

DRAFT Assessment Report *for Tilbury Marine Jetty Project*

**With respect to the Application by Tilbury Jetty Limited Partnership
for an Environmental Assessment Certificate pursuant to the
*Environmental Assessment Act, S.B.C. 2002, c. 43***

DRAFT: July 13, 2022

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1 COMMON TERMS AND ACRONYM LIST

2	$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
3	μPa	micropascal
4	12 nm limit	12 nautical mile (nm) limit of Canada's territorial sea
5	The Act	<i>Environmental Assessment Act, 2002</i>
6	the Agency	Impact Assessment Agency of Canada, known until August 28, 2019 as the Canadian
7		Environmental Assessment Agency
8	ACR	Aboriginal Consultation Report (i.e., ACR-1, ACR-2, ACR-3, and ACR-4)
9	AIA	archaeological impact assessment
10	AIR	Application Information Requirements
11	Application	Application for an Environmental Assessment Certificate
12	ATB	Articulated tug barge
13	B.C.	British Columbia
14	BC OGC	BC Oil and Gas Commission
15	BC WQG	BC Ministry of Environmental and Climate Strategy Water Quality Guidelines
16	BMP	Best Management Practices
17	BVS	Bunker Vessel Scenario
18	BVSA	Bunker Vessel Scenario Assessment
19	CAAQS	Canadian Ambient Air Quality Standards
20	CCG	Canadian Coast Guard
21	CCME	Canadian Council of Ministers of the Environment
22	CDC	Conservation Data Centre
23	CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>

1	CEMP	Construction Environmental Management Plan
2	CEQG	Canadian Environmental Quality Guidelines
3	CO	Carbon Monoxide
4	CO ₂	Carbon Dioxide
5	CO ₂ e	Carbon Dioxide Equivalents
6	COPC	Contaminant of Potential Concern
7	COSEWIC	Committee on the Status of Endangered Wildlife in Canada
8	CPD	Certified Project Description
9	CSA	Canadian Standards Association
10	Current Use	Current Use of Lands and Resources for Traditional Purposes
11	DAS	Disposal at Sea
12	dB	Decibel
13	dba	A-weighted decibel
14	Delta	City of Delta
15	DFO	Fisheries and Oceans Canada
16	DPM	Diesel Particulate Matter
17	DWT	Deadweight Tonnage
18	EA	Environmental Assessment
19	EAC	Environmental Assessment Certificate
20	EAO	Environmental Assessment Office
21	ECCC	Environment and Climate Change Canada
22	ECHO	Enhancing Cetacean Habitat and Observation Program
23	EMP	Environmental management plan

1	ENV	Ministry of Environment and Climate Change Strategy
2	EPA	US Environmental Protection Agency
3	EPIC	EAO's Project Information Centre
4	FLNRORD	Ministry of Forests, Lands, Natural Resource Operations Rural Development
5	FNFLF	First Nations Fisheries Legacy Fund
6	FOR	Ministry of Forests
7	FortisBC	FortisBC Energy Inc.
8	FRWQO	Fraser River Ambient Water Quality Objectives
9	FSC	food, social and ceremonial
10	FTBB	Floating Temporary Bunker Berth/ Platform
11	FTEs	full-time equivalents
12	GDP	Gross Domestic Product
13	GHG	greenhouse gases
14	ha	hectare
15	%HA	percent highly annoyed
16	HC	Health Canada
17	HCA	<i>Heritage Conservation Act</i>
18	HHRA	Human Health Risk Assessment
19	HNS	Hazardous and Noxious Substances
20	HQ	Hazard Quotient
21	Hz	hertz
22	ILCR	Incremental Lifetime Cancer Risk
23	IMO	International Marine Organization

1	IPCC	Intergovernmental Panel on Climate Change
2	ISO	International Organization for Standards
3	km	kilometre
4	KMM	Key Mitigation Measure
5	kt	kilotonnes
6	KUS	Knowledge and Use Study
7	LAA	Local Assessment Area
8	LCFS	BC Low Carbon Fuel Standard
9	LNG	liquefied natural gas
10	LSA	Local Study Area
11	LWRS	Ministry of Land, Water and Resource Stewardship
12	m	metre
13	m ²	square metre
14	m ³	cubic metre
15	m ³ /s	cubic metre per second
16	m/s	metres per second
17	MAA	Marine Assessment Area
18	MARPOL	International Convention for the Prevention of Pollution from Ships
19	mg/L	milligram per litre
20	MLAA	Marine Shipping Assessment Local Assessment Area
21	MOU	Memorandum of Understanding on Substitution of Environmental Assessments
22		(2013)
23	MRAA	Marine Shipping Assessment Regional Assessment Area
24	MSA	Marine Shipping Assessment

1	MSAA	Marine Shipping Assessment Area
2	MT	million tonnes
3	MTPA	million tonnes per annum
4	nm	nautical mile
5	NOAA	National Oceanic and Atmospheric Administration
6	NO ₂	nitrogen dioxide
7	NO _x	Nitrogen Oxides
8	OEMP	Operational Environmental Management Plan
9	PAH	polycyclic aromatic hydrocarbons
10	PBRP	Pattullo Bridge Replacement Project
11	PC	Pathway Components
12	PCB	polychlorinated biphenyls
13	PFMA	Pacific Fishery Management Area
14	PM	Particulate Matter
15	PM _{2.5}	particulate matter 2.5 micrometres or smaller in diameter
16	PM ₁₀	particulate matter 10 micrometres or smaller in diameter
17	PMTJ	Permanent Marine Tandem Jetty
18	QP	Qualified Professional
19	RAA	Regional Assessment Area
20	RBT2	Roberts Bank Terminal 2 Project
21	Richmond	City of Richmond
22	RNG	Renewable natural gas
23	RSA	Regional Study Area

1	SARA	<i>Species at Risk Act</i>
2	SPL _{rms}	root mean squared sound pressure levels
3	SRKW	southern resident killer whale
4	SRP	strategic review process
5	TC	Transport Canada
6	TEK	Traditional Ecological Knowledge
7	TERMPOL	Technical Review Process of Marine Terminal Systems and Transshipment Sites
8	TJLP	Tilbury Jetty Limited Partnership
9	TLU	Traditional Land Use
10	TLUS	Traditional Land Use Studies
11	TMJ	Tilbury Marine Jetty Project
12	TMX	Trans Mountain Expansion Project
13	TOC	Table of Conditions
14	TransLink	South Coast British Columbia Transportation Authority
15	TRC	Truth and Reconciliation Commission
16	TSS	Total Suspended Solids
17	TUS	Traditional Use Studies
18	UN Declaration	United Nations Declaration on the Rights of Indigenous Peoples
19	VAFFC	Vancouver Airport Fuel Facilities Corporations Fuel Delivery Project
20	VC	Valued Component
21	VFPA	Vancouver Fraser Port Authority
22	VOC	volatile organic compounds
23		

EXECUTIVE SUMMARY

1

2 **Overview**

3 Tilbury Jetty Limited Partnership (TJLP) is proposing to construct and operate the Tilbury Marine Jetty
4 (TMJ), located on Tilbury Island (adjacent to and in the Fraser River) in the City of Delta, British Columbia
5 (B.C.). TMJ would be a new marine jetty providing berthing and loading facilities for Liquefied Natural Gas
6 (LNG) carriers and bunker vessels with a carrying capacity of up to 100,000 cubic metres (m³) for a
7 minimum of 30 years. TMJ would transfer LNG via pipeline from the adjacent FortisBC Tilbury LNG
8 Liquefaction Plant (Tilbury LNG Plant) to third-party owned and operated carriers and bunkers berthed at
9 the jetty. LNG carriers would ship LNG predominantly to international markets, and LNG bunkers would
10 ship predominantly to regional coastal markets and transport LNG to fuel other vessels. TJLP would be
11 responsible for all shore-based marine operations at TMJ and all shore-to-ship transfer operations and
12 procedures. The partners of the TJLP are Fortis and Seaspan affiliates.

13 In TJLP's Application, TJLP estimated up to 137 vessels (68 LNG carriers calls and 69 bunker vessels calls)
14 calling on the jetty, resulting in 274 trips (inbound and outbound) annually, equivalent to approximately
15 one vessel call every three days. In November 2021, TJLP proposed a Bunker Vessel Scenario (BVS) of up to
16 365 LNG vessel calls per year based on recent developments in the LNG bunkering and bunker vessel
17 markets. As such, TJLP conducted additional analysis, which is captured in the Bunker Vessel Scenario
18 Assessment (BVSA) Report, assessing 365 vessel calls in a year, with a vessel mix of 307 bunker vessels and
19 58 LNG carriers. Both the Application scenario (274 trips annually) and BVS (730 trips annually) are
20 considered in the assessment.

21 TMJ is subject to an EA under B.C.'s *Environmental Assessment Act, 2002* (the Act) by the B.C.
22 Environmental Assessment Office (the EAO), and the *Canadian Environmental Assessment Act, 2012* (CEAA
23 2012) by the Impact Assessment Agency of Canada (the Agency) (formerly the Canadian Environmental
24 Assessment Agency). On July 20, 2015, the federal Minister of Environment and Climate Change approved
25 the substitution of the EA process to the Province of B.C. The substituted process must meet the EA
26 requirements of CEAA 2012. The approval was granted with the understanding that the EA would be
27 conducted by the EAO in accordance with the *Memorandum of Understanding on Substitution of*
28 *Environmental Assessments (2013)* (the MOU) entered into by the Agency and the EAO.

29 The EAO prepared this Assessment Report in consultation with an advisory Working Group (Working
30 Group), comprised of federal, provincial and local government representatives with mandates and skill sets
31 relevant to the review of TMJ, as well as representatives of Indigenous Groups potentially affected by
32 activities at the jetty site and along the shipping route (listed on Schedules B and D, in the section 11 Order

1 and subsequent section 13 Orders¹). The Agency also provided advice to the EAO in relation to fulfilling the
2 requirements related to CEAA 2012.

3 The EAO undertook public consultation activities during the EA, including holding four public comment
4 periods. All public comments, and TJLP and the EAO's responses to these comments, were considered in
5 completing the EA.

6 In conducting this EA, the EAO considered potential environmental, economic, social, heritage, and health
7 effects, including cumulative effects of other projects or activities of TMJ for the provincial EA. For the
8 purposes of meeting the CEAA 2012 substitution requirements, the EAO also considered effects that TMJ
9 may have on environmental effects described in subsections 5(1) and 5(2) of CEAA 2012, as well as the
10 *Species at Risk Act* (SARA), subsection 79(2).

11 **Assessment of Effects**

12 The EA focused on assessing effects on the Valued Components (VCs) and pathways of effects related to
13 air quality, greenhouse gas (GHG) management, river processes, vessel wake, water quality, fish and fish
14 habitat, marine fish and fish habitat, marine mammals, vegetation, wildlife and wildlife habitat, marine
15 birds, economy, socio-community, land and marine resource use, visual quality, heritage resources, human
16 health, and noise.

