Government of British Columbia 2023b)
- Bedrock geology digital data (Cui et al. 2017)
- Archaeological Overview Assessment (AOA) report (Rohdin et al. 2014) completed for PRGT
- Stantec's PRGT Project-specific archaeological potential model (the Model), also part of the AOA
- Final Archaeological Impact Assessment (AIA) reports completed for the pre-construction phases of the PRGT Project under *Heritage Conservation Act* (HCA) Heritage Inspection Permits (HIPs) 2013-0258 (Streeter et al. 2015) and 2015-0159 (Hossack and Streeter 2018)
- Interim AIA reports completed for the Ksi Lisims LNG Facility under HCA HIP 2022-0228 (Bond et al. 2023a; Bond et al. 2023b)
- Input received from local archaeological sub-consultants (ARCHER CRM Partnership and Kleanza Consulting Ltd.)
- Available Indigenous traditional knowledge considered as part of the Application
- Archaeological Assessment Information Forms completed as part of applications made to the former Oil and Gas Commission (OGC) (now BCER)

Background information was used to prepare a desktop AOA that summarized baseline heritage resource conditions for PRGT (Rohdin et al. 2014). The results of the desktop summary were supplemented by the results of a Project-specific archaeological field study consisting of an AIA of the Project footprint under HCA Heritage Inspection Permits 2013-0258 (Streeter et al. 2015) and 2015-0159 (Hossack and Streeter 2018). Heritage and archaeological resource information collected as part of the Ksi Lisims LNG Facility's AIA was reviewed and included in this assessment.

Most of the terrestrial Project footprint and a portion of the marine Project footprint have been previously assessed. Previously unassessed portions of the Project footprint will be subject to AIA under an HCA HIP.

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).

Two recorded archaeological sites previously overlapped by the Project footprint (GfTl-4 and GfTl-6) have been avoided by the revised Project footprint, while four recorded archaeological sites (GgTn-5, GgTn-9, GgTn-11, and GgTn-12) not previously overlapped by the Project footprint would overlap the proposed CPC included in the Amendment. A summary of changes to baseline conditions for heritage resources is provided in Table 4.15.

Table 4.15 Summary of Changes to Baseline Conditions for Heritage and Archaeological Sites

Indicators	Baseline Conditions
Archaeological sites	Recorded Archaeological Sites GgTn-5, GgTn-9, GgTn-11, and GgTn-12 are overlapped by the Proposed Marine CPC where it meets the Ksi Lisims LNG Pipeline Connection at the shore of Pearse Island. Previously overlapped archaeological sites GfTl-4 and GfTl-6 have been avoided by the reroute.
Historical sites	No changes
Palaeontological sites	No changes

Based on the limited spatial extent of many heritage sites and the limited physical (terrestrial, intertidal and subtidal) Project footprint associated with the Amendment components, avoidance is likely feasible in most instances. Where avoidance of sites is not feasible, mitigation would be achieved following site management procedures to be outlined in the Heritage Resources Management Plan and would meet or exceed standards defined by the Archaeology Branch and the BCER.

The proposed CPC associated with the Nass Bay Route (and Nass Bay Approach) overlaps an area of low palaeontological potential that is comparable with the area of low palaeontological potential overlapped in the Application. Bedrock in this area consists of metamorphic and igneous strata with low palaeontological potential. There is some potential for Quaternary fossil sites in the surficial deposits. Therefore, marine facilities do not result in any change to the potential effects, mitigations, residual effects identified, or the characterization of the residual adverse effects described in Section 27 of the Application (PRGT 2014a). To be conservative, Project construction would use a chance find protocol for artifacts and fossils per the requirements of the *Heritage Conservation Act*.

4.7.2 Influence of Consultation and Engagement

PRGT has consulted, and continues to consult with, Indigenous nations to discuss the Project and the proposed amendments, including the Marine Route Alternative Amendment. Since filing the Application, Indigenous nations have shared interests and concerns through the Project-specific consultation program, including Project-specific TLU studies related to heritage and archaeological resources. This feedback has been considered and summarized in Table 4.16 and has been integrated into the human health effects assessment.

Table 4.16 Summary of Consultation Feedback Related to Heritage and Archaeological Resources

Comment	Sources	PRGT Response
Kitselas First Nation previously reported that there are multiple campsites on Somerville Island of importance to members of the Nation.	Pulla 2014	• Somerville Island is not overlapped by the Marine Route Alternative footprint.
Lax Kw'alaams Band previously reported that Kts'm'atiin Inlet Cultural and Natural Area and the Kwa'ka-pal (Nass Bay) Special Management Area overlap with the proposed Nass Bay Route and identified these areas as containing documented archaeological sites of importance to Lax Kw'alaams Band.	ATTLK 2004	• The Marine Route Alternative footprint will be subject to an AIA and all recorded archaeological sites overlapped by it will either be avoided by redesign or mitigated under *HCA* Alteration Permits. Site avoidance is the preferred management option recommended by AIAs, but if avoidance is impracticable and Alteration Permits are required, mitigation work plans will be developed in collaboration with affected Indigenous nations.
Metlakatla First Nation previously identified transportation routes that serve to connect Metlakatla First Nation to important areas of traditional and cultural land use travel routes in the Nass Bay, Portland Inlet and Portland Canal.	DCMS and MFN 2014	• Marine travel routes are not anticipated to be significantly affected by the Project. Terrestrial travel routes predating AD 1846 are protected archaeological sites under the *HCA*. The Marine Route Alternative footprint will be subject to an AIA and all recorded archaeological sites overlapped by it will either be avoided by redesign or mitigated under *HCA* Alteration Permits. Site avoidance is the preferred management option recommended by AIAs, but if avoidance is impracticable and Alteration Permits are required, mitigation work plans will be developed in collaboration with affected Indigenous nations.
Metlakatla First Nation previously identified historical seasonal villages and campsites and shelters around the northern portion of the Portland Inlet, as well as along the shores of Sommerville Island. Metlakatla also identified a pictograph site along the northern shore of Nass Bay that is of cultural value to the nation.	DCMS and MFN 2014	• The historical seasonal villages, campsites, and shelters identified by Metlakatla First Nation around the northern shore of the Portland Inlet, as well as the northern shore of Nass Bay and all of Somerville Island are not overlapped by the Marine Route Alternative footprint.

4.7.3 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 and Application effects characterizations, anticipated cumulative effects, and the risks and uncertainty associated with the effects assessments. Proposed changes in the context of the heritage and archaeological resources assessment area consist of changes to the CPC, including the Nass Bay reroute and an extension northward to Pearse Island to encompass the Ksi Lisims LNG Pipeline Connection.

In addition to the effects characterization presented here, an application for a heritage inspection permit under the HCA will be submitted to the Archaeology Branch of the BC Ministry of Forests prior to construction. This permit will allow for AIA of previously unassessed portion of the revised CPC, archaeological monitoring of construction, heritage chance find responses, and will function in conjunction with HCA Alteration Permits, as appropriate.

4.7.3.1 Potential Effects and Mitigation Measures

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 changes to potential effects and mitigation measures for heritage resources is provided in Table 4.17.

The 2014 Application considered six potential effects of the Project on heritage and archaeological resources: 1) disturbance of archaeological sites; 2) hindering or increasing access to archaeological sites; 3) disturbance of historic sites; 4) hindering or increasing access to historic sites; 5) disturbance to palaeontological sites, and; 6) other applicable considerations raised by Indigenous nations. Based on the content of the Application and the information gathered during the Application review, and consultation with Indigenous nations and the public, the EAO's Assessment Report identified three areas where understanding of these potential effects could be refined.

Lax Kw'alaams Band and Nak'azdli Band requested recognition of a wider range of archaeological site types that include places of spiritual significance, named locales, known travel routes, and other locations of cultural value regardless of the presence of physical evidence. A technical memo was provided in response (PRGT 2014e), which stated that any such sites with physical evidence identified in the AIA are subject to detailed documentation, regardless of protection status. Traditional Knowledge and TLU information are considered in the study. Where heritage and archaeological sites are identified in the LAA, including sites that may not be automatically protected under the HCA, procedures for site management prior to Project construction would follow those required under Provincial regulation as well as those outlined in the Heritage Resource Management Plan. The project-specific AOA, AIA, and TLU studies also consider effects to some of the more intangible elements such as spiritual and ceremonial sites, traditional travel routes, and landscapes. These studies and the management recommendations they make are subject to review and comment by affected Indigenous Groups.

Two public comments were made regarding impacts to archaeological and historic trails. In response, it was noted that Indigenous nations had provided information regarding the importance, and in some cases specific location, of various trails. In addition, AIA fieldwork specifically targeted locations of known archaeological and historic trails. Where identified within the LAA, Project effects on heritage and archaeological sites, including trails, are to be managed in accordance with provincial regulations as well as the Heritage Resource Management Plan.

The Ministry of Forests, Lands, and Natural Resource Operations (now the Ministry of Forests) expressed several concerns regarding the management of paleontological resources encountered during pipeline construction. In response, the Heritage or Palaeontological Resources Discovery Contingency Plan includes chance find protocols for palaeontological resources. The Project has a standard no-collecting policy for heritage, archaeological, and palaeontological resources. Workers will be informed of this policy during Project orientation and directed to report any chance discoveries. The following mitigation measures were also put in place:

- Fossil recognition training during Project orientations
- A professional palaeontologist will monitor construction activities in zones considered to have high potential for palaeontological resources.

The Nass Bay Route (and Nass Bay Approach) and Ksi Lisims LNG Pipeline Connection are anticipated to carry potential for disturbance to archaeological, historic, and palaeontological sites as well as potential for changes to access to archaeological and historic sites consistent with the effects assessment in the Application. Project effects from the Amendment are anticipated to be reduced compared to the Application since the amended project marine footprint is considerably smaller than what was presented in the Application and the risk to currently unrecorded submerged archaeological, historic, and palaeontological sites is reduced.

The Ksi Lisims LNG Pipeline Connection will involve a reroute of the pipeline from the approved southerly route to the Port of Prince Rupert as it leaves Nasoga Gulf to a northerly route to the Ksi Lisims LNG Facility. At the entrance to Nasoga Gulf the new route turns north through Portland Inlet before turning northwest up Portland Canal to the Ksi Lisims LNG Facility. The new route will occur primarily within the RAA established in the Application. However, the RAA was expanded to include the northernmost extent of the Ksi Lisims LNG Pipeline Connection for the purposes of the Amendment as it extends outside of the RAA used in the Application (Figure 4.1). Information and effects predictions provided in the application for the CPC and the Proposed Pipeline Connection Area at the Ksi Lisims LNG Facility has been considered in the Amendment for heritage and archaeological resources. Project activities that are anticipated to be undertaken for the Ksi Lisims LNG Pipeline Connection are unchanged from those in the Application and will include site preparation (blasting, infilling, and under pipe support), marine entrance/exit (trenching, dredging, pipeline armouring, and HDD), and marine pipe placement (pipe lowering, under-pipe support, and pipeline armouring). The overall length of proposed pipeline has been reduced, resulting in a reduced risk to unrecorded submerged heritage and archaeological resources. Previously overlapped recorded archaeological sites GfTl-4 and GfTl-6 will be avoided by the reroute, while recorded archaeological sites GgTn-5, GgTn-9, GgTn-11, and GgTn-12 are now overlapped by the Proposed Pipeline Connection Area at the Ksi Lisims LNG Facility where it extends outside of the approved CPC at the shore of Pearse Island. Archaeological sites GgTn-5, GgTn-9, GgTn-11, and GgTn-12 will either be avoided by the Project or subject to mitigation under an HCA Alteration Permit. As a result, there are no additional anticipated changes in potential effects associated with the landfall location at the Ksi Lisims LNG Facility.

Table 4.17 Summary of Potential Effects and Mitigation Measures – Heritage and Archaeological 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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route; reduced terrestrial route)	No	No	No
	Operations				
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at the Ksi Lisims LNG Facility)	No	No	No
	Operations				

4.7.3.2 Residual Effects

The summary of residual effects on heritage and archaeological resources is the same as provided in the Heritage and Archaeological Resources, Section 26.5.3, of the Application (PRGT 2014a). Considering the scale of the Project and the likelihood that not all heritage and archaeological sites within the footprint can be feasibly avoided, the likelihood of residual effects is moderate to high.

Traditional Knowledge information with respect to heritage and archaeological resources was considered but did not change the results of the assessment. Identified issues concerning disturbance or changed access to historical, archaeological, and palaeontological sites, in general, are directly addressed in this assessment. Where specific archaeological site locations are identified in the Project footprint, these will be targeted and assessed as part of the AIA.

4.7.3.3 Changes to Characterization of Residual Effects

Analytical methods for the assessment of residual effects on heritage and archaeological resources are the same as those provided in the Heritage and Archaeological Resources, Section 26.5.1, of the Application (PRGT 2014a). In consideration of the predicted effects on heritage and archaeological resources, the conclusions presented in the EAO's Assessment Report remain valid with the proposed changes. A detailed comparison of the conclusions from the EAO Assessment Report and proposed Amendment residual effects is presented in Table 4.18.

Table 4.18 Changes to EAO Assessment Report Characterization of Residual Effects – Heritage and Archaeological Resources

Characterization of Residual Effects from the 2014 EAO Assessment Report			Changes to the Residual Effects Characterization
Criteria	**Assessment Rating**	**Rationale**	
Context	Disturbance varies	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.	No change
Magnitude	Low to Moderate	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.	No change
Extent	Project Footprint	Generally limited to portions of the Project footprint that are having direct ground disturbance.	No change
Duration	Permanent	Any archaeological values not collected would likely be permanently destroyed.	No change
Reversibility	Irreversible	Any permanent losses would be irreversible.	No change
Frequency	Once	Disturbance to archaeological sites would occur only one time (i.e. during construction ground disturbance).	No change
Likelihood	There is a moderate to high likelihood that some archaeological resources would be adversely affected.		No change
Significance	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. 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.		-
Confidence	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. 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.		No change

Notes:
AIA = Archaeological Impact Assessment; HCA = Heritage Conservation Act; TOC = Table of Conditions
Source: EAO 2014a

4.7.3.4 Cumulative Effects

The assessment of potential cumulative effects on heritage and archaeological resources is the same as provided in the Heritage and Archaeological Resources, Section 26.6, of the Application (PRGT 2014a). This includes the procedures outlined in the Heritage or Palaeontological Resources Discovery Contingency Plan. By following site avoidance and/or site mitigation measures, cumulative effects on heritage and archaeological sites will be consistent with the EAO's Assessment Report.