17 The EAO assessed the potential for TMJ to have significant adverse effects on the VCs and on the
18 requirements of CEAA 2012, including effects of TMJ on the environment that could affect Indigenous
19 peoples, and included an assessment of the effects TMJ could have on Aboriginal Interests. The
20 assessment also considered how accidents and malfunctions and changes to the environment could affect
21 the VCs and Indigenous peoples. These assessments were informed by the Application provided by TJLP as
22 well as comments received from the Working Group, Indigenous Groups, and the public.

23 TJLP proposed mitigation measures to avoid or minimize the adverse effects of TMJ. In consideration of
24 TJLP's proposed mitigation measures and the comments received during the Application review, the EAO is
25 proposing 20 conditions, each of which includes measures to mitigate the effects of TMJ. If provincial
26 Ministers issue an Environmental Assessment Certificate (EAC), they may establish these conditions as
27 legally binding requirements. The EAO has also recommended Key Mitigation Measures (KMMs) under
28 CEAA 2012, to inform federal conditions. Federal conditions are also proposed by the Agency for
29 consideration by the federal Minister of Environment and Climate Change as legally binding conditions in a
30 CEAA 2012 decision statement, should TMJ be approved to proceed.

31 The following are some of the mitigations that are included in the provincial conditions the EAO proposes
32 to provincial ministers:

¹ <https://projects.eao.gov.bc.ca/p/58851208aaecd9001b829b58/project-details>

- 1 • An Indigenous Monitors plan that provides opportunities for the participation of Indigenous Groups
2 in monitoring activities during construction and operations;
- 3 • Emergency response and spill prevention measures, including procedures to notify Indigenous
4 Groups, the City of Delta (Delta), Metro Vancouver, and the City of Richmond (Richmond) of
5 emergencies or spills;
- 6 • Light management at the TMJ site, including mitigating potential attraction of birds;
- 7 • Wildlife and wildlife habitat management and monitoring, including species-specific sensitive
8 timing windows and setbacks, invasive species prevention, control and management, and
9 monitoring of restored habitat;
- 10 • Water Quality Management Plan to manage potential adverse effects to water quality during in-
11 water works, including a monitoring program for turbidity and an adaptive management
12 framework;
- 13 • River Bed Monitoring Plan to mitigate potential adverse effects to the bed of the Fraser River
14 caused by dredging during construction and operations;
- 15 • Cultural and Archaeological Resources Management Plan to mitigate and monitor potential adverse
16 effects on archeological and cultural sites, including an Archaeological Impact Assessment,
17 measures to prevent unauthorized access to sites, and developing and implementing chance find
18 procedures with Indigenous Groups;
- 19 • Indigenous Training, Employment and Procurement Plan to provide opportunities to Indigenous
20 Groups and their members;
- 21 • Indigenous cultural awareness, recognition and mitigation to promote cultural awareness and
22 recognition and mitigation adverse effects on cultural resources or practices in the marine terminal
23 area;
- 24 • Vegetation and Wetland Management and Wetland Offsetting Plan to control noxious weeds and
25 invasive plants, incorporate Indigenous stewardship values related to vegetation and wildlife,
26 establish plant species of cultural significance to Indigenous Groups, and compensate for the loss of
27 wetlands, that would also provide additional habitat and habitat function for wildlife; and
- 28 • Air Quality Management Plan and Greenhouse Gas Reduction Plan with mitigations to reduce GHGs
29 and adverse effects to air quality during construction and operations, including triggers and
30 corrective actions to reduce air quality levels and GHG emissions.

31
32 The EAO is also recommending KMMs under CEAA 2012, intended to inform federal conditions, including
33 the following:

- 34 • Fish Mitigations to Reduce Harm and Mortality, including conducting in-water work activities during
35 reduced risk windows unless authorized by Fisheries and Oceans Canada (DFO), monitoring during

1 dredging activities, underwater noise mitigation and monitoring, fish habitat offset plan, and a
2 follow up program for effectiveness of fish and fish habitat mitigations;

- 3 • Marine Mammal Management Plan, including measures to reduce underwater noise and
4 monitoring at the TMJ site;
- 5 • Vessel Traffic Management Plan, including measures to reduce underwater noise of marine
6 shipping, participation in the Vancouver Fraser Port Authority-led Enhancing Cetacean Habitat and
7 Observation (ECHO) Program seasonal slowdown initiatives, and participation, where possible, in
8 regional environmental management measures and cumulative effects monitoring to protect
9 Southern Resident Killer Whale (SRKW);
- 10 • Marine Communication Plan to notify Indigenous Groups and other marine users of planned
11 activities associated with TMJ, including anticipated traffic schedules, and procedures to provide
12 feedback to TJLP on adverse effects related to navigation;
- 13 • Marine Access and Transportation Plan to coordinate and communicate with other marine users
14 and regulators, including Indigenous monitoring during food, social and ceremonial (FSC) fisheries
15 windows and measures to mitigate effects on Indigenous traditional use activities such as LNG
16 carrier call scheduling and synchronization of bunker vessels with other marine traffic on the Fraser
17 River, to limit disruption to Indigenous fishers when operating under DFO fishing licenses;
- 18 • Mitigation measure for TJLP to manage, during operations, the number of LNG vessels berthing at
19 TMJ, such that the number of LNG carriers does not exceed 68 carriers per year;
- 20 • Emergency Response Plan for the TMJ site, which would describe emergency response training,
21 measures to mitigate adverse effects and operating procedures to prevent potential accidents and
22 malfunctions, and a description of the integrated response planning, including roles and
23 responsibilities, and equipment requirements between TJLP and government agencies, local
24 government and emergency response departments;
- 25 • Marine Shipping Emergency Response Outreach Program which would describe the equipment
26 TJLP could provide to assist with a marine shipping spill or emergency response associated with
27 TMJ-related LNG vessels;
- 28 • Cultural Heritage mitigations, which would require TJLP to develop nation-specific measures to
29 address the effects on tangible and intangible cultural losses caused by TMJ, in consultation with
30 those Indigenous Groups experiencing the effects in the lower Fraser River (as described in the
31 EAO's Assessment Report), and to consider developing or contributing to Indigenous-led programs
32 to preserve and enhance cultural heritage.

33
34 In addition to the requirement for an EAC, TJLP also requires various permits, approvals and authorizations
35 which relate primarily to disturbance of land, water, fish and fish habitat, and disruption to marine
36 navigation. Prior to the start of construction, TMJ must obtain provincial permits under the *Oil and Gas*

1 *Activities Act; Land Act, Water Sustainability Act; Heritage Conservation Act (HCA); and the Environmental*
2 *Management Act.* TMJ is also subject to a variety of federal legislations, and in some cases must obtain
3 authorizations under these Acts, including CEEA 2012, *Canada Marine Act, Fisheries Act, Canadian*
4 *Navigable Waters Act, and Canadian Environmental Protection Act.*

5 In consideration of the mitigation measures that would be required of TMJ, either in an EAC or federal
6 decision statement should TMJ be approved, or in subsequent regulatory processes, the EAO concludes
7 that TMJ would result in residual adverse effects that include:

- 8 • Changes to ambient air quality and increased GHG emissions during operations, primarily from an
9 increase in combustion exhaust from LNG carriers and bunker vessels, and associated vessels such
10 as tugs and security vessels;
- 11 • Change in sediment processes, river currents and local geomorphology from dredging and propellor
12 wash during construction and operations at the TMJ site;
- 13 • Increase suspended sediment due to dredging during construction and operations at the TMJ site;
- 14 • Fish habitat loss and alteration at the TMJ site from piles, dredging, vibrodensification and the
15 scour protection placed in the dredge pocket;
- 16 • Potential harm to fish, including change in fish behaviour due to underwater noise during in-water
17 works at the TMJ site and injury or mortality to sturgeon due to vessel strikes at the TMJ site and in
18 the lower Fraser River;
- 19 • Behavioural changes and physical injury to marine mammals, including SRKW, due to underwater
20 noise at the TMJ site and TMJ-related vessels in transit, and vessel strikes;
- 21 • Loss or alteration of wetland and riparian ecosystems at the TMJ site;
- 22 • Loss or alteration of wildlife habitat and sensory disturbance from noise and light at the TMJ site,
23 and increased risk of wildlife mortality at the TMJ site and due to collisions with vessels and
24 disorientation from vessel lighting for TMJ-related vessels in transit;
- 25 • Increase in potential human health effects associated with exposure to airborne contaminants via
26 inhalation during operations;
- 27 • Increase in noise levels during construction and decommissioning at the TMJ site;
- 28 • Interference to commercial and non-commercial marine users from the TMJ site to Sand Heads;
29 and
- 30 • Reduced visual quality due to increase in daytime visibility of the TMJ site and TMJ-related vessels
31 and increase in nighttime visibility of the TMJ site.

32
33 In addition to the effects listed above, the EAO concluded that TMJ would result in residual adverse effects
34 to the following CEEA 2012 factors:

- 1 • Effects on Current Use of Lands and Resources for Traditional Purposes (CEAA 5(1)(c)(iii) through
2 effects to fish, access to fishing areas and the experience of fishing;
- 3 • Effects on Current Use for other Traditional and Cultural Uses [CEAA 5(1)(c)(ii)] and Cultural
4 Heritage [CEAA 5(1)(c)(ii)] through access, quality of experience and, in the case of cultural interests
5 in SRKW, through the resource itself; and
- 6 • Effects to the Health and Socio-economic Conditions of Indigenous Peoples (CEAA 5(1)(c)(i) in
7 consideration of the views of Indigenous Groups on the potential risk of accident or malfunction,
8 real and/ or perceived health risks associated with air, noise, visual disturbance and consumption of
9 country foods, knowledge transmission, cultural continuity, and cultural health.

10

11 The EAO concludes that TMJ, combined with existing significant cumulative effects and future foreseeable
12 projects and activities, would result in:

- 13 • Significant adverse cumulative effects on SRKW due to underwater noise;
- 14 • Significant adverse cumulative effects on Current Use of Lands and Resources for Traditional
15 Purposes for fishing (CEAA 2012, Section 5(1)(c)(iii)) for Indigenous Groups that preferentially fish
16 near the TMJ site or in the shipping lanes; and
- 17 • Significant adverse cumulative effects on Cultural Heritage (CEAA 2012, Section 5(1)(c)(ii) for all
18 Indigenous Groups who have a cultural interest in SRKW, for Tsleil-Waututh Nation related to
19 cultural and spiritual practices, for Musqueam related to cultural continuity and sense of place and
20 identity, for Tsawwassen First Nation related to cultural well-being and stewardship aspirations
21 under Tsawwassen First Nation's Treaty, and for Pacheedaht First Nation and Ditidaht First Nation
22 related to cultural practices, language and knowledge transmission.

23

24 The EAO appreciates that there is a high level of public, government and Indigenous concern regarding
25 public safety risks associated with LNG activities. While the consequences for public safety due the loss of
26 containment of LNG and ignition could reach substantial distances and be very high, after mitigation, the
27 EAO notes that the likelihood of such an event is very rare, based on TJLP's definitions used in the
28 quantitative risk analysis. The risk analyses conducted during the TMJ EA show the individual and societal
29 risk fall into the "Broadly Acceptable" or "Tolerable" if as low as reasonably possible ranges. There is
30 potential for extremely rare likelihood but very high severity of consequences of accidents and
31 malfunctions causing a SRKW fatality or irreversible damage to heritage resources, for which the residual
32 risk is moderate, based on TJLP's definitions in the risk matrix. For potential effects of accidents and
33 malfunctions on other environmental VCs, no significant effects are predicted effects and the residual risk
34 level is low to moderate. Should an EAC be issued, the EAO understands that public safety risk from
35 activities at the jetty site would be discussed further during the BC Oil and Gas Commission (BC OGC)

1 permitting process. For the marine navigation component, Transport Canada (TC) noted that the
2 assessment of probability and proposed mitigation measures in the Application and supplemental
3 information were reasonable for the marine transit risk, considering the redundant layers of safety that
4 make up Canada's marine safety system.

5 **Indigenous Consultation**

6 Potential effects from TMJ, including vessel berthing, loading and de-berthing within the marine terminal
7 area during operations, and increased levels of vessel traffic due to TMJ-related vessels transiting the
8 navigational channel of the lower Fraser River to Sand Heads would occur in the asserted traditional
9 territories of the Schedule B Indigenous Groups (as identified in the EAO's Section 11 Order), and
10 downstream of the traditional territories of Katzie First Nation and the Indigenous communities
11 represented by Stó:lō Nation, Stó:lō Tribal Council, and People of the River Referrals Office. Potential
12 effects from TMJ-related vessel traffic along the shipping route through the Salish Sea, from Sand Heads
13 out to 12 nautical miles (that is, approximately 22 kilometres [km] off the west coast of Vancouver Island),
14 would occur in the asserted traditional territories of Schedule B and Schedule D Indigenous Groups (as
15 identified in the EAO's Section 11 and 13 Orders). The EAO consulted these groups throughout the EA and
16 assessed the potential adverse effects of TMJ on their Aboriginal Interests. Métis Nation BC (MNBC)
17 asserts rights and traditional uses over the entire province of BC and has indicated an Aboriginal Interests
18 associated with the proposed TMJ site. The EAO notified MNBC of key milestones during the EA to meet
19 federal consultation agreements consistent with the MOU.

20 The EAO concludes that TMJ has the potential to affect Aboriginal Interests related to fishing, hunting,
21 trapping, gathering, use of travel ways, other cultural or traditional use of marine areas or SRKW,
22 intergenerational knowledge transfer, and archaeological and heritage resources and sites. The area of the
23 development for TMJ is crown land (submerged) and the upland portion of the TMJ site is located on fee
24 simple private land that are used for industrial purposes. In the context of potential effects on Aboriginal
25 Interests the EAO also considered: the importance of TMJ to the local, regional, and provincial economy;
26 the resources or values that may no longer be available for future generations; and the benefits of TMJ to
27 Indigenous Groups.

28 The EAO notes that consultation with Indigenous Groups will be ongoing throughout the public comment
29 period. This work includes collaborative condition development, responding to Indigenous Groups' views
30 on seriousness of effects, and engaging in further dialogue on the sufficiency of proposed mitigation and
31 accommodation measures.

1 **Conclusions**

2 The EAO concludes that, considering the analysis and implementation of the proposed provincial
3 conditions and recommended KMMs under CEAA 2012, TMJ would not result in significant residual
4 adverse effects. In terms of cumulative effects, the EAO concludes that the predicted residual effects from
5 TMJ, interacting with existing significant cumulative effects, existing projects and other reasonably
6 foreseeable future projects, would contribute to significant adverse cumulative effects to SRKW, current
7 use of lands and resources for traditional purposes for fishing in the lower Fraser River and at Swiftsure
8 Bank, and to cultural heritage for some Indigenous Groups.

DRAFT

1 PART A – INTRODUCTION AND BACKGROUND

2 1 PURPOSE OF THE ASSESSMENT REPORT

3 The purpose of this Assessment Report (Report) is to summarize the procedures and findings of the EA
4 conducted by the British Columbia (B.C.) Environmental Assessment Office (EAO) for the Tilbury Marine
5 Jetty Project (TMJ), formerly known as the WesPac Tilbury Marine Jetty Project. The EAO accepted WesPac
6 Midstream-Vancouver LLC's Application (the Application) for a B.C. Environmental Assessment Certificate
7 (EAC) for the TMJ on March 20, 2019. On June 11, 2020, the EAO was notified that Tilbury Jetty Limited
8 Partnership (TJLP) replaced WesPac Midstream-Vancouver LLC as the proponent for TMJ. TJLP is a
9 partnership between affiliates of Fortis and Seaspan².

10 The EAO prepared this Report as the Assessment Report for provincial Ministers who are responsible for
11 making a decision on TMJ under Section 17 of the B.C. *Environmental Assessment Act*, 2002 (the Act) and
12 the federal Minister of Environment and Climate Change under the *Canadian Environmental Assessment*
13 *Act, 2012* (CEAA 2012). During the TMJ EA, the EAO transitioned to the new *Environmental Assessment*
14 *Act, 2018*, to advance reconciliation with Indigenous Groups and provide specific opportunities for
15 consensus-seeking in the EA process. Although the TMJ EA was conducted under the 2002 Act, the EAO
16 has integrated aspects of the 2018 Act in the TMJ EA process, including seeking consensus with Indigenous
17 Groups. For TMJ, the deciding provincial ministers are the Minister of Environment and Climate Change
18 Strategy (ENV) and the Minister of Transportation and Infrastructure.

19 On July 20, 2015, the federal Minister of Environment and Climate Change approved the substitution of
20 the EA process to the Province of B.C. The approval was granted with the understanding that the EA would
21 be conducted by the EAO in accordance with the *Memorandum of Understanding on Substitution of*
22 *Environmental Assessments (2013)* (MOU) entered into by the Impact Assessment Agency of Canada (the
23 Agency) (formerly the Canadian Environmental Assessment Agency) and the EAO. In accordance with the
24 MOU, the EAO would consider the factors as set out in subsection 19(1) of CEAA 2012, including but not
25 limited to Section 5 of CEAA 2012 when conducting the EA, gather information from Indigenous Groups
26 about the effects of TMJ on their potential or established Aboriginal treaty rights and ways to prevent,
27 mitigate or otherwise address those effects as appropriate, and provide an EA Report to the Agency that
28 includes the findings and conclusions of the EA with respect to those factors. Ultimately, substitution
29 results in one EA process designed to support separate provincial and federal EA decisions. The EAO

² References to TJLP includes all the consultation and engagement activities, submissions and studies conducted by WesPac Midstream-Vancouver LLC prior to the ownership transfer of TMJ.

1 assessed TMJ in a manner also consistent with the Agency's *Notice of Commencement of an Environmental*
2 *Assessment and Substitution Approval* and Section 19(1)(f) of CEAA 2012.

3 The EAO will submit the EAO's Report to the Agency to inform the federal Minister's decision-making
4 under CEAA 2012. Pursuant to paragraph 34(1)(e) of CEAA 2012, the EAO's Report will be made public at
5 the conclusion of the EA. This Report:

- 6 • Describes TMJ, the substituted EA process, and consultation undertaken during the EA;
- 7 • Documents the work the EAO did to consult and accommodate Indigenous Groups in keeping with
8 the Supreme Court of Canada's direction in *Haida v. Minister of Forests* and related case law;
- 9 • Documents procedural aspects of consultation with Indigenous Groups, including Métis Nation B.C.
10 on behalf of Canada;
- 11 • Identifies the potential environmental, economic, social, health and heritage effects of TMJ,
12 including cumulative effects and how TJLP proposes to mitigate adverse effects;
- 13 • Identifies the residual adverse effects after mitigation;
- 14 • Summarizes all environmental management plans (EMPs) and follow-up plans described in TJLP's
15 Application for a provincial EAC and federal Decision for TMJ;
- 16 • Identifies the EAC conditions proposed by the EAO;
- 17 • Recommends Key Mitigation Measures (KMM)³ under CEAA 2012 (Appendix 1); and,
- 18 • Sets out conclusions based on TMJ's potential for significant adverse residual effects with respect
19 to both the Act and CEAA 2012.

20 In the preparation of this Report, the EAO has considered the following information:

- 21 • The Application (accepted March 2019) and supplemental information⁴ provided by TJLP;
- 22 • The Marine Shipping Assessment (MSA) report provided by TJLP (December 2019);
- 23 • The BVSA report provided by TJLP (February 2022);
- 24 • Advice provided on the Application and supplemental information, MSA report and BVSA report by
25 the Advisory Working Group (Working Group) and Indigenous Groups; and
- 26 • Input received from members of the public.

³ The EAO has recommended KMMs to mitigate potential adverse environmental effects related to CEAA 2012 because TMJ is undergoing a substituted EA process. The EAO led consultation on the KMMs to inform the development of the federal Conditions. Recommended federal conditions are not included in the Assessment Report and, under the MOU, are developed by the Agency and submitted to the federal Minister of Environment and Climate Change Canada. The Agency shared the list of draft federal conditions with the EAO, and the EAO confirms that the Agency is proposing conditions that have been informed by the KMMs recommended under CEAA 2012 by the EAO.

⁴ Alternatives Assessment Supplemental Report – Westpac Tilbury Marine Jetty Project dated November 2019 (https://www.projects.eao.gov.bc.ca/api/public/document/60a49304148b4a002330610c/download/20191127_Alternatives%20Assessment.pdf), and responses to information requests from Working Group members.

1 The Application, supplemental information, MSA report, and BVSA report are posted to the EAO's Project
2 Information Centre (EPIC)⁵. The MSA report was prepared in response to the expansion of the geographic
3 extent of the assessment for potential effects of marine shipping activities from Sand Heads to the 12-
4 nautical mile limit of the territorial sea of Canada. The BVSA report was prepared to assess TJLP's proposed
5 bunker vessel scenario (BVS) which considered additional bunker vessel calls on the jetty, using the same
6 geographic scope (i.e., jetty to Sand Heads), regulatory context, assessment boundaries and baseline
7 information as the Application. The BVS did not affect the number of vessels in the MSA (see Section 2.2.2
8 for more details).

9 **1.1 READER'S GUIDE TO THE ASSESSMENT REPORT**

10 Each Section in this Report focuses on a Valued Component (VC) and is organized in the manner described
11 below. The EAO's methodology and residual effects characterization definitions are provided in
12 Appendix 2.

- 13 • **Background** – contains relevant background information, primarily found in the Application, MSA
14 and BVSA. Information related to the MSA is found under a separate heading.
- 15 • **Potential Project Effects and Proposed Mitigations Identified in the Application** – summarizes
16 TJLP's assessment findings and proposed mitigation measures as provided in their Application,
17 MSA, BVSA and supplemental information. TJLP's MSA findings are under a separate heading.
- 18 • **Potential Project Effects and Proposed Mitigations Identified During Application Review** –
19 describes key issues and concerns raised by Working Group members and the public during the
20 Application review period. Each description of a key issue or concern is followed by TJLP's response
21 including critical outcomes from any additional analysis. Many of the EAO's proposed conditions
22 and recommended KMMs under CEAA 2012 (Appendix 1) are mitigations to further address the
23 issues.
- 24 • **The EAO's Characterization of Residual Effects** – contains the EAO's objective analysis of all
25 information received from TJLP, the Working Group and the public, and describes the EAO's
26 understanding of residual adverse effects of TMJ in consideration: context, magnitude, extent,
27 duration, reversibility, frequency, likelihood, and confidence.
- 28 • **The EAO's Analysis and Conclusions** – summarizes the EAO's significance determination, if
29 applicable. Where the EAO does not conclude on significance of residual adverse effects (for
30 example, Pathway Components such as River Processes), a reference to the applicable VC
31 conclusions is provided.