4.7.3.5 Risks and Data Uncertainty

The proposed Amendment reduces the potential for adverse effects on unrecorded submerged heritage and archaeological resources due to a reduction in the number of entrance/exits that require dredging and a reduction in overall marine pipeline length.

An AIA will be undertaken 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 site mitigation measures recommended by this AIA, the level of uncertainty for predicted effects on heritage and archaeological resources will be low.

4.8 Water Quality

Water quality was identified as a VC in the Application Information Requirements for the Application due to project interactions with the marine and freshwater environment. The Amendment includes an updated description of existing conditions based on data collected since the baseline studies for the Application were completed and includes expanded spatial boundaries that reflect the proposed Project changes in the Amendment. In the context of water quality, the LAA encompasses the area in which project-related effects can be predicted or measured, wherein there is a reasonable expectation that those effects could be of concern (PRGT 2014a). With respect to hydrology and water quality, this encompasses 100 m upstream and 300 m downstream of the watercourse crossing, depending on channel width and other watercourse characteristics.

4.8.1 Existing Conditions

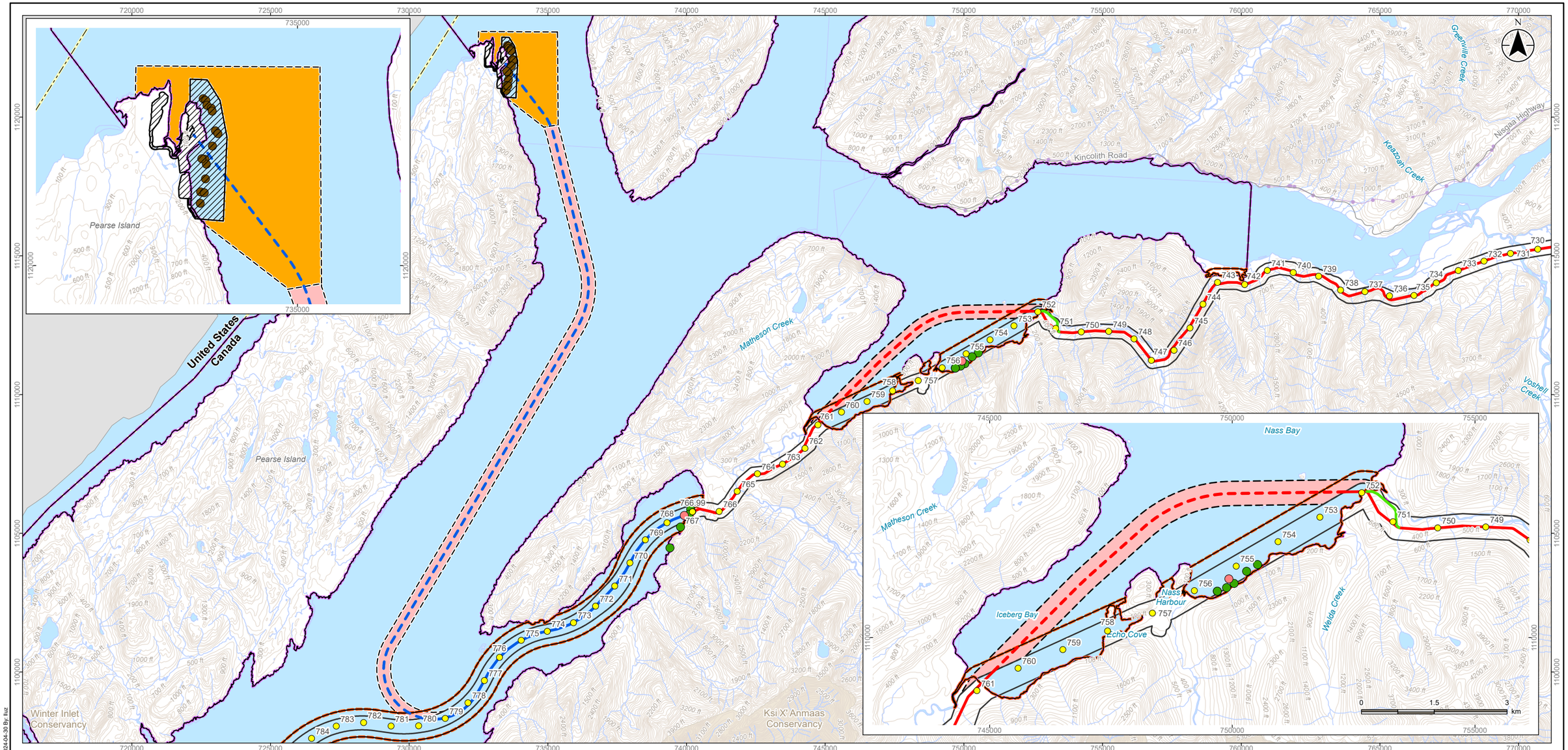
Existing conditions for water quality were evaluated through a combination of data from the water quality baseline data compiled as part of the Application (PRGT 2014a) and baseline data collected for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023h). Per Table 4.1, freshwater fish and fish habitat are not assessed in detail because the Nass Bay Route (including the Nass Bay Approach) does not cross additional fish-bearing freshwater watercourses outside of the CPC and would avoid crossing Flewin Creek and four wetlands.

The marine water quality LAA included a 500 m buffer on either side of the pipeline, or where hydrostatic water would be discharged, and an RAA of a 1 km buffer on either side of those features (Figure 4.3).

Most data for the areas of proposed changes covered in the Amendment were obtained from baseline data collected as part of the Application as it covers the RAA within Nasoga Gulf, around the Nass Bay Route and Portland Inlet where the Ksi Lisims LNG Pipeline Connection route traverses and its connection location with the Ksi Lisims LNG Facility (Figure 4.3). Baseline data and information from the Ksi Lisims LNG Facility EAC application (Ksi Lisims LNG 2023d) was used to support effects predictions for water quality in the Amendment.

Marine water quality sampling was undertaken at locations within Nass Bay and Nasoga Gulf during PRGT baseline programs that included water sampling and sediment grab samples to evaluate potential for remobilization of parameters from sediments into the water column during dredging activities (Figure 4.3; PRGT 2014a). The water samples met CCME and BC Water Quality Guidelines for the protection of marine life (CCME 2013; BC MOE 2013). Water quality data presented in the Application was not rescreened against updated guidelines. Parameter concentrations in sediment samples were low, with some metals higher than the CCME Interim Sediment Quality Guideline and disposal at sea screening criteria (arsenic at Nasoga Gulf; and arsenic, copper, chromium, nickel and zinc at Nass Bay); all samples had metal concentrations below the CCME Probable Effects Levels. Polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls, dioxins and furans were below guidelines in all Nasoga Gulf and Nass Bay samples collected.

Marine water quality and surface sediment sampling was conducted by Ksi Lisims at Wil Milit near the proposed connection location (Figure 4.3; Ksi Lisims LNG 2023c). Water quality results indicated the samples met CCME and BC Water Quality Guidelines for the protection of marine aquatic life for metals, volatile organic compounds (VOC), and hydrocarbons (CCME 2022; BC ENV 2023b). Sediment results indicated arsenic, copper, and nickel concentrations were elevated above either the lower or upper BC Working Sediment Quality Guidelines in some samples (BC Env 2021). These parameters have been documented to be elevated throughout the Skeena region, in both sediment and soils, and are not considered anthropogenic in nature (Ksi Lisims LNG 2023c). Sediment VOC and PAH concentrations were either below the detection limit or considered low and below the lower BC Working Sediment Quality Guidelines.



Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

Basemap Components

- KP Markers 9003
- Water Quality Sampling Locations (PRGT)
- Sediment Grab Samples (PRGT)
- Sediment Sampling Location (Ksi Lisims)
- Watercourse
- International Boundary
- Waterbody

Approved Project Components

- Certified Pipeline Corridor (CPC)
- Marine Centreline
- Nass Bay Approach Centreline
- Terrestrial Centreline
- Original Marine Resources LAA
- Original Marine Resources RAA

Marine Route Alternative Amendment Components

- Nass Bay Route
- Ksi Lisims LNG Pipeline Connection
- Nass Bay Approach
- Proposed CPC
- Proposed Pipeline Connection Location

Proposed Ksi Lisims LNG Project

- Ksi Lisims Project Footprint

0 2.5 5 km

1:140,000 (at original document size of 11x17)

Stantec

Project Location
Nass Bay, Kitimat - Stikine Regional District, British Columbia

Project Number 123514388
Prepared by EHERTZMAN on 20230828
Requested by LMACMILLAN on 20230828
Checked by TCARDINAL on 20230828

Client/Project/Report
Prince Rupert Gas Transmission Ltd.

Figure No.
4.3

Title
Marine Water Quality and Sediment Sampling Locations

C:\Users\luz\AppData\Local\Temp\46\ArcGISProTemp5136\Untitled\Untitled.aprx Revised: 2024-04-30 By: luz

4.8.2 Influence of Consultation and Engagement

PRGT has consulted, and continues to consult with, Indigenous nations to discuss the Project and the proposed amendments, including the Marine Route Alternative Amendment. Since filing the Application, no new interests and concerns related to water quality have been shared by Indigenous nations. PRGT will continue to consult 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.

4.8.3 Amendment Effects Assessment

The Amendment is not anticipated to interact differently with freshwater quality than was previously assessed in the Application. The proposed Ksi Lisims LNG Pipeline Connection does not interact with any freshwater watercourses at the entrance or exit locations. Freshwater quality is not carried forward into the Amendment effects assessment.

The marine portion of the Amendment reduces the number of entrance and exits, which may reduce the potential for or extent of dredging. Potential changes to marine water quality for the Nass Bay Route and for the Ksi Lisims LNG Pipeline Connection, including the landfall of the PRGT pipeline at the Ksi Lisims LNG Facility, are considered in this effects assessment. Trenching and/or dredging at the exit location at the Ksi Lisims LNG Facility (outside of the LAA used in the Application) may result in mobilization of sediments into the water column that were not evaluated in the previous assessment. The Ksi Lisims LNG Pipeline Connection is approximately 100 km shorter than the approved route from Nasoga Gulf to Lelu Island, which would reduce the volume of hydrostatic test water used.

4.8.3.1 Potential Effects and Mitigation Measures

The Application considered two effects on water quality: change in freshwater quality related to toxicity and change in marine water quality related to toxicity. As the Application does not included interactions with additional freshwater resources, changes to freshwater quality are not anticipated to occur. Based on the content of the Application and the information gathered during the Application review, the EAO's Assessment Report considered the potential effects on marine water quality within the Marine Resources chapter related to toxicity, including assessment of marine sediment resuspension and disposal associated with trenching at landfalls and discharge of hydrostatic test water.

Construction of the Nass Bay Route and the Ksi Lisims LNG Pipeline Connection may affect marine water quality through mobilization of sediments, which may result in a change to water quality related to suspended sediments and toxicity. Mobilization of bottom sediments and associated contaminants (e.g., metals, PAHs) into the water column during trenching, horizontal directional drilling, dredging, blasting or placement of in-water structures, as well as due to vessel movements in shallow areas, may occur during construction. Effects are primarily predicted to occur where the pipeline will be buried in Nass Bay and where it enters and exits the marine environment.

The Nass Bay Route entrance/exit trajectories are altered slightly from the approved PRGT route alignment; however, the area is still within the LAA and sediments are expected to be consistent with what was evaluated in the Application. Additionally, the Nass Bay Route reduces the number of entrance/exits, resulting in a reduction in potential effects to marine water quality. No new or modified mitigation measures are recommended for the Nass Bay Route.

The Ksi Lisims LNG Pipeline Connection differs from the approved route where it leaves Nasoga Gulf and turns northwest through Portland Inlet toward the Ksi Lisims LNG Facility. The portion of the Ksi Lisims LNG Pipeline Connection through Portland Inlet is planned to be surface laid and changes to water quality are expected to be small and consistent with effects described in the EAO Assessment Report, although the location is different and the length of pipelay is approximately 100 km shorter. The landfall location of the PRGT pipeline at the Ksi Lisims LNG Facility is new; however, sediments in the vicinity have similar composition to those in the Nass Area and limited marine sediment disturbance is anticipated at this location due to the steepness of the side of Portland Canal. Therefore, potential changes to water quality are predicted to be similar to those assessed for the Nasoga Gulf entrance and exit locations. As such, no additional effects of constructing the Ksi Lisims LNG Pipeline Connection on water quality are expected. In addition to pipeline route considerations, the marine exit is in a different location from that proposed in the Application (PRGT 2014a). In the Application, the landing at Lelu Island required on the order of 300,000 m^3 of sediment to be excavated from marine areas in the 4 km leading up to the landing. The Ksi Lisims LNG Pipeline Connection would replace the landing of the pipeline at Lelu Island with the landing at Wil Milit, avoiding this large excavation and sediment dispersal. As such, no new or modified mitigation measures are recommended for the Ksi Lisims LNG Pipeline Connection.

The potential effects on marine water quality as a result of discharge of hydrostatic test water would be reduced by the reduction in length (and therefore volume) of the marine pipelines.

Concerns were raised by Lax Kw'alaams Band and Gitxaała Nation citizens about potential spills into the marine environment that would negatively affect marine resources for generations and have devastating effects on the daily lives of community members (ATTLK 2004; Calliou Group 2014a). Gitxaała Nation citizens explained that chemicals, including pipeline coating, cement mix, and rust, have potential to be released from pipes underwater; which are contaminating to the water and marine ecosystem (Calliou Group 2014a). These potential effects are evaluated in the assessment of potential changes in water quality. Table 4.19 summarizes potential effects and mitigation measures for marine water quality. No new project effects (or effects pathways) were identified for the Amendment components. The Amendment components are predicted to result in reduced residual effects due to the reduction in spatial extent and number of entrance/exits. The reduced spatial extent also results in a reduction of potential cumulative interactions with past, present, and reasonably foreseeable projects due to the more remote location with less activity when compared to the previous exit at the Port of Prince Rupert. With the application of mitigation measures identified in the CEMP, no additional mitigation is proposed. Residual effects on marine water quality are predicted to be negligible with the proposed Amendment.