⁵ <https://www.projects.eao.gov.bc.ca/p/58851208aaecd9001b829b58/documents>

- 1 • **Cumulative Effects Assessment** – contains the EAO’s analysis and determination of residual
- 2 cumulative effects, including past, present, and reasonably foreseeable projects and activities with
- 3 the potential to act cumulatively with TMJ.
- 4 • **Conclusion** – States the EAO’s overall conclusion on whether TMJ would have significant adverse
- 5 effects on the given VC.

6 **2 PROJECT OVERVIEW**

7 **2.1 PROPONENT DESCRIPTION**

8 The Tilbury Marine Jetty is proposed by Tilbury Jetty Limited Partnership (TJLP). Once constructed, TMJ
9 would be owned and operated by TJLP. TJLP provides updates on TMJ at <https://tilburypacific.ca>.

10 **2.2 PROJECT DESCRIPTION AND SCOPE**

11 **2.2.1 PROJECT DESCRIPTION AND LOCATION**

12 TJLP proposes to construct and operate TMJ, a new marine jetty that would provide berthing and loading
13 facilities for liquefied natural gas (LNG) carriers and bunker vessels with a carrying capacity of up to
14 100,000 cubic metres (m³). TMJ would transfer LNG via pipeline from the existing adjacent FortisBC Tilbury
15 LNG Liquefaction Plant (Tilbury LNG Plant) to third-party owned and operated carriers and bunkers
16 berthed at the jetty. TMJ was assessed based on a maximum terminal throughput of 3.5 million tonnes per
17 annum (MTPA) of LNG⁶. The Tilbury Phase 2 LNG Expansion Project (Tilbury Phase 2), which proposes to
18 increase LNG storage capacity at the Tilbury LNG Plant, is currently undergoing a substituted EA under the
19 provincial *Environmental Assessment Act* (2018) and the federal *Impact Assessment Act* (2019). The EAO
20 understands that the capacity of Tilbury Phase 2 would exist regardless of TMJ, and that TMJ is not
21 FortisBC’s only path to serve LNG customers. TJLP confirmed that the existing facilities and Tilbury Phase 1
22 expansion (approved via provincial Order in Council) would produce LNG that would be shipped through
23 TMJ, and that TMJ does not require any of the Phase 2 expansion to proceed. The storage tank for Tilbury
24 Phase 2 would proceed whether the TMJ is build or not, as the purpose of Phase 2 is to improve gas
25 delivery system resiliency after recent no-flow events.

26 In TJLP’s Application, TJLP estimated up to 137 vessel calls (68 LNG carriers calls and 69 bunker vessel calls)
27 at the jetty, resulting in 274 trips (inbound and outbound) annually, equivalent to approximately one

⁶ TMJ would have a maximum LNG throughput of 3.5 MTPA, based on TJLP’s National Energy Board (NEB) export license, regardless of the number of vessel calls.

1 vessel call every three days. In November 2021, TJLP proposed a BVS of up to 365 LNG vessel calls per year,
2 based on recent developments in the LNG bunkering and bunker vessel markets. As such, TJLP conducted
3 additional analysis, which is captured in the BVSA Report, assessing up to 365 vessel calls in a year, with a
4 vessel mix of 307 bunker vessels and 58 LNG carriers. Both Application scenario (i.e., 274 annual trips) and
5 BVS (i.e., 730 annual trips) are considered in the assessment.

6 The overall vessel length of an LNG carrier would be 250 metres (m), with a deadweight tonnage (DWT) of
7 47,000 tonnes. In TJLP's Application, LNG bunkers were assumed to have an overall vessel length of 120 m
8 and a DWT of 6,500 tonnes. Since the Application, TJLP identified that smaller, highly maneuverable
9 vessels have emerged as the front-runner LNG bunker providers in the Port of Vancouver. TJLP identified
10 two types of bunker vessels currently in development to serve the Port of Vancouver that could load at
11 TMJ. One is an LNG-powered bunker vessel with a 7,600 m³ LNG capacity and the second is a diesel-
12 powered articulated tug barge⁷ (ATB) with a 4,000 m³ LNG capacity. TJLP identified that the use of smaller
13 bunker vessels would result in a reduction in capacity from the bunker vessel assumptions in the
14 Application, which resulted in TJLP proposing the BVS with an increase in number of bunker vessel calls
15 needed to supply LNG in the Port of Vancouver. For the BVSA analysis, TJLP assumed that bunkers vessels
16 would be up to 113 m in length, up to 3,500 DWT tonnes, be highly maneuverable, and would not require
17 the use of tugs⁸, which is a change from the Application. Most of the LNG carriers and bunker vessels
18 would be LNG powered. Up to 10 percent of LNG vessels may use crude-based fuel as a primary fuel
19 source, excluding LNG bunker barges moved by tugs.

20 The TMJ site would be located on Tilbury Island, adjacent to the Fraser River, approximately 21 km from
21 the mouth of the South Arm of the Fraser River at the Sands Head Lighthouse (Sand Heads) (Figure 1). The
22 TMJ site lies between the Tilbury LNG Plant and an industrial site currently occupied by Varsteel Ltd., a
23 steel services and supplier located southwest of TMJ. The site and surrounding lands are currently
24 designated for heavy industrial and marine uses by Delta. Existing marine terminals in the surrounding
25 areas include Seaspan Ferries, Lehigh Hanson Cement, Annacis Auto Terminals, and Fraser Surrey Docks.

26 TMJ involves onshore and offshore facilities. The onshore facilities portion would be located on easements
27 and rights-of-way within FortisBC-owned land on Hopcott Road. The closest identified permanent
28 residents are three farm dwellings located on 68th Street, approximately 440 m south of the TMJ site.
29 There are no seasonal or temporary residents within one km of the site and no land-based recreational

⁷ An articulated tug barge consists of a tank vessel (barge) and a large tug that is positioned in a notch in the stern of the barge, which enables the tug to propel and maneuver the barge.

⁸ TJLP stated that bunker vessels that would call to TMJ are anticipated to be 'purpose built' bunker vessels. TJLP noted the updated bunker vessel information of likely bunker vessels confirms that designs of these bunker vessels have incorporated exceptional maneuverability and station holding capability and redundancy so as not to require the assistance of tugs. However, that determination would be made by the Port of Vancouver Harbour Master under its rules and criteria.

1 access to the site. To access the onshore facilities, TJLP would need to construct a new access road on
2 Tilbury Road, next to and along the boundary of the property occupied by Varsteel Ltd.

3 The offshore facilities portion of TMJ involves 69,000 square metres (m²) of Provincial Crown waterlots
4 under the jurisdiction of the B.C. Ministry of Forests (FOR). A new waterlot permit for 150 m of Fraser River
5 foreshore would be required from the B.C. Oil and Gas Commission (BC OGC). Delta has expressed the
6 intent to rezone the waterlot portion of the TMJ site to reflect the possibility of LNG activity. The
7 assessment of land and marine resource uses is provided in [Section 8.2](#) of this Report. If TMJ receives an
8 EAC and all required regulatory approvals, TJLP will operate the proposed marine jetty for a minimum of
9 30 years.

10 LNG carriers would ship LNG predominantly to international markets, and LNG bunkers would ship
11 predominantly to local and regional coastal markets and transport LNG to fuel other vessels. Vessels
12 carrying out TMJ-related marine shipping activities would follow the standard shipping routes and
13 procedures along the international shipping lanes from the Sands Heads Lighthouse (Sand Heads) to the 12
14 nautical mile (nm) limit of Canada's territorial sea (12 nm limit). TJLP would be responsible for all shore-
15 based marine operations at TMJ and all shore-to-ship transfer operations and procedures. TJLP would not
16 be conducting marine shipping. Once vessels depart from the jetty, the independent vessel owners would
17 have responsibility for navigation, transit, and incidents.

18 The EAO made the preliminary determination that TMJ overlaps the traditional lands of those Indigenous
19 Groups listed below and may affect the Aboriginal Interests of those Indigenous Groups. Schedule B of the
20 Section 11 Order dated July 24, 2015, lists the Indigenous Groups below as those requiring a deeper level
21 of consultation:

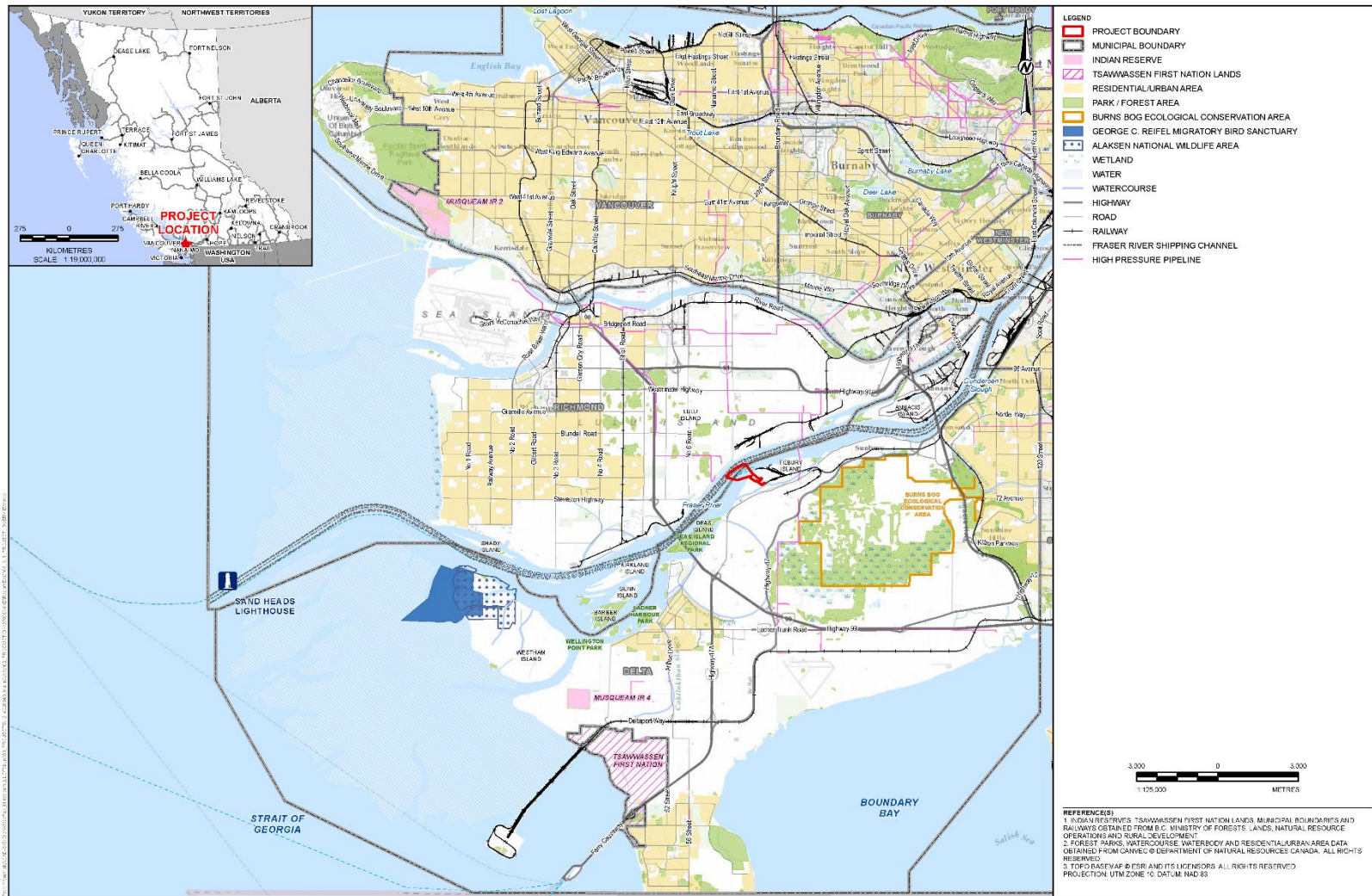
- Cowichan Tribes;
- Halalt First Nation;
- Kwantlen First Nation;
- Lyackson First Nation;
- Lake Cowichan First Nation¹⁰;
- Musqueam Indian Band;
- Tsawwassen First Nation⁹;
- Stz'uminus First Nation.
- Penelakut Tribe:
 - Hwlitsum¹¹;

22 TMJ would be closest to the communities of Tsawwassen First Nation and Musqueam Indian Band. A
23 Tsawwassen First Nation community is located 10 km from the TMJ site. A Musqueam Indian Band
24 community, Indian Reserve (IR) 2, is located 13 km from the TMJ site.

⁹ Tsawwassen First Nation entered into the Tsawwassen First Nation Final Agreement ("Tsawwassen Final Agreement") with Canada and B.C. which was negotiated under the BC Treaty Commission and came into effect on April 3, 2009.

¹⁰ Ts'uubaa-asatx Nation (formerly Lake Cowichan First Nation)

¹¹ The EAO's reference to the Hwlitsum is not intended to signify any change in the position that the Province may have taken in other contexts in relation to the duty to consult with this group. Hwlitsum was removed from Schedule B in accordance with the Section 13 Order issued on February 14, 2018. Refer to Section 4.2 of this Report.



1

2 **Figure 1: Location of Tilbury Marine Jetty Project**

1 Schedule C of the Section 11 Order lists the following Indigenous Groups as those requiring notification of
2 key project milestones:

- Katzie First Nation
- Métis Nation B.C.;
- Semiahmoo First Nation;
- Squamish Nation;
- Stó:lō Nation;
 - Stó:lō Tribal Council;
- Tsleil-Waututh Nation.

3 Between July 24, 2015 and January 19, 2022, the EAO issued five Orders under Section 13 of the Act to
4 amend the Section 11 Order:

- 5 1. On September 25, 2015, the EAO issued a Section 13 Order to clarify that the Act referred to in the
6 definition of “Aboriginal Consultation Plan” in Section 1 of Schedule A was CEAA 2012, not the
7 *Environmental Assessment Act*. This Section 13 Order also moved Tsleil-Waututh Nation from
8 Schedule C to Schedule B, and added the People of the River Referrals Office to Schedule C;
- 9 2. On May 11, 2016, the EAO issued a Section 13 Order to move Semiahmoo First Nation and
10 Squamish Nation from Schedule C to Schedule B because of additional information provided by the
11 two Indigenous Groups regarding their traditional territories, and the EAO’s analysis of that
12 additional information;
- 13 3. On February 14, 2018, the EAO issued a Section 13 Order to remove Hwlitsum First Nation from
14 Schedule B of the Section 11 Order because of the B.C. Supreme Court’s (Supreme Court) ruling in
15 *Hwlitsum First Nation v. Canada* (BCSC 47 in April 2017) in which the Supreme Court dismissed
16 Hwlitsum First Nation’s Aboriginal title claim under Section 35 of the *Constitution Act, 1982*; and
- 17 4. On July 9, 2019, based on information provided by TJLP and recommendations of the Working
18 Group, the Agency revised the conditions of substitution by extending the geographic scope of the
19 assessment of effects from marine shipping activities west to the 12 nm limit and north to include
20 the disposal at sea site near Point Grey. This extension enabled a broader assessment of the effects
21 on the marine environment. Additional Indigenous Groups needed to be consulted because the
22 scope extension overlaps the traditional territories of those Indigenous Groups. The EAO issued a
23 Section 13 Order on August 6, 2019, to put into effect a new Schedule D requiring that the
24 Indigenous Groups below be consulted on TMJ marine shipping activities:

- Ditidaht First Nation
- Esquimalt Nation
- Malahat First Nation
- Tsartlip First Nation
- Tsawout First Nation
- T'Sou-ke (Sooke) First Nation

- Pacheedaht First Nation
- Pauquachin First Nation
- Tseycum Indian Band
- Scia'new (Beecher Bay) First Nation
- Songhees Nation
- Maa-nulth First Nations¹²:
 - Huu-ay-aht First Nations;
 - Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations;
 - Toquaht Nation;
 - Uchucklesaht Tribe; and
 - Ucluelet First Nation

1 5. On January 19, 2022, the EAO issued a Section 13 order to add Snuneymuxw First Nation to
 2 Schedule B and Kw'ikw'əłəm (Kwkwetlem) First Nation to Schedule C for the remainder of the EA,
 3 related to the BVSA.

4 Part C of this Report describes the Aboriginal Interests of Indigenous Groups listed in Schedules B, C and D
 5 of the Section 11 Order and potential TMJ effects on these Aboriginal Interests.

6 2.2.2 DESCRIPTION AND LOCATION OF MARINE SHIPPING AREA FOR ASSESSMENT

7 On July 9, 2019, the federal Minister of Environment and Climate Change expanded the geographic extent
 8 of marine shipping for the purposes of assessing environmental effects from marine shipping activities
 9 associated with vessel movements in the MSA area. The EAO reflected this expansion in a Section 13 Order
 10 issued on August 6, 2019, in which the geographic extent of marine shipping was expanded from Sand
 11 Heads at the mouth of the Fraser River to the 12 nm limit (that is, approximately 22 km off the west coast
 12 of Vancouver Island). This expansion was in response to comments raised by the Working Group regarding
 13 potential effects associated with marine shipping beyond the boundaries established in the approved
 14 Application Information Requirements (AIR) document issued by the EAO on November 29, 2016. Vessels
 15 bound for existing ports in the Fraser River and for other Canadian and US ports enter and exit the
 16 shipping lanes in the Juan de Fuca Strait north of Cape Flattery at “Buoy J”, located at the western edge of
 17 the Salish Sea (Figure 2). The outbound shipping lane is located on the Canadian side of the Canada/ US
 18 border. The inbound shipping lane is located on the American side of the Canada/ US border. The Canadian
 19 and US coast Guards jointly manage ship traffic in this transboundary waterway.

20 The MSA Report is a supplemental report to the Application submitted by TJLP, in response to a formal
 21 request made by the EAO. The MSA Report provides additional details on the care and control of vessels,
 22 including relevant information regarding contractual arrangements and assess potential interactions

¹² Huu-ay-aht First Nations, Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations, Toquaht Nation, Uchucklesaht Tribe and Ucluelet First Nation entered into the Maa-nulth First Nations Final Agreement (“Maa-nulth Final Agreement”) with Canada and B.C. which was negotiated under the B.C. Treaty Commission and came into effect on April 1, 2011.

1 between activities associated with marine shipping and applicable VCs and Pathway Components (PC)
2 within the spatial and temporal boundaries described in this Report. The expansion of the geographic
3 extent applies to the MSA and is not an extension of the spatial boundaries described in the Application.
4 Rather, the spatial boundaries of the expanded MSA are considered separate from the Application and
5 include additional study areas.

6 The MSA relied on baseline information collected and assessment already completed for the Trans
7 Mountain Expansion Project (TMX) and Roberts Bank Terminal 2 Project (RBT2). The TMX and RBT2
8 projects provided substantial baseline information on existing marine environmental and human
9 environmental conditions along B.C.'s south coast and completed assessments including a review of
10 regional cumulative effects associated with shipping. The MSA also drew on existing publicly available data
11 and analytical assessments completed as part of the TMX and RBT2 Projects, including Panel¹³ review
12 transcripts, other public sources, and input from the Marine Shipping Working Group.

13 In the MSA, TJLP assessed an operating scenario of 118 LNG vessel round trips (approximately 68 LNG
14 carrier and 50 bunker vessel round trips) through the MSA Area. TJLP has advised to the EAO that, despite
15 the change in bunkering and bunker vessel markets, the estimated number of TMJ-related LNG vessel
16 round trips in the MSA Area remains at 118, consistent with the MSA. As such, TJLP conducted the BVSA
17 on the variation in vessel traffic that may be experienced in the lower Fraser River (i.e., original Application
18 area). The EAO understands that although the ratio of LNG carrier and bunker vessel trips in the MSA Area
19 may change from what was considered in the MSA, the number of LNG carrier round trips would be no
20 more than 68. At the request of the EAO, [TJLP provided justification](#), including bunker vessel displacement
21 analysis, to verify TJLP's predictions that there would be no change in TMJ-related vessel traffic compared
22 to what was assessed in the MSA.

23 2.2.3 PROJECT COMPONENTS

24 TMJ would involve two main components, the floating temporary bunker berth/ platform (FTBB) and the
25 permanent marine tandem jetty (PMTJ) (Figure 3). Below is a summary description of the FTBB and PMTJ.
26 The Application provides more details on these components as well as on the proposed ancillary structures
27 and facilities associated with TMJ, and systems for operation monitoring, vessel traffic control, security,
28 lighting, water treatment, fire protection, and emergency management. Waste water generation is not
29 anticipated for TMJ; therefore, waste water treatment is not a component of TMJ.

¹³ On January 7, 2014, the federal Minister of Environment and Climate Change announced the referral of the proposed RBT2 for an EA by an independent review panel.

1 **Floating Temporary Bunker Berth/ Platform**

2 TJLP proposed to construct the FTBB prior to the construction of the PMTJ. The FTBB would be a
3 temporary off-shore structure made up of a floating platform, approximately 12 m wide and 18 m long,
4 and two berthing dolphins¹⁴ that would connect to the shoreline via a FTBB trestle. The new temporary
5 trestle would provide access from the existing stub dock to the FTBB. To anchor the FTBB trestle and
6 floating platform, 18 temporary piles would be installed. The FTBB would be constructed upstream of the
7 proposed site for the PMTJ. The FTBB would supply LNG bunker vessels until the PMTJ is commercially
8 operational. The FTBB is expected to be in operation for three years while the construction on the PMTJ
9 proceeds. Once the PMTJ is operational, TJLP intends to decommission and remove the temporary FTBB
10 platform and trestle via barge. Temporary piles would also be removed.