Table 4.19 Summary of Potential Effects and Mitigation Measures – Marine Water Quality

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
Nass Bay Route	Construction	Yes (longer marine route into deeper area [less dredging]; reduction in number of entrance/exit locations [four reduced to two]).	Changes in sediment and water quality	No change	No change
	Operations	No	No	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (pipeline route alteration; new landfall location, including trenching, at Ksi Lisims LNG Facility)	Changes in sediment and water quality	No change	No change
	Operation	No	No	No change	No change

4.8.3.2 Residual Effects

Residual effects of the Amendment on marine water quality, including the residual effects associated with the Ksi Lisims LNG Pipeline Connection landfall, are predicted to be reduced compared to the portion of the approved alignment that the Amendment components would replace. Residual effects include a change in water quality (toxicity), but to a lesser extent than the approved alignment because the Amendment would lessen the overall Project footprint, the duration of construction, and the spatial extent of maintenance and inspection activities during operation.

4.8.3.3 Changes to Characterization of Residual Effects

Based on information for marine water quality available for the Amendment that was included in the Application, combined with additional information from the Ksi Lisims LNG Facility baseline studies, the proposed Amendment changes, and existing mitigations as described in the CEMP(s) (PRGT 2016a, PRGT 2017) and approved management plans, no changes to the characterization of residual effects are anticipated. Predicted residual effects on marine water quality were previously assessed to be 'negligible to low' magnitude, restricted to the LAA, and short-term duration and reversible. With the implementation of mitigation measures, residual effects on marine water quality are not expected to result in toxicity risk to aquatic life. Predicted Project residual effects for the Amendment components are consistent with the Application, with the potential for some reduction due to the reduced spatial extents. Therefore, Project effects for the Amendment components on marine water quality are consistent with the EAO Assessment Report.

With respect to the predicted effects on marine water quality, the residual effects conclusions presented in the EAO Assessment Report are unchanged as a result of the Amendment. A detailed comparison of the EAO Assessment Report conclusions and proposed Amendment residual effects is presented below in Table 4.20.

Table 4.20 Changes to EAO Assessment Report Characterization of Residual Effects – Marine Water Quality

Characterization of Residual Effects from the 2014 EAO Assessment Report[1]			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 to effects characterization. Note regulator now BCER, not OGC.
Extent	Local	Substantive impacts beyond the LAA are not anticipated.	No change. The overall area of the LAA is decreased as a result of the Amendment.
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 to effects characterization. Note regulator now BCER, not OGC.
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

Note:

[1] Marine water quality was assessed with freshwater water quality in the EAO Assessment report and were not separated in the characterization table. The text has been unaltered and as a result this text contains elements related to freshwater crossings.

TSS = total suspended solids

Source: EAO 2014a

4.8.3.4 Cumulative Effects

Cumulative effects for water quality are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

With the proposed Amendment, which will have less interaction with past, present, and reasonably foreseeable projects and activities as compared to the Application, cumulative effects on water quality are predicted to be consistent with the EAO Assessment Report.

4.8.3.5 Risks and Data Uncertainty

The proposed Amendment reduces adverse effects on water quality due to a reduction in the number of entrance/exits that require dredging/excavation and a reduction in overall marine pipeline length. Additional information collected as part of the Ksi Lisims LNG Facility baseline programs was reviewed and results were consistent with those reported for the portion of the PRGT route in the Nass Area. Limited data are available for the marine portion of the Ksi Lisims LNG Pipeline Connection; however, this section is planned to be surface laid and would have limited potential for effects on water quality.

The level of uncertainty for predicted effects on water quality, including uncertainty related to where the Ksi Lisims LNG Pipeline Connection is anticipated to make landfall, is considered low due to 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. As the uncertainty in this prediction is not high, no additional risk analysis is necessary.

4.9 Section 25 Matters

While the Project was assessed under the *Environmental Assessment Act* (2002), the 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 (EAO 2014c), considered as part of PRGT's 2014 Application, and relevant findings were presented in the EAO's Assessment Report. A summary of these matters and how they are considered in the context of the Amendment is included in Table 4.21.

Table 4.21 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 *Constitution Act, 1982*	The Application (PRGT 2014a) and the EAO's Assessment report were assessed under the *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. Relevant to the Amendment, this included Nisga'a Nation, Lax Kw'alaams Band, Metlakatla First Nation, Kitsumkalum First Nation, Kitselas First Nation, and Gitxaała Nation. The potential changes to the interests of these Indigenous nations as a result of the Amendment are assessed for each of these nations within sub-sections of section 5 of the Amendment.
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	Positive and negative direct and indirect effects of the proposed Amendment on environmental, economic, social, cultural and health VCs are assessed in Sections 4.3 through 4.8, following the methods and approach outlined in Sections 4.1 and 4.2. The Application (PRGT 2014a) considered both adverse and positive effects; however, negative direct and indirect effects were the primary focus of the assessments for all VCs. Cumulative effects assessments were completed for all VCs. Section 2.5 of the EAO's Assessment Report discussed the benefits (positive effects) of the Project including: • Construction: 8,500 person-years of direct employment, and support almost 37,000 person-years on indirect employment. • Operation: support the natural gas exploration and production sector in northeastern BC (upstream activities), create 68 full-time direct and indirect jobs in BC, payment of taxes to local, provincial and federal governments. • Social Benefits (construction and operation): Generate social benefits to local and Indigenous communities, such as training, education and employment opportunities for unemployed and underemployed individuals, and increased availability of funds for government programs. The proposed Amendment is not expected to affect these benefits and as such has not been assessed further (Table 4.1). However, it is noted that the proposed changes to the Project will enable the positive effects and benefits identified in the environmental assessment certificate application for the Ksi Lisims LNG Facility, as that project requires a supply of sweet natural gas to be viable. The Amendment itself has several environmental benefits. Changes associated with the Nass Bay Route and Nass Bay Approach have several environmental benefits: 1) avoids crossing the isthmus between kilometre post (KP) 756 and 757 avoiding wetlands and heritage sites; 2) removes the requirement for the Nass Harbour Jetty, and; 3) reduces the area of intertidal marine habitat disturbed during construction. The Nass Bay Route also avoids a parcel of land at the isthmus owned by Nisga'a Lisims Government (defined in the Nisga'a Final Agreement as the Echo Cove Fee Simple Site, Category B lands). The Ksi Lisims LNG Pipeline Connection reduces the length of marine pipeline by approximately 100 km, and if constructed would avoid trenching on Flora Bank and landfall on Lelu Island in Prince Rupert.

Section	Assessment Matter	Relevance and Rationale
25(2)(b)	Risks and uncertainties associated with those effects, including the results of any interaction between effects	The characterization of effects within the Application (PRGT 2014a) included the identification of likelihood and confidence for each effect within each VC chapter. In addition, a significance determination was provided. These effects characterization descriptors and the significance determination inherently incorporated the assessor's consideration of risks and uncertainties. Assumptions used for the assessment were presented 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. Changes to risk and uncertainty associated with the Amendment are identified within Sections 4 and 5 of the Amendment, where applicable.
25(2)(c)	Risks of malfunctions or accidents	The Application (PRGT 2014a) included an assessment of accidents and malfunctions. No changes to the assessment of accidents and malfunctions are expected as a result of the Amendment, and therefore it is not discussed further.
25(2)(d)	Disproportionate effects on distinct human populations, including populations identified by gender	The Application (PRGT 2014a) was assessed under the *Environmental Assessment Act* (2002) where disproportionate effects on distinct human populations, including populations identified by gender was not required. Except for the potential disproportionate effects on Indigenous subpopulations, no new or additional potential interactions or effects specific to distinct human populations, including gender, are expected to occur as a result of the Amendment.
25(2)(e)	Effects on biophysical factors that support ecosystem function	The effects on biophysical factors that support ecosystem function are assessed in Section 4.9.1 and take into consideration the findings of the VC assessments in Sections 4.3 to 4.8 of the Amendment.
25(2)(f)	Effects on current and future generations	The changes to the Project identified in the 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, it is noted that the EAO's Assessment Report identified operational jobs and social benefits as positive effects of the Project. These are expected to have positive effects on current and future generations, in particular for citizens of NLG.

Section	Assessment Matter	Relevance and Rationale
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	Section 23 (Land and Resource Use) of the Application considered land use plans both in the overview of existing conditions and effects assessment. In the existing conditions section of the EAC Application, an overview of government and Indigenous land use planning documents was provided, including: • Land and Resource Management Plans • Indigenous Land Use Planning • Official Community Plans Section 7.2.3 of the EAO's Assessment Report 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. The most relevant land-use plans for the Amendment include: • North Coast Land and Resource Management Plan • Nisga'a Final Agreement • Regional District of Kitimat-Stikine land-use zoning The proposed changes in the Amendment do not require a zoning charge and are permissible when the defined mitigation measures are applied, and appropriate permits are obtained. This is consistent with the findings of the Application and the EAO's Assessment Report. As a result, section 25(g) is not considered further with respect to the proposed Project changes.
25(2)(h)	Greenhouse gas emissions, including the potential effects on the province being able to meet its targets under the *Greenhouse Gas Reduction Targets Act*	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 and Chapter 5.3 of the EAO's Assessment Report concluded significant adverse effects regarding greenhouse gas emissions during operations. The revisions to the Project considered in the Amendment will reduce the marine pipeline length by approximately 100 km. As a result, greenhouse gas emissions are anticipated to be comparable to what was assessed in the Application (Section 6) and EAO's Assessment Report (Section 5.3). As such, the conclusion of significant residual effects in the EAO Assessment Report remain unchanged for greenhouse gas emissions.
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	The Amendment does not change the Application 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's Assessment Report the Application and Certified Project Description (Section 1.0 of the Application [PRGT 2014a]) include a number of alternative routes and construction methods.

Section	Assessment Matter	Relevance and Rationale
25(2)(j)	Potential changes to the reviewable project that may be caused by the environment	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's Assessment Report. Mitigation measures (e.g., engineering design standards) identified in the Application are applicable to the proposed changes in the Amendment. No changes to the EAO's assessment are expected as a result of the Amendment and no new mitigation measures are proposed. As a result, effects of the environment on the Project are not discussed further.
25(2)(k)	Other prescribed matters	There are no other prescribed matters for consideration.

4.9.1 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 Application. The following assessment (Table 4.22) uses the framework established in Appendix 1 (Ecosystem Function Scoping Tool) with the Effects Assessment Policy Version 1.0 (EAO 2020a) to consider the effects of the changes proposed in the Amendment on those factors. The mitigation measures set out in the CEMP(s) (PRGT 2016a, PRGT 2017) and the additional mitigation measures proposed in the Amendment are predicted to reduce and avoid adverse effects in a manner that maintains fully functional ecosystem functions.

Table 4.22 Assessment of Biophysical Factors, Potential Interactions, and Valued Components Assessments

Possible Interaction	Key Consideration	Description of Potential Interaction/ Rationale for Exclusion	Valued Components
Habitats Supporting Ecosystem Function Category			
☒	Could the proposed changes to the Project cause impacts to ecosystems that provide unique or critical habitats that support ecosystem function?	The proposed Ksi Lisims LNG Pipeline Connection to Wil Milit on Pearse Island will cross DFO IAs for eulachon, pollock, and tanner crab (Rubidge et al. 2018). Important Areas do not have any specific regulatory protections or other status but reflect the value of the areas for these species. The Nass Bay Route intersects one red-listed ecological community, an estuarine marsh at the entrance and exit of the bay, and a blue-listed ecological community in the area just beyond the CPC. However, this Route Alternative will have several benefits over the approved route including avoiding: impacts to the isthmus at Nass Harbour; crossing of Flewin Creek and four wetlands; and impacts on a red-listed Sitka spruce salmonberry community and two sub-populations of flowering quillwort (*Lilaea scilloides*). There are no mapped habitats that contain the biophysical attributes of terrestrial critical habitat within the terrestrial portions of the Amendment.	Marine Resources Vegetation and Wetland Resources Wildlife and Wildlife Habitat
☒	Could the proposed changes to the Project cause impacts to potential or listed ecological communities?	The Nass Bay Route intersects one red-listed ecological community, an estuarine marsh at the entrance and exit of the bay, and a blue-listed ecological community in the area just beyond the CPC. However, the Nass Bay Route will have several benefits over the approved route including avoiding: impacts to the isthmus at Nass Harbour; crossing of Flewin Creek and four wetlands; and, impacts on a red-listed Sitka spruce salmonberry community and two sub-populations of flowering quillwort (*Lilaea scilloides*).	Vegetation and Wetland Resources

Possible Interaction	Key Consideration	Description of Potential Interaction/ Rationale for Exclusion	Valued Components
☐	Could the proposed changes to the Project make an ecosystem more susceptible to change?	The proposed changes to the Project will not increase potential edge effects in the terrestrial environment from those effects that would be induced by the Project as approved. The Nass Bay Route is predicted to increase total suspended solids in the marine environment during construction, but this would be a temporary effect and occurs in an area where local ecosystem is adapted to seasonal increases in suspended sediments due to sediment deposition from the Nass River during freshet and major storm events.	Marine Resources Vegetation and Wetland Resources Wildlife and Wildlife Habitat Marine Water Quality Freshwater Quality, Hydrology
Habitat Patches Category			
☐	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 changes to the Project will not create any new barriers to fish or wildlife movement nor will they increase the magnitude of effects that were considered in the assessment of the Project as approved.	Wildlife and Wildlife Habitat Freshwater Fish and Fish Habitat Marine Resources
☐	Is there the potential for habitats to be isolated and/or fragmented by the Project?	The proposed changes to the Project are not predicted to result in changes to potential isolation or fragmentation of terrestrial or marine ecosystems from those considered in the assessment of the Project as approved.	Vegetation and Wetland Resources Wildlife and Wildlife Habitat Freshwater Fish and Fish Habitat Marine Resources
☒	Will there be Project effects to ecological corridors or key habitats in a migration route due to the proposed changes?	The western portion of the Project lies within areas that are used by migratory birds and fish. The proposed changes to the pipeline route do not interact with migratory bird sanctuaries, but overlap DFO IAs for eulachon, pollock, and tanner crab. Five species of Pacific salmon species migrate past Nasoga Gulf, Portland Inlet, Portland Canal and Nass Bay on their way to and from the Nass River and other spawning rivers and streams in the region. These migrations are not expected to be disrupted by the Project. The terrestrial footprint does not interact with migration corridors or key habitats within a migration route. The proposed changes to the Project would only have limited interactions with local migrations of birds, mammals, amphibians through the wildlife and wildlife habitat LAA.	Wildlife and Wildlife Habitat Freshwater Fish and Fish Habitat Marine Resources