11 **Permanent Marine Tandem Jetty (PMTJ)**

12 The PMTJ would be a physical structure made up of two berths, one for carriers and the other for bunker
13 vessels. Each berth would be approximately 20 m wide and 22 m long and include mooring dolphins and
14 berthing dolphins. Piles would be installed to support the berths, main trestle and mooring dolphins. The
15 two berths would be connected to each other by a platform. In turn, the platform would be connected to
16 the onshore LNG transfer piping system by a main trestle, up to 300 m in length and 4 m wide. Section
17 1.1.5.1 and Figure 1.0-3 of the Application provide more details on the design components of the main
18 trestle and platforms. Once construction on the PMTJ is complete, the combined two-berth structure
19 would accommodate vessels of up to 250 m long and 38 m wide.

20 **2.2.4 PROJECT ACTIVITIES**

21 The temporal boundary is defined as the life of TMJ, which involves three phases: construction, operations
22 and decommissioning. For the effects assessment, the temporal boundaries are as follows:

- 23 • Construction: 3 years;
- 24 • Operations: a minimum of 30 years; and
- 25 • Decommissioning: 1 year.

26 Section 1.1.6 of the Application provides more details on key activities.

¹⁴ A mooring dolphin is a man-made marine structure that extends above water and is not connected to shore. A mooring dolphin is installed to provide a fixed structure when it would be impractical to extend the shore to provide a dry-access facility for mooring. Dolphins typically consist of several piles driven into the seabed and connected above the water level to provide a platform or fixed point. Access to a mooring dolphin may be via a pedestrian bridge.

1 **CONSTRUCTION**

2 Proposed on-site and off-site construction activities for the construction of the FTBB and the PMTJ are
3 expected to begin as early as 2023 if TMJ is granted an EAC and all applicable permits and approvals. Early
4 construction activities are expected to occur predominantly outside the established navigational channel
5 in the Fraser River. Key activities during construction are summarized below:

6 **Site Preparation**

- 7 • Establish laydown area;
- 8 • Removal of existing abandoned marine infrastructure in the water lot;
- 9 • Vegetation clearing;
- 10 • Construction of a construction dock;
- 11 • Dredging of the approach channel and berth pocket. During construction, capital dredge,
12 approximately 50,000 m³ of sediment, would be dredged for construction of the FFTB within a
13 1.7 hectare (ha) area. Approximately 460,000 m³ of sediment would be dredged for construction of
14 the permanent marine jetty within a 20.4 ha area. Estimated volumes and frequency of
15 maintenance dredging would depend on actual sediment deposition rates;
- 16 • Ground stabilization works for both onshore and offshore facilities to meet post-seismic
17 requirements;
- 18 • Construction of the jetty and LNG transfer pipeline; and
- 19 • Implementation of erosion and sediment control measures.

20 **Temporary Works**

- 21 • Construction of temporary roads and detours for TMJ access;
- 22 • Construction of a temporary dock for the transport of materials and equipment;
- 23 • Dredging of the FTBB construction area;
- 24 • Installation of temporary piles to support the FTBB structures; and
- 25 • Installation of cryogenic hose auxiliary supports for the FTBB.

26 **Construction of the PMTJ and LNG Transfer Pipeline**

- 27 • Installation of the main trestle bridge, berthing dolphins, mooring dolphins, pile support, catwalks,
28 bunker platforms and deck; and
- 29 • Installation of the jetty and LNG transfer pipeline, vapour return pipe, re-circulation line, loading
30 arms, pipe rack system, lighting, control systems, and supporting utilities.

1 OPERATIONS

2 The FTBB would operate until the permanent PMTJ becomes commercially operational. During the
3 operations of the FTBB¹⁵, followed by the operations of the PMTJ, activities would involve:

- 4 • Navigation of vessels using the commercial shipping route from Juan de Fuca Strait, to Haro Strait,
5 Boundary Pass, Strait of Georgia, mouth of the Fraser River, and then to TMJ;
- 6 • Berthing of LNG carriers and LNG bunker vessels at the jetty;
- 7 • Transfer of LNG from FortisBC to LNG carriers and LNG bunkers using the proposed TMJ loading
8 system;
- 9 • Maintenance dredging; and
- 10 • Pilotage which would follow the Port of Vancouver TCZ-4 Guidance.

11

12 Navigation

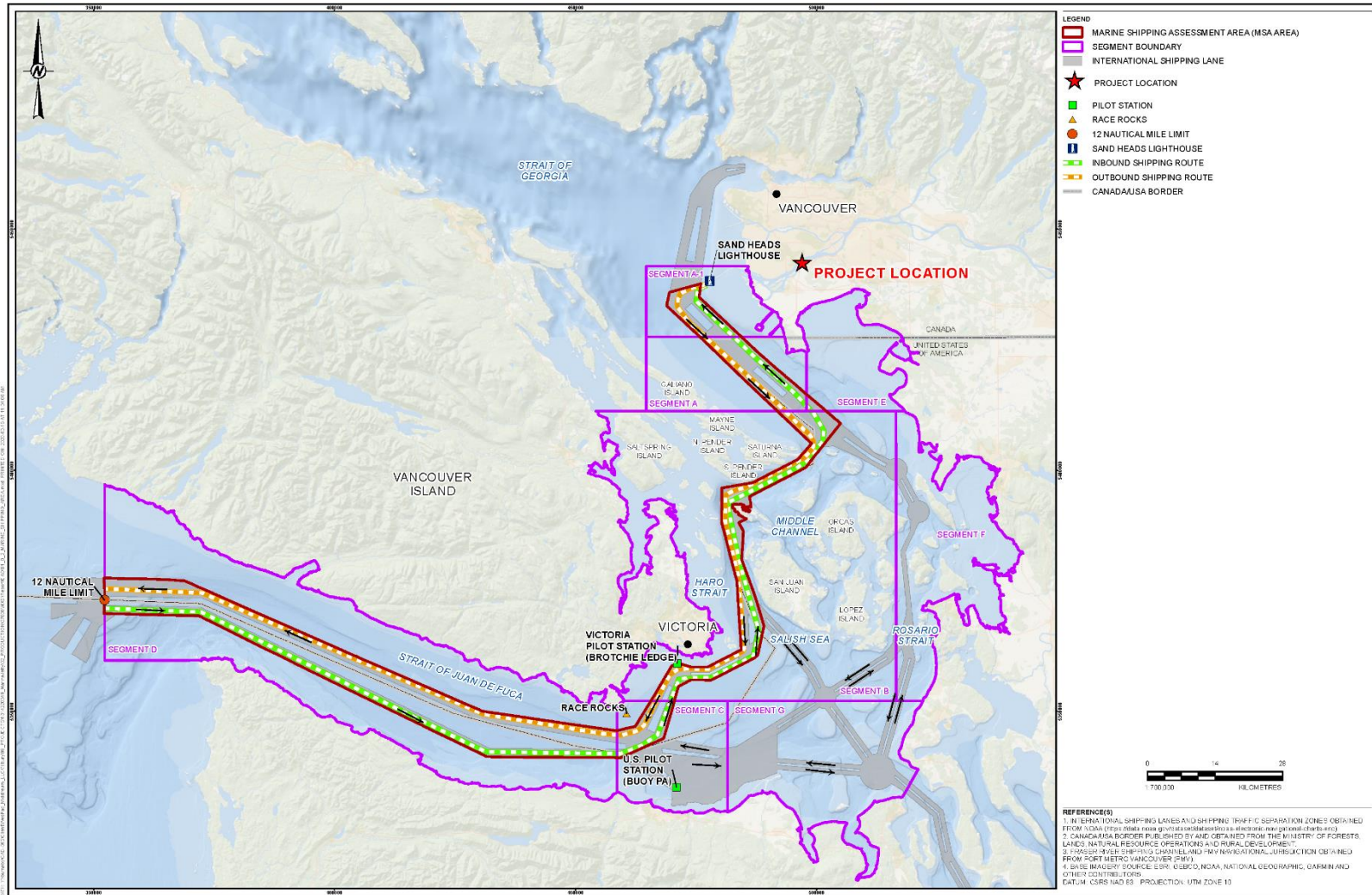
13 While the navigation of vessels is not a component of TMJ, navigation is an aspect of marine shipping for
14 which the EAO noted a high level of public and Working Group interest. For this reason, navigation was
15 assessed as part of the EA and a summary of navigation is included in this Report.

16 TJLP views TMJ as a key link in the LNG supply chain on the Pacific, facilitating the loading of LNG from
17 FortisBC's adjacent Tilbury LNG facility onto purpose-built bunker vessels and LNG carriers. This integrated
18 supply chain relies on multiple partners in the global supply chain working closely together to supply LNG
19 to the end customer.

20 Longer-term commercial agreements with LNG bunker or LNG export customers provide supply chain
21 certainty to the partners involved. These commercial agreements specify the requirement to develop
22 annual delivery plans for LNG. These annual delivery plans set out the timing and frequency with which
23 LNG carriers or bunker vessels would call at TMJ and these plans would be based on the availability of LNG
24 from FortisBC's Tilbury LNG facility, the operational requirements of the TMJ as well as numerous other
25 commercial considerations contained within the commercial agreements.

26 The TMJ is operationally limited to loading one vessel with LNG per day, on average, to an annual
27 maximum of about 365 calls. Annual LNG carrier calls would be limited to 68 and the TMJ's maximum
28 throughput capacity is 3.5 MTPA of LNG. Based on these operational limits, TJLP considers a maximum
29 annual operating scenario to involve 58 LNG carrier calls and 307 bunker vessel calls. This is the maximum
30 scenario because it involves the greatest number of vessel calls, while still meeting the maximum annual
31 throughput capacity.