Possible Interaction	Key Consideration	Description of Potential Interaction/ Rationale for Exclusion	Valued Components
Natural Disturbance Regimes Category			
☐	Could natural disturbance regimes be altered as a result of the proposed changes to the Project (e.g., fire suppression, flood control, forest clearing)?	The natural disturbance regime of the forest ecosystem within the assessment boundaries is Natural Disturbance Type 1, which has stand-replacing disturbance every 250 years or greater. The Project is not expected to alter this disturbance regime. The Project is not expected to alter wetland functions, hydrology, or slope stability to the extent that it would alter natural disturbance regimes such as flooding, erosion, fires, or landslides.	Freshwater Quality, Hydrology Vegetation and Wetland Resources
☒	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 sea level, affect the severity and frequency of storms on the north coast, and increase the intensity of dry and wet periods. These may exacerbate the effects of the environment on the project that were assessed in Section 10.2 of the EAO's Assessment Report and any resulting effects on the environment. Engineering design of the pipeline has included consideration of effects of climate change. With respect to the proposed changes to the Project, coastal areas of northern British Columbia are expected to be some of the areas least affected by climate change.	Water Quality Vegetation and Wetland Resources
Structural Complexity Category			
☒	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?	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. However, there are no mapped habitats that contain the biophysical attributes of terrestrial critical habitat with the terrestrial portions of the Amendment. Disturbance of intertidal areas within the marine resources LAA could result in reduced availability of stopover foraging habitat for shorebirds during migration. However, the effect will be local in geographic extent and the proposed changes to the Project do not occur within an Important Bird Area. The Project is not expected to affect features in the marine environment that are important to key life stages of marine fish or marine mammals.	Wildlife and Wildlife Habitat Marine Resources

Possible Interaction	Key Consideration	Description of Potential Interaction/ Rationale for Exclusion	Valued Components
☒	Could the proposed changes to the Project cause a reduction in the structural complexity of an ecosystem?	The proposed Nass Bay Route would add a comparatively small terrestrial area (approximately 0.2 ha) outside of the CPC near the pipeline entry into Nass Bay. The alternative route will affect one red-listed ecological community, an estuarine marsh at the entrance and exit of the bay, and a blue-listed ecological community in the area just beyond the CPC. However, the Nass Bay Route will have several benefits over the approved route including avoiding: crossing of Flewin Creek and four wetlands; and, impacts on a red-listed Sitka spruce salmonberry community and two sub-populations of flowering quillwort (*Lilaea scilloides*).	Vegetation and Wetland Resources Wildlife and Wildlife Habitat
☒	As a result of the changes to the Project, will an ecosystem be managed to a certain seral stage?	Maintenance activities along the terrestrial portion of the RoW will keep the vegetation community in an herbaceous or shrub state; vegetation management is limited to a portion of the terrestrial RoW during operation.	Vegetation and Wetland Resources
Hydrologic or Oceanographic Patterns Category			
☐	Could hydrologic patterns and/or flow be altered by the Project	There are no operational consumptive water requirements for the Project and maintaining drainage across the terrestrial RoW is a key mitigation measure. As a result, hydrologic patterns and/or stream flows will not be affected.	Freshwater Quality, Hydrology
☐	Could oceanographic patterns be altered by the Project?	The proposed changes to the Project are not predicted to have any affect on oceanographic patterns.	
Nutrient Cycling Category			
☐	Will the Project result in an input of nutrients into the ecosystem (for example, waste discharges)?	There are no effluent or atmospheric discharges from the proposed changes to the Project that would affect the input of nutrients into the ecosystem.	Water Quality Freshwater Fish and Fish Habitat Marine Resources
☒	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 proposed changes to the Project will require clearing and grading of the RoW and new disturbance of sediments in Nass Bay and the marine pipeline landing at Wil Milit on Pearse Island. 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 and are predicted to be fully mitigated within five years of construction after vegetation is reestablished on the RoW and temporary workspaces. Disturbance of the seabed in Nass Bay (and associated suspended sediments) would be limited to the construction period and the year afterwards as the work area stabilizes.	Marine Resources Freshwater Fish and Fish Habitat Water Quality

Possible Interaction	Key Consideration	Description of Potential Interaction/ Rationale for Exclusion	Valued Components
Purification Services Category			
☐	Could proposed changes to the Project discharges lead to accumulation of waste or chemicals in an ecosystem?	The proposed changes to the project do not include any effluent discharges.	Water Quality
Biotic Interactions Category			
☐	Could the Project have effects to keystone or foundation species that have the potential to alter ecosystems?	The proposed changes to the Project will not have any new effects or increase the magnitude of predicted effects on keystone or foundation species from those predicted in the EAO's Assessment Report.	Wildlife and Wildlife Habitat Freshwater Fish and Fish Habitat Marine Resources
☐	Could Project effects allow for invasive species to change ecosystem function?	The proposed changes to the Project will not have any new effects or increase the magnitude of predicted effects related to invasive species from those predicted in the EAO's Assessment Report.	Vegetation and Wetland Resources Marine Resources
☒	Will there be species impacts that could change predator prey dynamics?	The proposed changes to the Project will not have any new effects or increase the magnitude of predicted effects related to predator-prey dynamics from those predicted in the EAO's Assessment Report.	Wildlife and Wildlife Habitat
Population Dynamics Category			
☐	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.	Wildlife and Wildlife Habitat Marine Resources
Genetic Diversity Category			
☐	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.	Wildlife and Wildlife Habitat Marine Resources

4.9.2 Effects on Current and Future Generations

The *Environmental Assessment Act* (2002) did not consider how adverse or positive effects of the Project would be distributed across generations. For the purposes of the Amendment, a generation is defined as 20 years and therefore effects of the Project are expected to be distributed across two generations. This matter is considered within the context of sustainable development within the Province of British Columbia.

The EAO's Assessment Report considered the potential adverse environmental, economic, social, heritage and health effects of the Project through the assessment of 16 VCs. It also considered the requirements set out in Chapter 10 of the Nisga'a Final Agreement, including potential adverse environmental effects on residents of Nisga'a Lands, Nisga'a Lands, and Nisga'a interests, as well as effects on the existing and future economic, social and cultural well-being of Nisga'a citizens. In consideration of PRGT's proposed mitigations and the conditions of approval set out in the EAC, the EAO concluded that no direct or indirect significant adverse effect were predicted, with the exceptions of significant adverse effects to GHG emissions and caribou. The effects identified with the construction phase of the Project are expected to be mitigated during construction or shortly after the start of operation. As a result, these effects are not predicted to be distributed temporally across generations. As discussed in the Amendment, the proposed changes do not interact with caribou and do not alter the greenhouse gas emissions from the Project and these are anticipated to be comparable to what was assessed in Section 5.3 of the EAO's Assessment Report (EAO 2014a).

Section 2.5 of the Assessment Report identified benefits of the Project including economic benefits from construction, economic benefits from operation, contributions to business development, and community and social benefits. In addition, the Assessment Report discussed socio-economic benefits for Aboriginal Groups and Nisga'a Nation. It is the economic benefits from operation, contributions to business development, and community and social benefits that are expected to occur throughout the lifetime of the Project and therefore have effects on current and future generations. The primary change to these benefits that is related to the Amendment is the proposed end point alternative for the pipeline at Wil Milit on Pearse Island to supply natural gas to the Ksi Lisims LNG Facility.

This change supports Nisga'a Nation's objective of participating and becoming leaders in the LNG industry as a partner in the Ksi Lisims LNG Facility. This partnership will advance economic reconciliation and self-determination for Nisga'a Nation. Revenue, taxes, and funding that flow to Nisga'a Lisims Government and other Indigenous nations from PRGT and Ksi Lisims will support their respective governments to advance policies and financially support priorities that will benefit the lives and health of their communities over the 40-year lifespan of the Project. This in turn will bring economic and social benefits to these communities.

5 Assessment of Potential Effects on Indigenous Interests

Under section 25(1) of the *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 *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 Project's Section 11 Order. This included Nisga'a Nation, Lax Kw'alaams Band, Metlakatla First Nation, Kitsumkalum First Nation, Kitselas First Nation, and Gitxaała Nation. Additional Indigenous nations were also listed in 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 Amendment. For the purpose of this assessment Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation and their ability to exercise their Indigenous interests is assessed in Section 5.1 and Nisga'a Nation is assessed in Section 5.2.

Section 35 of the *Constitution Act,* 1982 recognizes and affirms existing Indigenous 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 Project may hold asserted or established Indigenous rights in the Project area. This assessment includes consideration for all effects to interests or matters of importance that may be identified by each potentially affected Indigenous nation.

5.1 Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation

5.1.1 Methods

This section assesses how the proposed Project Amendment may affect the citizens, lands, and resources of Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation and their ability to exercise their Indigenous interests[5]. The proposed Amendment component and activities overlap the territories of Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band and Metlakatla First Nation, and the Gitxaała Nation interests includes a eulachon fishing station on the Nass River (Ksi Lisims LNG 2023i).

[5] As defined in the EAO's 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 2020a).

To complete this assessment, the following are discussed for Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation:

- Potential effects of the Amendment changes on Indigenous interests
- Summary of mitigation measures to avoid or reduce adverse effects on Indigenous interests
- Preliminary overview of the key interests and concerns of Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation identified during the Application, through consultation feedback, through Project-specific TLU studies, and through a review of the publicly available feedback provided by Indigenous nations engaged on the Ksi Lisims LNG Project, 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
- 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).

5.1.2 Indigenous Knowledge, Information Sources, Assumptions, and Limitations

PRGT understands that there is no universally accepted definition of Indigenous Knowledge, and that it is community-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 consulted 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.

The Application included a review and integration of applicable information from Project-specific TLU studies, land and marine use plans, or other written responses prepared by Metlakatla First Nation, Kitsumkalum First Nation, Kitselas First Nation, Lax Kw'alaams Band, and Gitxaała Nation, as well as consultation feedback and information identified through a literature review of publicly available information. In addition to these sources, this assessment Amendment considers key interests and concerns identified through a review of the publicly available feedback provided by Indigenous nations engaged on the Ksi Lisims LNG Project.Project-specific TLU studies and consultation feedback that have

been submitted by affected Indigenous nations to PRGT since the filing of the Application in 2014., Finally, rRelevant, publicly-available information considered in the Ksi Lisims LNG Project Indigenous interests assessments, including key interests and concerns, was reviewed in the context of understanding potential effects on Indigenous interests, including the Nass Bay area and where the Ksi Lisims LNG Pipeline Connection could make landfall. The landfall location will overlap with the Ksi Lisims LNG Project footprint component and comprise a comparatively small portion thereof.

The following TLU studies were prepared for the Project by affected Indigenous nations following the filing of the Application and have been reviewed and integrated into this amendment:

- Gitxaała Nation
  - Gitxaała Use Study for Port Edward Area LNG Projects (Calliou Group 2014a)
  - Gitxaała Valued Components Report. Port Edward Area LNG Projects (Calliou Group 2014b)
- Kitselas First Nation
  - Kitselas First Nation Traditional Use Study Analysis: Lelu Island and the North Coast of British Columbia (Pulla 2014)
- Kitsumkalum First Nation
  - Kitsumkalum Traditional Land Use Study (TLUS) Interim Report for TransCanada/Prince Rupert Gas Transmission Project (CCRM 2014a)
  - Kitsumkalum Traditional Land Use Study for TransCanada/Prince Rupert Gas Transmission Project (CCRM 2014b)
- Metlakatla First Nation
  - Metlakatla First Nation Traditional Land Use and Ecological Knowledge of TransCanada Pipelines Limited's Proposed Prince Rupert Gas Transmission Project Final Report (DMCS and MFN 2014)

Information shared by Indigenous nations has been considered in alignment with protocols and consent for its use and public disclosure was provided. The sources of information and Indigenous Knowledge used in describing background information and key interests and concerns were provided to Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation for review and comment. PRGT has received feedback from Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation about the Marine Route Alternative Amendment and the feedback has been reviewed and integrated, where appropriate, into the Amendment. Feedback received has been incorporated in the assessment of related environmental VCs, such as, marine resources (Section 4.3), vegetation and wetland resources (Section 4.4), wildlife and wildlife habitat (Section 4.5), human health (Section 4.6), and heritage and archaeological resources (Section 4.7).

Where feedback is not available, a conservative approach is taken, which assumes that Gitxaała Nation, Kitsumkalum First Nation, Kitselas First Nation, Lax Kw'alaams Band, and Metlakatla First Nation Interests exist 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. Gitxaała Nation, Kitsumkalum First Nation, Kitselas First Nation, Lax Kw'alaams Band or Metlakatla First Nation.

5.1.3 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 (Section 4) and considers how these effects could affect the ability of Indigenous nations to exercise their Indigenous interests. Table 4.1 outlines the VCs carried forward in this assessment and provides the rationale for why they are or are not carried forward for further assessment in the Amendment. Given the interactions identified in Table 4.1, and in consideration of the EAO's Assessment Report, potential interactions associated with the proposed changes to the Project include:

- Disruption of hunting
- Disruption of trapping
- Disruption of fishing
- Disruption of plant gathering
- 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 or cultural transmission
- Disruption of governance

At the time of submitting the Application, hunting, trapping, fishing, and plant gathering effects assessments were conservatively conducted 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 Indigenous interests because they are not as readily predicted.

Based on a review of Marine Route Alternative Amendment consultation feedback, Project-specific TLU studies submitted following the filing of the Application, and the information available publicly for the Ksi Lisims LNG Facility, PRGT recognizes that the list of project effects assessed as part of the Application may not be a fulsome representation of the interests of the Indigenous nations engaged on the Amendment. For example, interests in the offshore pipeline associated with the Ksi Lisims LNG Facility were raised and there is potential for a small interaction with where the Ksi Lisims LNG Pipeline Connection would make landfall on Pearse Island. Therefore, the Amendment has been updated to

consider 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 and marine use and transmit knowledge. This assessment also considers disproportionately distributed effects on subpopulations of Indigenous nations.

PRGT will continue to consult with Indigenous nations to identify interests and concerns with respect to the Amendment. Should new potential effects be identified during consultation with Indigenous nations, they will be assessed in the context of the Amendment.

5.1.4 Mitigation Measures

Mitigation measures to avoid or reduce potential adverse effects on Indigenous interests include those identified in the Application (PRGT 2014a) and the Conditions of Environmental Assessment Certificate #E14-06 (EAO 2014d). Key mitigation measures, commitments, and conditions include[6]:

- 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 will develop and 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.