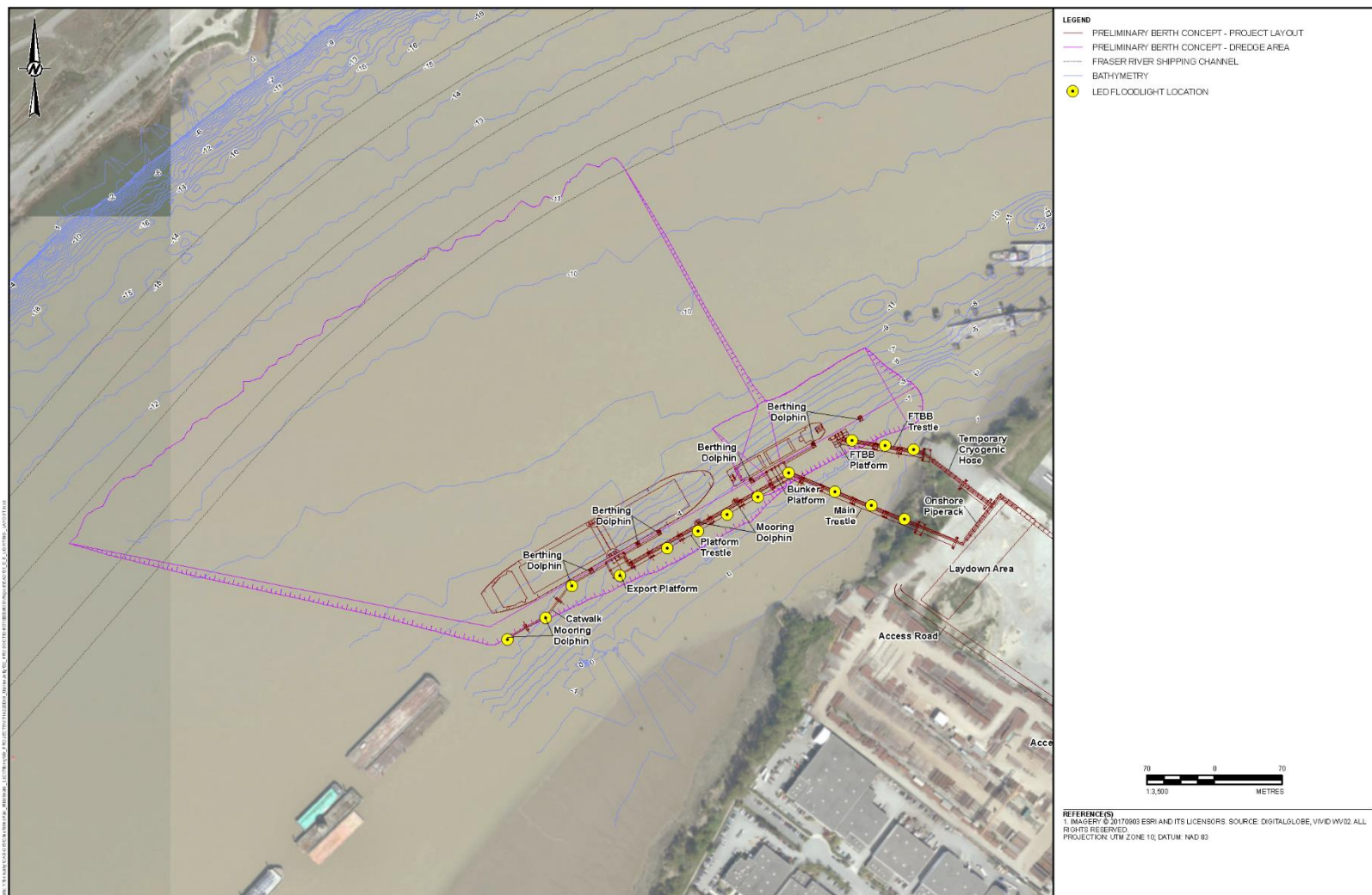
¹⁵ The FTBB would only supply LNG bunkering vessels.



1
2

Figure 2: Location of Marine Shipping Area for Assessment.

1



2

3 **Figure 3: Location of Tilbury Marine Jetty Project Components**

1 LNG carriers calling at the jetty would use the principal commercial shipping route starting at
2 the Juan de Fuca Strait, continuing through Haro Strait, Boundary Pass and the Strait of Georgia
3 to the entrance of the Fraser River, and up the Fraser River to the jetty. The first pilot boarding
4 location is at the Fairway Buoy Pilot Station off Brotchie Ledge, Victoria. TMJ LNG carriers would
5 be piloted by a BC Coasts Pilot from this pilot station to Sand Heads Pilot Station located at the
6 entrance of the Fraser River. At Sand Heads, the BC Coasts Pilot would disembark, and a Fraser
7 River Pilot would board the carrier and continue to navigate the vessels to the jetty to ensure
8 safe navigation in the Fraser River. Tugs operated by qualified tug operators would escort the
9 LNG carriers to berths at the jetty. On departure, carriers would be pulled off the berth using a
10 tug assist. Vessel operators must comply with all applicable national and international safety
11 requirements and Vancouver Fraser Port Authority (VFPA) guidelines while the vessels are on
12 the Fraser River or at the jetty.

13 LNG carriers would arrive at TMJ at scheduled intervals in respect of a predictable and reliable
14 global supply chain. These intervals would ensure that the upstream supply of natural gas to
15 FortisBC's Tilbury LNG facility, the production and storage of LNG at the facility and the
16 offloading of LNG to the receiving terminals is well coordinated. The consistency of the intervals
17 would also ensure that no part of the supply chain is required to shut down or modify their
18 operations as a result of inconsistent deliveries.

19 In the Application scenario of 68 LNG carrier calls a year, loading would take place roughly once
20 every five days. A typical transit schedule would allow 48 hours for an LNG carrier to transit the
21 Fraser River.

22 Bunker vessels calling at the jetty would use the principal commercial shipping route to access
23 non-regional markets (i.e., external of the Salish Sea). A portion of bunker vessels are expected
24 to service regional markets and could travel in and outside of the established shipping lanes to
25 deliver LNG as fuel to ships visiting Vancouver and regional ports. In contrast to the LNG
26 carriers, the bunker vessels would not require a pilot in the Salish Sea.

27 The loading period for an LNG carrier is approximately 16 hours. The loading period for bunker
28 vessels would be complete in up to 7-8 hours and while these smaller vessels would not require
29 the same buffer times as LNG carriers, their departures and arrivals may be affected by the
30 same complexities such as changing weather, tides or other concerns.

31 **DECOMMISSIONING**

32 Decommissioning would involve the dismantling and removal of all onshore and offshore
33 facilities and structures. Decommissioning would also include the installation of foreshore slope
34 protection, restoration and re-vegetation to prepare the site for future use.

1 2.2.5 ALTERNATIVE MEANS OF UNDERTAKING THE PROJECT

2 *PROJECT DESIGN*

3 The Application describes the process through which TJLP evaluated alternate design options
4 for the jetty. TJLP selected the design described in the Application because, overall, TJLP
5 concluded that it would result in greater navigation safety and loading operations safety, and
6 lower environmental effects. The Application indicated that TJLP provided information to
7 Schedule B Indigenous Groups (prior to the establishment of Schedule D) on alternate project
8 designs and configuration options early in the consultation process. Comments received by TJLP
9 were incorporated into refining the TMJ project design.

10 TJLP determined that the alignment of the main trestle described in the Application would
11 provide more direct routing over the riverbed thereby reducing disturbance to soil stabilization,
12 pile driving and shading. The alternative option would have resulted in a greater disturbance
13 footprint in the riparian area.

14 In developing the current option, TJLP considered alternative modes of transporting LNG fuel to
15 bunker and export markets including road and rail in addition to marine options to transport
16 LNG from the FortisBC Tilbury LNG Plant. Marine transport was selected to transport LNG to
17 export markets as it is the most efficient method of transportation that has the capability to
18 export LNG across the ocean to off-shore LNG markets.

19 Marine transfer of LNG fuel to the local bunker market was selected by TJLP as this mode is
20 consistent with the existing method of fueling ships. Currently, ships typically load fuel from the
21 water side of the vessel while at berth or while anchored off-shore. TJLP noted that a marine-
22 based fuel transportation system is required to meet the current fueling system while
23 alternative methods of delivery would require changes to the regional fueling systems.

24 TJLP considered LNG transport via roads to local and/ or regional ports; however, TJLP noted
25 this option is not consistent with the typical fuel delivery system currently implemented in the
26 region. Further, TJLP considered road transportation of large quantities of LNG using the public
27 road system presents logistical challenges resulting in a less efficient and economical delivery
28 system.

29 *MARINE SHIPPING ROUTE ALTERNATIVES*

30 The MSA Report concluded that there is no practical alternative marine route to the one
31 described in the MSA Report. A marine emergency is the only foreseeable reason for which re-
32 routing an LNG carrier would be necessary. Alternate routes would involve passage via Puget

1 Sound, and the American passage would require US and Canadian pilotage. TJLP concluded that
2 such alternate routes were not viable because of expense and pilotage.

3 *ALTERNATIVES TO THE PROPOSED PROJECT*

4 TJLP considers TMJ, as described in the Application, the only viable project option. The location
5 proposed for TMJ was selected because of its proximity to the existing, and operational,
6 FortisBC Tilbury LNG Facility (built in 1971). The FortisBC Tilbury LNG Facility currently supplies
7 natural gas to local residents as well as to local and export markets. TMJ provides a means to
8 deliver LNG to regional and global markets. Further, the selected TMJ site is designated for
9 heavy industrial use and has been historically modified, reducing the potential effects to natural
10 environmental resources. Any other alternatives involving a different location would not be
11 situated near a pre-existing liquefaction facility and therefore would require the development
12 of a new LNG facility in a greenfield site and additional natural gas pipelines and related
13 infrastructure.

14 *DREDGE DISPOSAL*

15 Section 1.3.3 of the Application describes potential benefit uses and disposal options for marine
16 sediment that would be dredged from the Fraser River's bed. Preliminary sediment sampling
17 conducted by TJLP indicates that dredged material from the construction and operation of TMJ
18 would be similar to the dredged material routinely removed as part of the navigational
19 dredging program in this section of the Fraser River. Given the similarity, TJLP expects that
20 dredged material from TMJ could be used for fill and construction purposes. TJLP notes that the
21 ultimate means of disposing the dredged material would be influenced by the market demand
22 for dredged material and the needs of regional projects during the TMJ construction.
23 Depending on suitability, TJLP might reuse a portion of the dredged materials within the TMJ
24 area for shoreline restoration.

25 In the Application, TJLP proposes to apply to Environment and Climate Change Canada (ECCC)
26 for a Disposal at Sea (DAS) Permit under the federal DAS Regulations to dispose the material at
27 sea if a beneficial use for the dredged material cannot be identified. If the dredged material is
28 determined to be unsuitable for either beneficial use or ocean disposal, TJLP proposes that the
29 material be disposed at a permitted onshore disposal facility.

30 The Application (Section 1.3) included an assessment of alternative methods for disposal of
31 marine sediment from dredging. During Application review, ECCC identified the following
32 concerns with the alternatives assessment presented in Section 1.3.3 of the Application:

- 33 • Need to expand the assessment area to evaluate potential effects of transporting and
34 disposing of dredge material to the Point Grey ocean disposal location, recognizing that

- 1 the material generated by TMJ is not eligible for disposal at the Sand Heads ocean
2 disposal location;
- 3 • Need to provide a more robust approach to the alternatives assessment; and
 - 4 • Lack of selection of a preferred alternative being carried forward throughout the effects
5 assessment.

6 During Application review, the EAO requested TJLP to provide additional information on the
7 alternative options for dredge disposal, and an assessment of potential effects for each disposal
8 option to be considered within the scope of the EA. In response, TJLP provided an *Alternatives*
9 *Assessment Supplemental Report*¹⁶ which included the Point Grey ocean disposal location as a
10 fifth disposal option, in addition to the four alternatives presented in the EAC Application and
11 provided a comparison of the potential effects to VCs associated with the five disposal options.