[6] Some mitigation measures, commitments, and conditions have been abridged from the original sources to focus on aspects pertaining to Indigenous interests or have been edited for clarity (e.g., defining acronyms).

PRGT will implement a Social and Economic Effects Management Plan (SEEMP) (PRGT 2016c). The SEEMP includes specific actions to address the following:

- Planning and implementation for effective engagement with affected Indigenous nations, Nisga'a Nation, 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(s) (PRGT 2017, PRGT 2016a) developed in consultation with the relevant regulatory agencies, Nisga'a Nation, and Indigenous nations with the approval of EAO. A marine CEMP will also be developed in consultation with relevant regulatory agencies, Nisga'a Nation, and Indigenous nations.

PRGT must implement a construction monitoring program for Indigenous nations that provides opportunities for individuals of Indigenous nations to monitor Construction activities.

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 any plans for offsets on marine, aquatic, riparian, or in-stream values required by any relevant regulatory agency, for information sharing purposes prior to submission to the relevant regulatory agency
- Discuss the development of the CEMP(s), 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 traditional ecological knowledge (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 consulting 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.

5.1.5 Gitxaała Nation

5.1.5.1 Preliminary Overview of Gitxaała Nation Key Interests and Concerns

Through consultation feedback shared on the Marine Route Alternative Amendment, Gitxaała Nation stated that Nass Bay marine mammals and fish are of interest to the nation. Gitxaała Nation requested to be fully involved in the amendment discussions and construction methods to protect marine waters, including culturally sensitive areas and interests such as effects on a camp, eulachon run, whales, and commercial fishing as well as the consideration of tanker traffic and the potential for accidents.

Through a review of information considered in the Application, the Project-specific TLU study (Calliou Group 2014a), and publicly available information shared by Gitxaała Nation for the assessment of the Ksi Lisims LNG Facility, the following is a summary of Gitxaała Nation interests and concerns relevant to the Amendment area.

In the Application (Section 33.14 [PRGT 2014a]), key Indigenous interests and concerns identified by Gitxaała Nation included:

- Effects on marine and intertidal fish and fish habitat (for commercial, subsistence, recreational, and cultural purposes)
- Effects on harvesting rights
- Effects on cultural sites, sacred places, cultural identity
- Effects on marine protected areas

Species of importance to Gitxaała Nation are likely to be present in the Amendment area (Section 33.14 [PRGT 2014a]). Through the Project-specific TLU study, Gitxaała Nation reported that marine harvesting is an important practice for both sustenance and commercial purposes. The nation stated that members share harvested resources among community members and trade with partners (Calliou Group 2014a).

Specific locations relative to the Amendment area were not identified in the Application; however, as noted in Section 33.14 of the Application, Gitxaała Nation seaweed harvesting occurs along rocky shorelines (PRGT 2014a; JFKLC 2011). The Amendment route may intersect or be in close proximity to marine and terrestrial areas of importance to Gitxaała Nation.

Through a review of the information available publicly for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023i), Gitxaała Nation identified the following interests and concerns that may also pertain to the Amendment:

- Project planning and scope, including the onshore and offshore pipeline
- Emergency response planning
- Potential effects on Gitxaała Nation exercise of rights and interests, including:
  - Heritage sites
  - Harvesting, sensory disturbances, marine resources and health

- Disproportionately distributed effects
- Cumulative effects

Through their Project-specific TLU study (Calliou Group 2014), Gitxaała Nation previously expressed concerns about navigational safety along important travel routes as a result of the Project. Gitxaała Nation explained that wakes created by tanker traffic may also be an issue and might be a danger to smaller vessels when passing. The nation noted that marine traffic may also affect seaweed harvesting because seaweed is sensitive and may potentially be affected by wakes, especially during sensitive harvesting periods (Calliou Group 2014a; Calliou Group 2014b).

Concerns about the effects of loud noise under water on orca whales were previously raised by Gitxaała Nation members; members have observed orcas breaching when there is too much noise in the water. Similar concerns were raised by Gitxaała Nation members about noise affecting fish behaviour and crab migration (Calliou Group 2014a).

Gitxaała Nation members previously stated that citizens' food is harvested from the ocean, and expressed concerns about potential tanker accidents and the potential for effects on the nation. Gitxaała Nation members explained that chemicals have potential to release from pipes underwater, including pipeline coating, cement mix, and rust, which contaminate water and marine ecosystems (Calliou Group 2014a).

5.1.5.2 Residual Effects on Gitxaała Nation Indigenous Interests

Residual effects of the Amendment on Gitxaała Nation Indigenous 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 marine activities to temporarily affect marine navigability and access to important sites during construction. Additionally, PRGT acknowledges that Gitxaała Nation citizens may chose not to pursue their interests near project activities. Although the Amendment would reduce the overall Project footprint, the duration of construction activities, and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO's Assessment Report remain, which predicted negligible or minor impacts on Gitxaała Nation Indigenous Interests.

5.1.5.3 Changes to Characterization of Residual Effects on Gitxaała Nation Indigenous Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Gitxaała Nation's interests. Therefore, based on information available pertaining to Gitxaała Nation Indigenous interests that was included in the Application combined with the Project-specific TLU study and additional information identified through a review of the publicly available feedback provided by Gitxaała Nation on the Ksi Lisims LNG Facility, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application. Project residual effects on Gitxaała Nation Indigenous interests were characterized as low magnitude (low—moderate magnitude for fishing) and with the reduced length of the alignment as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 5.1 summarizes potential effects, mitigation, and residual effects for Gitxaała Nation Indigenous interests. No new Project effects (or effects pathways) were identified for the Amendment components. At the time of submitting the Application, Gitxaała Nation had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, gathering areas, sacred areas, cultural transmission, and governance. Gitxaała Nation had not identified any issues related to habitation areas; however, as described in Section 5.1.3, if habitation interests are identified by Gitxaała Nation with respect to the Amendment, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area.

As further information is shared through consultation, PRGT will review the information in the context of this analysis. PRGT acknowledges that although the footprint will be reduced by the Nass Bay Route and Ksi Lisims LNG Pipeline Connection, the route is being proposed through areas not previously discussed with Indigenous nations and there may be new Indigenous interests raised through consultation. In consideration of the predicted effects on Gitxaała Nation, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes.

Table 5.1 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Gitxaała Nation Indigenous Interests

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route in Nass Bay area; reduced terrestrial route; reduction in number of entrance/exit locations [four reduced to two])	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at Ksi Lisims LNG Facility)	No change	No change	No change
	Operations	No change	No change	No change	No change

5.1.5.4 Cumulative Effects

Cumulative effects for Gitxaała Nation Indigenous interests are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

PRGT will continue to consult with Gitxaała Nation to practically address any Project-specific issues related to cumulative effects on Indigenous interests. Information will be reviewed as it is received by Gitxaała Nation to determine if any additional mitigation measures are required.

5.1.5.5 Disproportionately Distributed Effects on Gitxaała Nation Indigenous Interests

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Gitxaała Nation's citizens in the following ways:

Reduced quality of marine and terrestrial harvesting experience or access to harvesting areas, which may disproportionately affect Gitxaała Nation citizens who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations

Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Gitxaała Nation citizens 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 Gitxaała Nation citizens 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 Gitxaała Nation citizens 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 consultation with Gitxaała Nation, PRGT aims to reduce these disproportionate effects.

5.1.5.6 Risks and Data Uncertainty

While this assessment takes into account 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 implementation of mitigation measures and EAC conditions, inclusive of monitoring and follow up programs, confidence in the assessment will increase as consultation with Gitxaała Nation advances. PRGT will continue to consult Gitxaała Nation to enhance the consideration of Gitxaała Nation's Indigenous interests and reduce uncertainty.

5.1.6 Kitselas First Nation

5.1.6.1 Preliminary Overview of Kitselas First Nation Key Interests and Concerns

Through consultation feedback shared on the Marine Route Alternative Amendment, Kitselas First Nation expressed concerns about effects on salmon and about cumulative effects.

Through a review of information considered in the Application in addition to the Project-specific TLU study (Pulla 2014) and a review of publicly available information shared by Kitselas First Nation for the assessment of the Ksi Lisims LNG Facility, the following is a summary of Kitselas First Nation Interests and concerns relevant to the Amendment area.

In the Application (Section 33.16 [PRGT 2014a]), key Indigenous interests and concerns identified by Kitselas First Nation included:

- Effects on marine harvesting, including vegetation and wildlife
- Effects on marine fish and fish habitat

Species of importance to Kitselas First Nation are likely to be present in the Amendment area (Section 33.16 [PRGT 2014a]).Specific locations relative to the Amendment area were not identified in Section 33.16 of the Application; however, the Amendment route may intersect or be in close proximity to marine and terrestrial areas of importance to Kitselas First Nation. In the Project-specific TLU study, Kitselas First Nation previously reported that the entire the mouth of the Nass River below Greenville and above Kincolith is considered an integral part of the traditional economic basis of the all the Tsimshian people, including Kitselas First Nation. Kitselas First Nation explained that the nation's oral history includes stories of members travelling to their eulachon fishery on Nass River by canoe and via the Kalum grease trail (Pulla 2014).

Kitselas First Nation previously reported that Somerville Island is a camping area where all the Tsimshian could stop on the way back from their eulachon fishery on Nass River. Kitselas First Nation stated that there are numerous campsites on Somerville Island; one area of importance included a sandy reef in a sheltered bay (Pulla 2014).

Through a review of the information available publicly for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023j), Kitselas First Nation identified the following interests and concerns that may also pertain to the Amendment:

- Project planning and scope, including the onshore and offshore pipeline, and interactions with the Kitselas eulachon village lax'a'tə (south shore at the mouth of the Nass River)
- Onshore and offshore accidents and malfunctions
- Implementation of Kitselas First Nation laws, customs, and protocols
- Potential impacts on Kitselas First Nation's ability to exercise rights and interests, including:
  - The Ksi Lisims LNG Facility assessment not acknowledging existing cumulative impacts
  - Stewardship
  - Access to clean air, water, lands, resources and preferred sites for peaceful enjoyment, harvesting and cultural and spiritual practice within Kitselas First Nation territory
  - Revitalization, development, and transmission of knowledge, histories, and traditions
  - Cultural, historical and heritage connection to the North Coast region
  - Continued ability to exercise land-based and marine-based rights

- Changes to navigation, safety, and open water, coastal, or intertidal harvesting
- Marine, terrestrial and human health cumulative effects along the coast from the Port of Prince Rupert to Pearse Island, which have already resulted in reduced ability to access and harvest resources to the necessary extent

Through the Project-specific TLU study (Pulla 2014), Kitselas First Nation expressed concern about risks to coastal resource sustainability and stated that it is important to remember that coastal resources are not just harvested recreationally by Kitselas First Nation; resources also play a significant role as part of Kitselas First Nation's traditional food fishery, and commercial fishing operations are essential for Kitselas First Nation's economy. Kitselas First Nations citizens previously expressed concern about continued access to resources. Kitselas First Nation also expressed concerns about increasing commercial shipping traffic, and the potential effects of anchoring large ships at the proposed site on commercial, food, and recreational harvesters, resource sustainability, and navigation routes (Pulla 2014).

5.1.6.2 Residual Effects on Kitselas First Nation Indigenous Interests

Residual effects of the Amendment on Kitselas First Nation Indigenous 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 marine activities to temporarily affect marine navigability and access to important sites during construction. Additionally, PRGT acknowledges that Kitselas First Nation citizens may chose not to pursue their interests near project activities. Although the Amendment would lessen the overall Project footprint, the duration of construction activities, and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO's Assessment Report remain, which predicted negligible or minor impacts on Kitselas First Nation Indigenous Interests.

5.1.6.3 Changes to Characterization of Residual Effects on Kitselas First Nation Indigenous Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Kitselas First Nation's interests. Therefore, based on information available pertaining to Kitselas First Nation Indigenous interests that was included in the Application combined with the Project-specific TLU study and additional information identified through a review of the publicly available feedback provided by Kitselas First Nation on the Ksi Lisims LNG Facility, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application. Project residual effects on Kitselas First Nation Indigenous interests were characterized as low magnitude (low—moderate magnitude for fishing) and with the reduced length of marine pipeline as a result of this Amendment, effects are predicted to remain the same or be slightly reduced.

Table 5.2 summarizes potential effects, mitigation, and residual effects for Kitselas First Nation Indigenous interests. No new Project effects (or effects pathways) were identified for the Amendment components. At the time of submitting the Application, Kitselas First Nation had identified interests and issues related to hunting, trapping, fishing, and plant gathering. Kitselas First Nation had not identified any issues related to trails and travelways, habitation areas, gathering areas, sacred areas, cultural

transmission, or governance; however, as described in Section 5.1.6.1, additional interests have been identified by Kitselas First Nation. As described in Section 5.1.3, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area.

As further information is shared through consultation, PRGT will review the information in the context of this analysis. PRGT acknowledges that although the footprint will be reduced by the Nass Bay Route, the route is being proposed through areas not previously discussed with Indigenous nations and there may be new Indigenous interests raised through consultation. In consideration of the predicted effects on Kitselas First Nation, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes.

Table 5.2 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Kitselas First Nation Indigenous Interests

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route in Nass Bay area; reduced terrestrial route; reduction in number of entrance/exit locations [four reduced to two])	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at Ksi Lisims LNG Facility)	No change	No change	No change
	Operations	No change	No change	No change	No change

5.1.6.4 Cumulative Effects

Cumulative effects for Kitselas First Nation Indigenous interests are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

PRGT will continue to consult with Kitselas First Nation to practically address any Project-specific issues related to cumulative effects on Indigenous interests. Information will be reviewed as it is received by Kitselas First Nation to determine if any additional mitigation measures are required.

5.1.6.5 Disproportionately Distributed Effects on Kitselas First Nation Indigenous Interests

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Kitselas First Nation's citizens in the following ways:

- Reduced quality of marine and terrestrial harvesting experience or access to harvesting areas, which may disproportionately affect Kitselas First Nation citizens who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Kitselas First Nation citizens 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 Kitselas First Nation citizens 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 Kitselas First Nation citizens 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 consultation with Kitselas First Nation, PRGT aims to reduce these disproportionate effects.

5.1.6.6 Risks and Data Uncertainty

While this assessment takes into account 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 implementation of mitigation measures and EAC conditions, inclusive of monitoring and follow up programs, confidence in the assessment will increase as consultation with Kitselas First Nation advances. PRGT will continue to consult Kitselas First Nation to enhance the consideration of Kitselas First Nation's Indigenous interests and reduce uncertainty.

5.1.7 Kitsumkalum First Nation

5.1.7.1 Preliminary Overview of Kitsumkalum First Nation Key Interests and Concerns

Through consultation feedback shared on the Marine Route Alternative Amendment, Kitsumkalum First Nation expressed concern about potential effects on ground and commercial fishing and the nation's continued ability to fish. Potential effects on commercial fishing will be addressed in the Marine Access and Traffic Management Plan, per Condition 5 of the Environmental Assessment Certificate, and will also address the requirements for a Fisheries Interaction Plan per Condition 6 of the Environmental Assessment Certificate. With respect to ground fishing, PRGT has also developed a Crab Movement Mitigation and Monitoring Plan as part of satisfying Condition 8 of the Environmental Assessment Certificate.

Through feedback received on the 2016 draft Amendment for the Nass Bay Route, as well as a review of information considered in the Application, the Project-specific TLU study (CCRM 2014a; CCRM 2014b), and publicly available information shared by Kitsumkalum First Nation for the assessment of the Ksi Lisims LNG Facility, the following is a summary of Kitsumkalum First Nation Interests and concerns relevant to the Amendment area.

In the Application (Section 33.17 [PRGT 2014a]), key Indigenous interests and concerns identified by Kitsumkalum First Nation included:

- Effects on fish and fish habitat
- Effects on access to fishing
- Effects on marine mammals and migrating fauna
- Effects on important cultural sites in the marine environment

Species of importance to Kitsumkalum First Nation are likely to be present in the Amendment area (Section 33.17 [PRGT 2014a]) and the Amendment route may intersect or be in close proximity to marine and terrestrial areas of importance to Kitsumkalum First Nation. Kitsumkalum First Nation eulachon fishing areas identified in Section 33.17 include but are not limited to Nass River (PRGT 2014a; Tobey 1990). Through the Project-specific TLU study, Kitsumkalum First Nation previously reported that the eulachon fishery on Nass River attracted thousands of Tsimshian, Tlingit, Haida, and other Indigenous people annually to come together to harvest eulachon grease, and currently eulachon is listed

as a threatened species. Kitsumkalum First Nation stated that is it important that the habitat required for this fishery be restored and further destruction halted (CCRM 2014a).

Kitsumkalum First Nation previously identified Portland Inlet and Nass River as important habitat for multiple harvested fish and marine wildlife species, which are harvested for consumption and commercial purposes. Kitsumkalum First Nation reported that Nation citizens require fish permits for the fishery in order to monitor eulachon, gill net, saltwater, and rod and reel fishing in an effort to regulate declining resources that were once enough to support the nation (CCRM 2014a).

In response to the 2016 draft Amendment for the Nass Bay Route, Kitsumkalum First Nation stated that the Nass Bay area is used for anchorage, particularly when the weather is rough, and moving the route north could create further hazards and anchorage challenges for vessels. Kitsumkalum First Nation is interested in further discussions about the potential changes to their ability to anchor in Nass Bay.

Also in response to the 2016 draft Amendment for the Nass Bay Route, Kitsumkalum First Nation expressed interest in Nasoga Gulf, stating that it is associated with traditional stories and used as a camp and resource collection area.

In response to the 2016 draft Amendment for the Nass Bay Route, Kitsumkalum First Nation advised that the Nass Bay area is used for crab and halibut harvesting, for both food and commercial purposes. They also advised that it contains eulachon habitat. Kitsumkalum First Nation is interested in additional discussions on the potential changes to these resources, including migration, mating, and harvest, and the mitigation measures that will be applied in response. In addition, the Crab Movement Mitigation and Monitoring Plan has been developed, as part of EAC Condition 8 (EAO 2014d).

Through a review of the information available publicly for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023k), Kitsumkalum First Nation identified the following interests and concerns that may also pertain to the Amendment:

Project planning and scope, including the onshore and offshore pipeline, and commercial and community fishing opportunities

Potential impacts on Kitsumkalum First Nation's ability to practice Section 35 rights, including:

- Loss of commercial fishing opportunities in the Portland Canal, Portland Inlet, and surrounding areas, including impacts from increased underwater linear development
- Impacts to community food security, particularly for vulnerable and off-reserve populations
- Effects on livelihood and the cumulative effects of historical and ongoing development, including loss of access to Indigenous land and marine use areas, loss of sense of place and opportunities for cultural knowledge transmission

Through the Project-specific TLU study, Kitsumkalum First Nation previously expressed concerns that the Project will affect traditional gathering sites and fishing sites along the pipeline. Kitsumkalum First Nation reported that the potential environmental effects of greatest concern include effects resulting from disposal of dredged material at sea, effects on navigation, and effects on fish and fish habitat. Additional concerns were expressed related to on-site land disposal and effects on whales from vessel collisions. Kitsumkalum First Nation is also concerned that the large scale of the liquid natural gas industry on the

northwest coast will affect the use and access to coastal areas for future generations. Kitsumkalum First Nation explained that sensorial changes (including noise and visual aesthetics) and Project effects on citizens' sense of place may create anxiety among Kitsumkalum First Nation citizens, which can affect the use of and access to the Project study area and traditional resources that are part of the nation's seasonal harvests (CCRM 2014a; CCRM 2014b). The nation previously stated that fish harvesting and trade was and continues to be an important cultural component and access to a diverse number of terrestrial and marine resources results in cultural continuity, connection to the land and water, and allows for the continuing practice of sharing during community gatherings and traditional feasts. Kitsumkalum First Nation reported that without land and resources, a sustainable community is not possible (CCRM 2014a).

5.1.7.2 Residual Effects on Kitsumkalum First Nation Indigenous Interests

Residual effects of the Amendment on Kitsumkalum First Nation Indigenous 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 marine activities to temporarily affect marine navigability and access to important sites during construction. Additionally, PRGT acknowledges that Kitsumkalum First Nation citizens may chose not to pursue their interests near project activities. Although the Amendment would lessen the overall Project footprint, the duration of construction activities, and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO's Assessment Report remain, which predicted negligible or minor impacts on Kitsumkalum First Nation Indigenous Interests.

5.1.7.3 Changes to Characterization of Residual Effects on Kitsumkalum First Nation Indigenous Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Kitsumkalum First Nation's interests. Therefore, based on information available pertaining to Kitsumkalum First Nation Indigenous interests that was included in the Application combined with the Project-specific TLU study and additional information identified through a review of the publicly available feedback provided by Kitsumkalum First Nation on the Ksi Lisims LNG Facility, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application. Project residual effects on Kitsumkalum First Nation Indigenous interests were characterized as low magnitude (low to moderate magnitude for fishing) and with the reduced length of the alignment as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 5.3 summarizes potential effects, mitigation, and residual effects for Kitsumkalum First Nation Indigenous interests. No new project effects (or effects pathways) were identified for the Amendment components. At the time of submitting the Application, Kitsumkalum First Nation had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, gathering areas, and sacred areas. Kitsumkalum First Nation had not identified any issues related to cultural transmission or governance; however, as described in Section 5.1.7.1, additional interests have been identified by Kitsumkalum First Nation. As described in Section 5.1.3, it is anticipated that the

residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area.

As further information is shared through consultation, PRGT will review the information in the context of this analysis. PRGT acknowledges that although the footprint will be reduced by the Nass Bay Route, the route is being proposed through areas not previously discussed with Indigenous nations and there may be new Indigenous interests raised through consultation. In consideration of the predicted effects on Kitsumkalum First Nation, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes.

Table 5.3 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Kitsumkalum First Nation Indigenous Interests

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route in Nass Bay area; reduced terrestrial route; reduction in number of entrance/exit locations [four reduced to two])	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at Ksi Lisims LNG Facility)	No change	No change	No change
	Operations	No change	No change	No change	No change

5.1.7.4 Cumulative Effects

Cumulative effects for Kitsumkalum First Nation Indigenous interests are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

PRGT will continue to consult with Kitsumkalum First Nation to practically address any Project-specific issues related to cumulative effects on Indigenous interests. Information will be reviewed as it is received by Kitsumkalum First Nation to determine if any additional mitigation measures are required.

5.1.7.5 Disproportionately Distributed Effects on Kitsumkalum First Nation Indigenous Interests

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Kitsumkalum First Nation's citizens in the following ways:

- Reduced quality of marine and terrestrial harvesting experience or access to harvesting areas, which may disproportionately affect Kitsumkalum First Nation citizens who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Kitsumkalum First Nation citizens 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 Kitsumkalum First Nation citizens 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 Kitsumkalum First Nation citizens 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 consultation with Kitsumkalum First Nation, PRGT aims to reduce these disproportionate effects.

5.1.7.6 Risks and Data Uncertainty

While this assessment takes into account 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 implementation of mitigation measures and EAC conditions, inclusive of monitoring and follow up programs, confidence in the assessment will increase as consultation with Kitsumkalum First Nation advances. PRGT will continue to consult Kitsumkalum First Nation to enhance the consideration of Kitsumkalum First Nation's Indigenous interests and reduce uncertainty.

5.1.8 Lax Kw'alaams Band

5.1.8.1 Preliminary Overview of Lax Kw'alaams Band Key Interests and Concerns

Through consultation feedback, as well as a review of information considered in the Application and a review of publicly available information shared by Lax Kw'alaams Band for the assessment of the Ksi Lisims LNG Facility, the following is a summary of Lax Kw'alaams Band Interests and concerns relevant to the Amendment area.

Following a review of the CEMP (PRGT 2016a), Lax Kw'alaams Band stated that the approved route connecting to Lelu Island had the potential for affecting eelgrass beds during construction activities and expressed interest in understanding if the Amendment Route will avoid effects on the eelgrass beds near Lelu Island. Lax Kw'alaams Band also noted that Flora Bank could be affected by the route combined with the proposed PNW LNG project trestle; the PNW LNG project trestle and its associated EAC were cancelled and will not be proceeding. Additionally, the Ksi Lisims LNG Pipeline Connection addresses this interest by avoiding potential impacts to Lelu Island and Flora Bank.

- During a meeting on February 26, 2015, Lax Kw'alaams Band identified the following key concerns:
- Potential effects on fish from the Lelu Island LNG facility
- Potential effects on fish from trenching
- Potential effects on salmon, eulachon, eelgrass beds, crab, and halibut

In the Application (Section 33.12 [PRGT 2014a]), key Indigenous interests and concerns identified by Lax Kw'alaams Band included:

- Effects on wildlife habitat and health
- Effects on marine plants and plant habitat
- Effects on access for hunters
- Effects on fish and fish habitat
- Effects on access to fishing areas for commercial, sustenance, and recreational purposes

- Effects on important cultural sites in the marine environment
- Cumulative effects

Species of importance to Lax Kw'alaams Band are likely to be present in the Amendment area, including eulachon and clams (Section 33.12 [PRGT 2014a]; ATTLK 2004). Lax Kw'alaams Band previously identified wildlife species of importance along the coastal rainforests of their territory including the Kts'm'atiin Inlet Cultural and Natural Area (KICNA) as well as the Kwa'ka-pal (Nass Bay) Special Management Area (KSMA). Lax Kw'alaams Band reported that the KICNA includes the Khutzeymateen Inlet, Steamer Passage, and Somerville Island, and is an intensive traditional area of importance to Lax Kw'alaams Band members. Lax Kw'alaams Band identified harvesting areas for various species of groundfish, salmon, crab, clams, cockles, mussels, seals, and sealion are located within the KICNA. Lax Kw'alaams Band explained that the KICNA is intended to restore depleted heritage and cultural resources, support and enhance local opportunities, and protect traditional harvesting resources.

Lax Kw'alaams Band also previously reported that the KSMA is an intensive traditional use area and includes the foreshore and marine areas of Nass Bay, Nass Inlet, and Iceberg Bay. Lax Kw'alaams Band identified critical eulachon harvesting and processing sites, as well as salmon, seal, sea lion, waterfowl, and crab harvesting areas within the KSMA. The KSMA also contains domestic use and archaeological sites of importance to Lax Kw'alaams Band members. Lax Kw'alaams Band explained that the KSMA is focused primarily on the protection of traditional harvesting resources, especially eulachon harvesting and processing (ATTLK 2004). Lax Kw'alaams Band fishing areas identified in Section 33.12 of the Application include, but are not limited to, Nass River estuary in Portland Inlet and the south edge of Nass Bay (PRGT 2014a; PRGT 2013). The Amendment route may intersect or be in close proximity to marine and terrestrial areas of importance to Lax Kw'alaams Band. Lax Kw'alaams Band previously reported that the entire coastline is important for harvesting, as are the breakwater, beaches, channel, islands, and the ocean. Lax Kw'alaams Band reported that seafood harvesting was relied upon by citizens and they want this practice to continue (ATTLK 2004).

Through a review of the information available publicly for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023l), Lax Kw'alaams Band identified the following interests and concerns that may also pertain to the Amendment:

- Project planning and scope, including the onshore and offshore pipeline
- Marine harvesting areas and important marine resource habitat and migration routes include, but are not limited to, Portland Inlet, Pearse Canal, mouth of Nass River, and Wales Island
- Potential effects on Lax Kw'alaams Band ability to exercise rights and interests, including:
  - Ability to practice land-based and marine-based rights
  - Limitations or impeded access to preferred fishing areas, as well as temporary and seasonal camps
  - Impacts to culture and heritage sites, cultural identity, cultural continuity, and way of life
  - Effects on harvested species and other resources
  - Members physical and mental health

- Effects on social and economic conditions
- Disproportionately distributed effects
- Impacts to governance and stewardship
- Cumulative effects on the environment, regional flora and fauna, cultural continuity, and the health of the ocean and its resources

Lax Kw'alaams Band previously expressed concerns about the decline in availability of, quality of, and access to marine resources. These concerns apply to traditional campsites, which need to be managed or protected in a way that they can continue to be used as destinations for food and traditional harvesting. Competition for resources with non-members is a factor limiting access to marine resources. Concerns were also raised by Lax Kw'alaams Band about potential spills into the marine environment, which would negatively affect marine resources for generations (ATTLK 2004).

5.1.8.2 Residual Effects on Lax Kw'alaams Band Indigenous Interests

Residual effects of the Amendment on Lax Kw'alaams Band Indigenous 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 marine activities to temporarily affect marine navigability and access to important sites during construction. Additionally, PRGT acknowledges that Lax Kw'alaams Band citizens may chose not to pursue their interests near project activities. Although the Amendment would lessen the overall Project footprint, the duration of construction activities, and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO's Assessment Report remain, which predicted negligible or minor impacts on Lax Kw'alaams Band Indigenous Interests.

5.1.8.3 Changes to Characterization of Residual Effects on Lax Kw'alaams Band Indigenous Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Lax Kw'alaams Band's interests. Therefore, based on information available pertaining to Lax Kw'alaams Band Indigenous interests that was included in the Application combined with additional information identified through a review of the publicly available feedback provided by Lax Kw'alaams Band on the Ksi Lisims LNG Facility, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application. Project residual effects on Lax Kw'alaams Band Indigenous interests were characterized as low magnitude (low—moderate magnitude for fishing) and with the reduced length of the alignment as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 5.4 summarizes potential effects, mitigation, and residual effects for Lax Kw'alaams Band Indigenous interests. No new project effects (or effects pathways) were identified for the Amendment components. At the time of submitting the Application, Lax Kw'alaams Band had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, gathering areas, and sacred areas. Lax Kw'alaams Band had not identified any issues related to cultural transmission or governance; however, as described in Section 5.1.8.1, additional interests have been

identified by Lax Kw'alaams Band. As described in Section 5.1.3, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area.

As further information is shared through consultation, PRGT will review the information in the context of this analysis. PRGT acknowledges that although the footprint will be reduced by the Nass Bay Route, the route is being proposed through areas not previously discussed with Indigenous nations and there may be new Indigenous interests raised through consultation. In consideration of the predicted effects on Lax Kw'alaams Band, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes.

Table 5.4 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Lax Kw'alaams Band Indigenous Interests

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route in Nass Bay area; reduced terrestrial route; reduction in number of entrance/exit locations [four reduced to two])	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at Ksi Lisims LNG Facility)	No change	No change	No change
	Operations	No change	No change	No change	No change

5.1.8.4 Cumulative Effects

Cumulative effects for Lax Kw'alaams Band Indigenous interests are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

PRGT will continue to consult with Lax Kw'alaams Band to practically address any Project-specific issues related to cumulative effects on Indigenous interests. Information will be reviewed as it is received by Lax Kw'alaams Band to determine if any additional mitigation measures are required.

5.1.8.5 Disproportionately Distributed Effects on Lax Kw'alaams Band Indigenous Interests

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Lax Kw'alaams Band's citizens in the following ways:

Reduced quality of marine and terrestrial harvesting experience or access to harvesting areas, which may disproportionately affect Lax Kw'alaams Band citizens who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations

Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Lax Kw'alaams Band citizens 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 Lax Kw'alaams Band citizens 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 Lax Kw'alaams Band citizens 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 consultation with Lax Kw'alaams Band, PRGT aims to reduce these disproportionate effects.

5.1.8.6 Risks and Data Uncertainty

While this assessment takes into account 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 implementation of mitigation measures and EAC conditions, inclusive of monitoring and follow up programs, confidence in the assessment will increase as consultation with Lax Kw'alaams Band advances. PRGT will continue to consult Lax Kw'alaams Band to enhance the consideration of Lax Kw'alaams Band's Indigenous interests and reduce uncertainty.

5.1.9 Metlakatla First Nation

5.1.9.1 Preliminary Overview of Metlakatla First Nation Key Interests and Concerns

Through a review of information considered in the Application in addition to the Project-specific TLU study (DMCS and MFN 2014) and a review of publicly available information shared by Metlakatla First Nation for the assessment of the Ksi Lisims LNG Facility, the following is a summary of Metlakatla First Nation Interests and concerns relevant to the Amendment area identified.

In the Application (Section 33.13 [PRGT 2014a]), key Indigenous interests and concerns identified by Metlakatla First Nation included:

- Effects on fish, fish habitat, and marine resources
- Effects on dwellings and spiritual sites
- Effects on plant gathering interests (including food and medicines)
- Effects on wildlife and wildlife habitat

Species of importance to Metlakatla First Nation are likely to be present in the Amendment area (Section 33.13 [PRGT 2014a]) and the Amendment route may intersect or be in close proximity to marine and terrestrial areas of importance to Metlakatla First Nation. Through the Project-specific TLU study, Metlakatla First Nation previously reported that the islands throughout Chatham Sound and Portland Inlet provide the nation with a variety of harvested shellfish, plants, fish, mammals, and other food resources (DMCS and MFN 2014).

Metlakatla First Nation fishing areas identified in Section 33.13 of the Application included Nass River for eulachon (PRGT 2014a; Tobey 1990). Through the Project-specific TLU study, Metlakatla First Nation previously identified several marine resources are traditionally harvested within, or in close proximity to, the Amendment route, including: eulachon, salmon, and seal in the Nass Bay area; salmon (spring, pink, coho, sockeye, chum), Pacific halibut, eulachon, clam, and black cod in the Nasoga Bay Gulf area; and salmon (sockeye, chum, coho, pink), Pacific halibut, killer whale, crab, seal, clam, porpoise, and black cod, throughout the Portland Inlet and Portland Canal. Metlakatla First Nation also reported important herring spawning locations, as well as marine and terrestrial hunting areas for bear, mountain goat, and a variety of birds throughout the Portland Inlet (DMCS and MFN 2014).

In addition to harvesting areas, Metlakatla First Nation previously stated that there are many placenames found in the Nass Bay to Portland Canal region, including the Nasoga Gulf, which have spiritual or cultural significance; the nation reported that there is a pictograph site along the northern shore of Nass Bay as well. Travel routes providing citizens with access to harvesting and other cultural use areas are also present in Nass Bay, Portland Inlet, and Portland Canal. Metlakatla First Nation reported that seasonal villages, campsites, and shelters are also present in the Nass Bay, Portland Inlet, and Somerville Island area that were originally established to access eulachon fisheries and to support community gatherings (DMCS and MFN 2014).

Through a review of the information available publicly for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023m), Metlakatla First Nation identified the following interests and concerns that may also pertain to the Amendment:

- Concern about cumulative effects and accidents within the territory
- Potential effects on Metlakatla First Nation rights and interests, including:
  - Loss of place-based knowledge and cultural landscape, and the associated disruption to cultural transference and cultural identity
  - Effects on quality of experience and sense of place at cultural and spiritual sites
  - Changes to governance and decision making and industrialization of the land
  - Health, safety, and well-being, and sensory disturbance on land and water
  - Changes in access to, and quality and quantity of harvested resources and marine and intertidal harvesting areas

Through the Project-specific TLU study, Metlakatla First Nation previously reported that development of the proposed pipeline Project is likely to result in an increase in marine traffic through important water transportation routes, fishing, and marine resource harvesting areas. Metlakatla First Nation previously expressed concern that access to these areas may become restricted as a result of Project construction and further development activities (DMCS and MFN 2014).

5.1.9.2 Residual Effects on Metlakatla First Nation Indigenous Interests

Residual effects of the Amendment on Metlakatla First Nation Indigenous 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 marine activities to temporarily affect marine navigability and access to important sites during construction. Additionally, PRGT acknowledges that Metlakatla First Nation citizens may chose not to pursue their interests near project activities. Although the Amendment would lessen the overall Project footprint, the duration of construction activities, and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO's Assessment Report remain, which predicted negligible or minor to moderate impacts on Metlakatla First Nation Indigenous Interests.

5.1.9.3 Changes to Characterization of Residual Effects on Metlakatla First Nation Indigenous Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Metlakatla First Nation's interests. Therefore, based on information available pertaining to Metlakatla First Nation Indigenous interests that was included in the Application combined with the Project-specific TLU study and additional information identified through a review of the publicly available feedback provided by Metlakatla First Nation on the Ksi Lisims LNG Facility, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application. Project residual effects on Metlakatla First Nation Indigenous interests were characterized as low magnitude (low—moderate magnitude for fishing) and with the reduced length of the alignment as a result of the Amendment, effects are predicted to remain the same or be slightly reduced.

Table 5.5 summarizes potential effects, mitigation, and residual effects for Metlakatla First Nation Indigenous interests. No new project effects (or effects pathways) were identified for the Amendment components. At the time of submitting the Application, Metlakatla First Nation had identified interests and issues related to hunting, trapping, fishing, plant gathering, trails and travelways, habitation areas, sacred areas, and cultural transmission. Metlakatla First Nation had not identified any issues related to gathering areas or governance; however, as described in Section 5.1.9.1, additional interests have been identified by Metlakatla First Nation. As described in Section 5.1.3, it is anticipated that the residual effects analysis will be consistent with the potential effects identified and assessed for similar interests in the area.

As further information is shared through consultation, PRGT will review the information in the context of this analysis. PRGT acknowledges that although the footprint will be reduced by the Nass Bay Route, the route is being proposed through areas not previously discussed with Indigenous nations and there may be new Indigenous interests raised through consultation. In consideration of the predicted effects on Metlakatla First Nation, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes.

Table 5.5 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Metlakatla First Nation Indigenous Interests

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route in Nass Bay area; reduced terrestrial route; reduction in number of entrance/exit locations [four reduced to two])	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at Ksi Lisims LNG Facility)	No change	No change	No change
	Operations	No change	No change	No change	No change

5.1.9.4 Cumulative Effects

Cumulative effects for Metlakatla First Nation Indigenous interests are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

PRGT will continue to consult with Metlakatla First Nation to practically address any Project-specific issues related to cumulative effects on Indigenous interests. Information will be reviewed as it is received by Metlakatla First Nation to determine if any additional mitigation measures are required.

5.1.9.5 Disproportionately Distributed Effects on Metlakatla First Nation Indigenous Interests

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Metlakatla First Nation's citizens in the following ways:

Reduced quality of marine and terrestrial harvesting experience or access to harvesting areas, which may disproportionately affect Metlakatla First Nation citizens who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations

Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Metlakatla First Nation citizens 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 Metlakatla First Nation citizens 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 Metlakatla First Nation citizens 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 consultation with Metlakatla First Nation, PRGT aims to reduce these disproportionate effects.

5.1.9.6 Risks and Data Uncertainty

While this assessment takes into account 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 implementation of mitigation measures and EAC conditions, inclusive of monitoring and follow up programs, confidence in the assessment will increase as consultation with Metlakatla First Nation advances. PRGT will continue to consult Metlakatla First Nation to enhance the consideration of Metlakatla First Nation's Indigenous interests and reduce uncertainty.

5.2 Nisga'a Nation

5.2.1 Methods

This section assesses how the proposed Project Amendment may affect the citizens, lands, and resources of Nisga'a Nation and their ability to exercise their Indigenous interests, as the Amendment area is within the Nass Area. To complete this assessment, the following is discussed:

- Potential effects of the Amendment changes on Nisga'a Nation Interests
- Summary of mitigation measures to avoid or reduce adverse effects on Nisga'a Nation's Interests
- Preliminary overview of the key interests and concerns of Nisga'a Nation identified during the Application, through consultation feedback, and through a review of the publicly available feedback provided by NLG on the Ksi Lisims LNG Facility, considered in the context of the Amendment area
- Residual effects of the Amendment changes on residents of Nisga'a Lands, Nisga'a Lands and Nisga'a Treaty rights and interests, or on the existing and future economic, social, and cultural well-being of Nisga'a Nation's citizens, pursuant to paragraphs 8€ and 8(f), Chapter 10 of the Nisga'a Treaty
- Changes to the characterization of residual adverse effects on Nisga'a Nation's Indigenous interests after mitigation
  - Cumulative effects
  - Disproportionately distributed effects on Nisga'a Nation Indigenous interests
- Risks and data uncertainty

The assessment methods are consistent with Section 34.4 of the Application.

5.2.2 Ni'ga'a Nation Indigenous Knowledge, Information Sources, Assumptions and Limitations

PRGT understands that there is no universally accepted definition of Indigenous Knowledge, and that it is community-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 2020b; 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 Nisga'a Nation is best positioned to identify interests and concerns and preferred assessment approach, as well as the sources of information to consider when analyzing and assessing effects. This information requires the same consideration as any other information source.

The Application included consultation feedback and information identified through a literature review of publicly available information. In addition, this assessment considers key interests and concerns identified through a review of the publicly available feedback provided by NLG on the Ksi Lisims LNG Facility.

PRGT has received feedback from NLG about the Marine Route Alternative Amendment and the feedback has been reviewed and integrated, where appropriate, into this assessment including in the assessment of related environmental VCs and, such as, marine resources (Section 4.3), vegetation and wetland resources (Section 4.4), wildlife and wildlife habitat (Section 4.5), human health (Section 4.6), heritage and archaeological resources (Section 4.7).

Where feedback is not available, a conservative approach is taken, which assumes that Nisga'a Nation Interests exist in the vicinity of the Project, even if these interests are not specifically identified by Nisga'a Nation. The lack of information does not represent a lack of interest or concern to Nisga'a Nation.

5.2.3 Potential Effects

The proposed Amendment footprint overlaps the Nass Area. This assessment on Nisga'a Nation's Interests considers the effects of the proposed changes to the Project on each of the listed VCs listed in the Amendment (Section 4) and considers how these effects could affect the ability of Nisga'a Nation citizens to exercise their Indigenous interests. Table 4.1 outlines the VCs carried forward in this assessment and provides the rationale for why they are or are not carried forward for further assessment in this Application. Given the interactions identified in Table 4.1, and in consideration of the EAO's Assessment Report, potential interactions with Indigenous interests associated with the proposed changes to the Project include:

- Effects on Nisga'a Nation' Land Interests
- Effects on other Nisga'a Nation Land-related Interests
- Effects on Nisga'a Nation access to other lands

- Effects on Nisga'a Nation Interests in freshwater fish and aquatic plants
- Effects on Nisga'a Nation Interests in marine fish and aquatic plants
- Effects on the right of Nisga'a Nation citizens to harvest wildlife
- Effects on Nisga'a Nation Interests regarding the right of Nisga'a Nation citizens to harvest migratory birds
- Effects on Nisga'a Nation Interests regarding the harvest of non-timber forest resources
- Effects on Nisga'a Nation economic well-being
- Effects on Nisga'a Nation social well-being
- Effects on Nisga'a Nation cultural well-being

Based on a review of Marine Route Alternative Amendment consultation feedback and the information available publicly for the Ksi Lisims LNG Facility, PRGT understands that certain project effects not previously carried forward for the Application may now be of concern. This assessment considers disproportionately distributed effects on subpopulations of Indigenous nations. PRGT will continue to consult with NLG to identify interests and concerns with respect to the Amendment. Should new potential effects be identified during this consultation, they will be assessed in the context of the Amendment.

5.2.4 Mitigation Measures

Mitigation measures to avoid or reduce potential adverse effects on Indigenous interests include those identified in the Application (PRGT 2014a) and the Conditions of Environmental Assessment Certificate #E14-06 (EAO 2014d). Key mitigation measures, commitments, and conditions include[7]:

- 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 must provide Cultural Awareness Training to Project personnel. If requested by an Nisga'a Nation prior to PRGT providing training, PRGT must make efforts to engage with Nisga'a Nation to determine the scope and content of the training.

[7] Some mitigation measures, commitments, and conditions have been abridged from the original sources to focus on aspects pertaining to Indigenous interests or have been edited for clarity (e.g., defining acronyms).

- PRGT must develop and implement a No-Hunting, No-Trapping, No-Fishing, and No-Plant Gathering Policy for P'GT'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 the SEEMP (PRGT 2016c). The SEEMP must include specific actions to address the following:
  - Planning and implementation for effective engagement with affected Indigenous nations, Nisga'a Nation, 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 must implement the CEMP (PRGT 2016a) developed in consultation with the relevant regulatory agencies, Nisga'a Nation, 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.
- PRGT must provide Nisga'a Nation, for activities within the Nass Area and Nisga'a Lands:
  - A schedule of construction activities
  - Reports or results provided to EAO
  - Notification, a minimum of 30 days in advance, of Operations activities causing disturbance to land, vegetation or watercourses.

  In addition, PRGT must engage Nisga'a Nation in the development and implementation of:

  - Any plans for offsets of marine, aquatic, riparian, or in-stream values within the Nass Area and Nisga'a Lands that are required by any relevant regulatory agency
  - Siting of ancillary facilities in the Nass Area
  - The CEMP(s), as well as any plans set out in the Table of Conditions and other relevant plans developed to meet regulatory requirements of the Project, within the Nass Area and Nisga'a Lands.

PRGT must, in consultation with Nisga'a Nation, develop a program to provide for Nisga'a Nation participation in monitoring opportunities required for Construction.

If the final pipeline route overlaps with existing aquatic or riparian habitat restoration or compensation sites within Nisga'a Lands, PRGT must develop, in consultation with Nisga'a Nation, a Nisga'a Watercourse Restoration Plan with the objective of achieving no net loss of environmental function.

In addition to these mitigation measures, commitments, and conditions, PRGT is committed to consulting with NLG to develop specific mitigation strategies in the event that new interests are identified, in accordance with the Traditional Land Use Site Discovery Contingency Plan.

5.2.5 Preliminary Overview of Key Interests and Concerns

Through consultation feedback shared on the Marine Route Alternative Amendment, NLG stated that the proposed route amendment through Nass Bay is the preferable route for the Project because it avoids nearshore areas of Nass Harbour and Echo Cove. NLG also provided a report entitled "Baseline Implementation of the Ecosystem Health and Fish Habitat Monitoring Plan for the Nass River Estuary: Marsh and Eelgrass Mapping (Year 2)" depicting the location of eelgrass in the Iceberg Bay area" and stated it is pleased there is a commitment to develop and implement a Crab Movement Mitigation and Monitoring Plan and a Marine Access and Traffic Management Plan.

Through a review of Project-specific consultation feedback received on the 2016 draft Amendment for the Nass Bay Route, as well as information considered in the Application and a review of publicly available information related to the Ksi Lisims LNG Facility, the following is a summary of Nisga'a Nation Interests and concerns relevant to the Amendment area.

NLG had previously noted during consultation NLG's concern that PRGT would not be able to anchor the pipe along the approved route that hugs the shore (resulting in a floating pipe). PRGT has addressed this concern by proposing the Amendment (originally proposed in the 2016 draft Amendment) to locate the pipe to deeper water.

Through consultation in 2016, NLG also expressed interest in avoiding the Nass Estuary located at the mouth of the Nass River, because it is an important habitat and migration site for salmon, halibut, eulachon, and crab. NLG have expressed their view to PRGT that the proposed marine route amendment is a mitigation measure to avoid the Nass Estuary. The proposed marine route amendment is addressing this interest by locating the route in deeper water and avoiding the Nass Estuary.

In the Application (Section 34.5 [PRGT 2014a]), key Indigenous interests and concerns identified by Nisga'a Nation included:

- Nisga'a Nation owns and has jurisdiction over Nisga'a Lands, including mineral resources and forest resources
- Nisga'a Nation owns Nisga'a Fee Simple Lan–s - Category A Lands and Category B Lands – which are outside of Nisga'a Lands
- Effects on the right of Nisga'a citizens to harvest fish and aquatic plan–s - freshwater
- Effects on the right of Nisga'a citizens to harvest fish and aquatic plan–s - marine
- Effects on the right of Nisga'a citizens to harvest wildlife

- Effects on the right of Nisg̲a’a citizens to harvest migratory birds
- Effects on the ability of Nisg̲a’a citizens to harvest non-timber forest resources

Species of importance to Nisg̲a’a Nation are likely to be present in the Amendment area (Section 34 [PRGT 2014a]).

In the Application, Nisg̲a’a Nation identified interests in the Nass Area. The Amendment route may intersect or be in close proximity to marine and terrestrial areas of importance to Nisg̲a’a Nation.

Through a review of the information available publicly for the Ksi Lisims LNG Facility (Ksi Lisims LNG 2023a), Nisg̲a’a Nation identified the following interests and concerns that may also pertain to the Amendment:

- Interactions between the project and halibut habitat within Portland Canal
- Pipelines potentially disturbing harvesting areas, including fishing and hunting areas and traplines
- The potential for spills/ leaks or other accidents and malfunctions, safety concerns, seismic activity and earthquakes
- Involvement of local Gingolx residents in development and implementation of Project monitoring program(s)
- Potential effects on Nisg̲a'a Nation Treaty rights and interests, including:
  - interruptions to commercial fishermen, long lines set for halibut, country food fishing and harvesting in Portland Canal and northern Pearse Island
  - Effects on halibut and salmon fishing along the eastern extent of Pearse Island
  - Effects on fish migration
  - Effects on salmon and eulachon runs
  - Changes to the quality and health of marine resources such as halibut, cockles, and salmon
  - Construction noise impacting terrestrial and marine wildlife health and behaviour, such as whales, porpoises, marine fish, and spawning grounds
  - Disruption to transmission of culture, and ability of families to engage in harvesting and other activities on or around Pearse Island and within Nisg̲a'a Lands

5.2.6 Residual Effects on Nisga'a Nation Interests

Residual effects of the Amendment on Nisga'a 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 marine activities to temporarily affect marine navigability and access to important sites during construction. Additionally, PRGT acknowledges that Nisga'a Nation citizens may chose not to pursue their interests near project activities. Although the Amendment would lessen the overall Project footprint, the duration of construction activities, and the spatial extent of maintenance and inspection activities during operation, the residual effects identified in the EAO's Assessment Report remain, which predicted no adverse effects on Nisga'a Nation's Interests.

5.2.7 Changes to Characterization of Residual Effects on Nisga'a Nation Interests

The EAO Assessment Report did not include a detailed characterization of residual effects on Nisga'a Nation's interests. Therefore, based on information available pertaining to Nisga'a Nation Interests that was included in the Application combined with additional information identified through a review of the publicly available feedback provided by NLG on the Ksi Lisims LNG Facility, the Amendment has determined that no changes to the characterization of residual effects are anticipated as compared to the characterizations found in the Application. Project residual effects on Nisga'a Nation Interests were characterized as low magnitude (low—moderate magnitude for fishing) and with the reduced length of the alignment as a result of the Amendment, effects are predicted to remain the same.

Table 5.6 summarizes potential effects, mitigation, and residual effects for Nisga'a Nation Interests. No new project effects (or effects pathways) were identified for the Amendment components. As information is shared through consultation, PRGT will review the information in the context of this analysis. PRGT acknowledges that although the footprint will be reduced by the Nass Bay Route, the route is being proposed through areas not previously discussed with NLG and there may be new Nisga'a Nation Interests raised through consultation. In consideration of the predicted effects on Nisga'a Nation, the conclusions presented in the EAO's Assessment Report are consistent with the proposed changes.

Table 5.6 Summary of Changes to Potential Effects and Mitigation Measures Due to the Amendment – Nisga'a Nation Indigenous Interests

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
Nass Bay Route (includes Nass Bay Approach)	Construction	Yes (longer marine route in Nass Bay area; reduced terrestrial route; reduction in number of entrance/exit locations [four reduced to two])	No change	No change	No change
	Operations	No change	No change	No change	No change
Ksi Lisims LNG Pipeline Connection	Construction	Yes (new routing; shortens marine routing; no terrestrial route; new landfall location at Ksi Lisims LNG Facility)	No change	No change	No change
	Operations	No change	No change	No change	No change

5.2.8 Cumulative Effects

Cumulative effects for Nisga'a Nation Interests are expected to be lower for the Amendment than for the approved Project. With the Amendment, there would no longer be an interaction with existing or future projects or activities located further south along the approved alignment in the region of the Port of Prince Rupert and Lelu Island. In particular, cumulative effects identified in the Application were largely related to the large volume of marine traffic that is expected as a result of industrial development and the termination of the Project on Lelu Island. The Ksi Lisims LNG Facility was not previously considered in the cumulative effects assessment for the Project but would interact cumulatively. However, as stated in the Ksi Lisims LNG Facility EAC application, with respect to the amended alignment, "[p]*otential effects associated with the amended route would likely be either similar or less adverse to what was concluded in EAO's Project Assessment Report for the marine portion of the pipeline (EAO Nov. 12, 2014)*" (Ksi Lisims LNG 2023b).

PRGT will continue to consult with NLG to practically address any Project-specific issues related to cumulative effects on Indigenous interests. Information will be reviewed as it is received by NLG to determine if any additional mitigation measures are required.

5.2.9 Disproportionately Distributed Effects on Nisga'a Nation Indigenous Interests

Based on predicted residual effects, the Amendment may disproportionately affect subpopulations of Nisga'a Nation's citizens in the following ways:

- Reduced quality of marine and terrestrial harvesting experience or access to harvesting areas, which may disproportionately affect Nisga'a Nation citizens who rely more heavily on these habitats and resources for commercial, sustenance, ceremonial, or other cultural purposes than non-Indigenous populations
- Reduced access to and disruption of experience at habitation, gathering, sacred, and other cultural areas, which may disproportionately affect Nisga'a Nation citizens 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 Nisga'a Nation citizens 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 Nisga'a Nation citizens 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 consultation with NLG, PRGT aims to reduce these disproportionate effects.

5.2.10 Risk and Data Uncertainty

While this assessment takes into account 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 implementation of mitigation measures and EAC conditions, inclusive of monitoring and follow up programs, confidence in the assessment will increase as consultation with Nisga'a Nation advances. PRGT will continue to consult NLG to enhance the consideration of Nisga'a Nation's Interests and reduce uncertainty.

6 Summary and Conclusions

PRGT is proposing changes to the Prince Rupert Gas Transmission Project to improve the constructability of the pipeline and to supply natural gas to the Ksi Lisims LNG Facility at Wil Milit on the northern end of Pearse Island. To facilitate these objectives, two changes that fall outside the scope of the CPD (Schedule A to EAC #E14-06) have been identified:

An approximately 9.4 km reroute of the pipeline corridor, called the Nass Bay Route, that at its furthest point is approximately 1.5 km northwest of the CPC. The Nass Bay Route component includes the Nass Bay Approach, which is a 0.2 ha expansion of the CPC prior to entering the marine environment.

An approximately 27 km reroute of the pipeline corridor called the Ksi Lisims LNG Pipeline Connection, that begins near the entrance of Nasoga Gulf and heads northward through Portland Inlet to terminate at the proposed Ksi Lisims LNG Facility on the northern end of Pearse Island (instead of terminating at Lelu Island in the Port of Prince Rupert, which effectively reduces the Project length by approximately 100 km).

Similar to previous amendments to the Project the reroutes would be added to the CPD. Where two options are certified, only one will be constructed, not both.

The proposed Marine Route Alternative Amendment is primarily within Nisga'a Nation Treaty Lands and the Nass Area between Gingolx and Wil Milit, as well as in the area around Nass Bay. The Nisga'a village of Gingolx is the nearest community to the proposed changes.

The implications of these changes were considered for all matters in Section 25 of the *Environmental Assessment Act*, including each VC that was assessed as part of the 2014 environmental assessment process. Specifically, the Amendment considered whether the proposed changes would affect the conclusions of the EAO's Prince Rupert Gas Transmission Project Assessment Report for each VC (EAO 2014a). In addition, potential changes to effects on the interests of Nisga'a Nation, Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation and other matters in Section 25 of the *Environmental Assessment Act* (2018) have been considered.

Valued components that were carried through the effects assessment are summarized in Table 6.1. No changes were predicted for the EAO's characterization of effects for any of these VCs. Additional mitigation measures were proposed for marine resources.

Table 6.1 Summary of Predicted Changes to the Effects Characterization for the Proposed EAC Amendment

Valued Component	Assessment Report Section	Changes to Mitigation Measures Presented in the Application and the CEMP	Change to the Assessment Report's Characterization
Water quality	5.6	No change	No change
Vegetation and wetlands	5.7	No change	No change
Wildlife and wildlife habitat	5.8	No change	No change
Marine resources	5.9	Two additional mitigation measures are proposed to mitigate effects on marine life from in water blasting.	No change
Heritage and archaeological resources	8.1	No change	No change
Human health	9	No change	No change

The assessment of Indigenous interests was completed for Nisga'a Nation, Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation (see Section 5). No changes, positive or negative, are anticipated to the conclusions presented in the EAO's Assessment Report as a result of the proposed changes to the Project that are presented in the Amendment.

Confidence in the predicted effects on Indigenous Interests is considered low The Amendment takes into account the understanding of the effects of the proposed changes to the Project, 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 implementation of mitigation measures and EAC conditions, including validation through monitoring and follow-up programs. Confidence in the assessment is also anticipated to increase as consultation with Indigenous nations advances.

Based on the conclusions within the Amendment it is not anticipated that the proposed EAC Amendment will result in effects beyond those characterized in the Assessment Report. In some cases, VC effects are predicted to be reduced due to a reduction in spatial extent and Project activities occurring in areas with less competing use (i.e., reduction in cumulative effects by avoiding the Port of Prince Rupert area).

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