12 Potential options considered for dredge disposal were based on guidance of the
13 *Canadian Environmental Protection Act, 1999*¹⁷ Section 4 of Schedule 6 which provides
14 guidance for the assessment of waste disposal options and a preferred waste management
15 hierarchy. All practical land-based and beneficial-use alternatives to disposal at sea must be
16 considered and evaluated before an application for disposal at sea is considered by ECCC.
17 Potential re-use on land or into water, and disposal on land and into water were considered in
18 the order of preference:

- 19 • Beneficial onsite use and commercial use;
- 20 • Upland disposal at an approved landfill facility; and
- 21 • Marine disposal at a previously used site pursuant to a permit under the DAS
22 Regulations.

23 The *Alternatives Assessment Supplemental Report* identified the following hierarchy of dredge
24 disposal options:

- 25 • Use as substrate for the restoration and enhancement of the existing degraded
26 estuarian marsh and mudflat;
- 27 • Re-use onsite for construction purposes;
- 28 • Temporarily stockpiling on-site for subsequent re-use and/ or re-sale off-site;
- 29 • Disposal at an approved upland site, such as a licensed landfill; and

¹⁶

https://projects.eao.gov.bc.ca/api/public/document/60a49304148b4a002330610c/download/20191127_Alternatives%20Assessment.pdf

¹⁷ <https://laws-lois.justice.gc.ca/eng/acts/c-15.31/>

- 1 • Disposal at an existing ocean disposal site, such as Sand Heads or Point Grey, subject to
- 2 the terms and conditions of a DAS Permit.

3 The following five dredge disposal alternatives were considered within the scope of the EA:

- 4 • **Alternative 1:** Construction Material for Habitat Creation and Enhancement;
- 5 • **Alternative 2:** Commercial Upland Use;
- 6 • **Alternative 3:** Land-based Disposal;
- 7 • **Alternative 4:** Marine-based Disposal at Sands Heads DAS site; and
- 8 • **Alternative 5:** Marine-based Disposal at Point Grey DAS site.

9 The *Alternatives Assessment Supplemental Report* noted that the preferred options for dredge
10 disposal are beneficial commercial upland uses and/ or disposal at a landfill facility; however,
11 marine disposal of the dredge material cannot be excluded at this time. Given that the potential
12 land-based location(s) and markets for commercial upland uses of the dredge marine sediments
13 are unknown at this time, the assessment of dredged sediment disposal considers both marine
14 and land-based alternatives. The TMJ may require a combination of the alternative marine and
15 land-based dredge disposal methods, rather than relying on one disposal method alone.

16 The EAO considered five dredge disposal alternatives identified in the *Alternatives Assessment*
17 *Supplemental Report* in its conclusions for relevant VCs in this Report. Table 34 (Appendix 3)
18 provides a summary of these alternatives and potential effects to VCs associated with each
19 dredge disposal method.

20 The *Alternatives Assessment Supplemental Report* noted that the final selection of dredge
21 disposal methods and locations would depend on commercial market demand for sand at the
22 time of dredging, and physical and chemical characteristics of the dredge material. Several of
23 the alternative dredge disposal options may be required. Possible dredge disposal scenarios
24 considered in the alternatives assessment include:

- 25 1. The preferred scenario would be no disposal at sea. This would result in 5 percent of
26 dredge material from the capital dredge going to beneficial reuse for habitat
27 restoration/ enhancement, 10 percent going to upland disposal, and 85 percent going to
28 commercial sand sales; and 100 percent of materials from maintenance dredging going
29 to commercial sand sales;
- 30 2. The least preferred dredge disposal scenario would be no material going to commercial
31 sand sales. This would result in 5 percent of dredge material from the capital dredge
32 going to beneficial reuse for habitat restoration/ enhancement, 10 percent going to
33 upland disposal, and 85 percent going to disposal at sea; and 100 percent of materials
34 from maintenance dredging going to disposal at sea; and

1 3. The most likely scenario is a portion of the dredge materials going to both commercial
2 sand sales and disposal at sea.

3 Scenario 3 was carried forward for further analysis based on an estimated volume of dredge
4 materials going to commercial sand sales (40 percent) and disposal at sea (60 percent). Over
5 the past five years, Fraser River Pile and Dredge has disposed of approximately 3.4 million m³ of
6 sediment from the annual navigational channel maintenance dredge program at a ratio of
7 40 percent commercial sand sales and upland disposal sites to 60 percent ocean disposal. This
8 ratio was conservatively used in the alternatives assessment as the estimated distribution for
9 dredge disposal from the TMJ site.

10 Dredge material identified as suitable for disposal at sea at Sand Heads or Point Grey
11 (Alternatives 4 and 5) requires the concentrations of metals and organic parameters to meet
12 the Lower Level Limits specified in the DAS Regulations under the *Canadian Environmental*
13 *Protection Act*. During the Application review, ECCC clarified that dredge material identified as
14 suitable for disposal at sea at Sand Heads or Point Grey (Alternatives 4 and 5) requires the
15 concentrations of metals and organic parameters to meet the Lower Level Limits specified in
16 the DAS Regulations under the *Canadian Environmental Protection Act*. During the Application
17 review, ECCC has clarified that the Sand Heads disposal at sea site (Alternative 4) is only used
18 for the disposal of sand from the lower reaches of the Fraser River navigation channel
19 maintenance dredging program. The sand goes through additional chemical analysis to ensure
20 that the activity would not harm SRKW critical habitat. The alternatives assessment noted that
21 ECCC has indicated that the material generated by TMJ is not eligible for disposal at Sand Heads
22 (Alternative 4). Therefore, as noted in the alternatives assessment, TJLP selected Point Grey
23 (Alternative 5) has been selected as the likely preferred disposal at sea site.

24 The Point Grey Disposal Site is located outside the of SRKW critical habitat. However, to transit
25 from the TMJ area to the Point Grey Disposal Site, the dredge vessel and tug assisted barges
26 would need to travel through SRKW critical habitat.

27 The alternatives assessment noted that capital dredging (construction phase) and annual
28 maintenance dredging (operations phase) would be completed during the least risk fisheries
29 work window specified by DFO (that is, June 16 – February 28). Where possible, maintenance
30 dredging would be limited to the months of December to February when white sturgeon is least
31 likely to be present or migrating through the Fraser River. However, in-water construction
32 activities are expected to require more than 3 months to complete. Most of the capital
33 dredging is expected to be conducted using a trailer suction hopper dredge (80 percent) with
34 the remainder using a hopper clamshell dredger (20 percent). This assumption was used to
35 estimate the number of vessel trips to receiving locations for each of the five disposal

- 1 alternatives. Sediment within the lower Fraser River is dredged annually by both dredge
2 methods to maintain the navigational shipping channel.

3 **2.3 PROJECT BENEFITS AND PURPOSE**

4 *ECONOMIC BENEFITS OF TMJ*

5 This section summarizes the estimated economic benefits of TMJ during construction,
6 operations, and decommissioning, as reported in the Application. The capital costs for TMJ are
7 estimates and would be revised during the preliminary and detailed design phases. More
8 details are in [Section 8.4](#) (Assessment of Economic Effects) of this Report.

9 *ECONOMIC BENEFITS FROM TMJ CONSTRUCTION*

10 Table 1 summarizes the estimated annual economic benefits from TMJ construction, as
11 reported in the Application. Depending on the final project configuration, the total construction
12 cost for TMJ would range between \$154 million and \$260 million, of which, approximately
13 \$106.7 million would go to B.C. and \$93.5 million to Metro Vancouver over the five-year
14 construction period.

15 **Table 1: Summary of Estimated Annual Economic Benefits from TMJ Construction (\$million)**

	LAA (Metro Vancouver)	BC ¹
Gross Output		
Direct	18.7	21.3
Indirect	5.7	10.1
Contribution to Gross Domestic Product (GDP)		
Direct	not calculated	4.6
Indirect	12.2	17.0
Labour Income		
Direct	4.4	4.4
Indirect	8.7	11.9

16 ¹B.C. estimates include LAA estimates.

17 During construction, an estimated total of \$22.8 million in tax revenues would be generated,
18 \$10 million to the federal government, \$9.8 million to the provincial government, and \$3
19 million to the local governments. Table 2 is a summary of the estimated annual average tax
20 revenues to government.

21

1 **Table 2: Summary of Estimated Annual Average Tax Revenues to Government**

Average Tax Revenues from TMJ Construction (\$million) ¹	LAA (Delta) ²	BC	Federal
Direct	0.2	0.5	0.9
Direct Suppliers	0.2	0.7	0.8
Indirect	0.1	0.2	0.5
Induced	0.1	0.1	0.2
Total	0.6	1.7	2.3

2 ¹ The individual estimates are rounded to once decimal point, and therefore do not add to the presented total.

3 ² Economic benefits in the form of property taxes.

4 Table 3 summarizes the estimated total construction employment opportunities (Full-time
5 equivalents [FTEs]) that might be created by TMJ¹⁸. TJLP estimates that TMJ would create a
6 total of 1,083 FTEs in B.C. over the four-year construction (276 direct FTEs, 407 direct supplier
7 FTEs, 271 indirect FTEs and 129 induced FTEs). A large portion of job opportunities would be
8 created in the local communities within Metro Vancouver in the engineering construction
9 industry. According to the Application, there would be a total of 852 FTEs in Metro Vancouver
10 of which 276 FTEs would be direct employment opportunities, and 340 FTEs would be direct
11 supplier, 161 indirect and 76 induced employment opportunities in the Local Assessment Area
12 (LAA) communities within Metro Vancouver. TJLP expects 126 FTEs in direct employment would
13 be needed in the first year of construction, during peak construction, when the construction of
14 the FTBB and PMTJ would take place at the same time.

15 **Table 3: Estimated Total Employment during TMJ Construction**

	Metro Vancouver Person-Years (FTEs)	BC (FTEs)
Direct ¹⁹	276	276
Direct Supplier ²⁰	340	407
Indirect	161	271
Induced	76	129
Total Employment	852	1,083

¹⁸ Based on the model used for this assessment, Person years and FTEs are synonymous in this context. In the model used for this analysis, one FTE is considered 1,750 hours per year to account for vacation and statutory holidays.

¹⁹ Number of job opportunities created for the construction of the Project on the Tilbury site.

²⁰ Number of job opportunities created by suppliers who would supply goods, materials and services for and during construction (for example, transportation and warehousing, manufacturing, technical services).

1

2

3 ***ECONOMIC BENEFITS FROM PROJECT OPERATIONS***

4 The Application estimates that TMJ would spend between \$3.6 million and \$6.6 million
5 annually, or \$86.3 million to \$160.1 million over the operational life of TMJ. Much of the costs
6 would be incurred for maintenance dredging and tug escorts.

7 According to the Application, approximately seven direct FTEs would be required during
8 operations. Economic benefits through indirect and induced employment during operations are
9 anticipated to be negligible because employment opportunities during operations would be
10 filled by existing Fortis employees. The average annual wage for direct employees is expected
11 to range between \$89,000 and \$166,600. During operations, TJLP, their suppliers and
12 contractors would continue to pay tax to the federal, provincial and local governments.

13 Direct annual operational expenditures (\$3.6 million to \$6.6 million), employment and labour
14 income would result in very small annual changes in goods and service contracting
15 opportunities and in direct and indirect output, labour income, GDP and government revenue
16 from income tax, corporate tax, and taxes on products – relative to that of the provincial and
17 local (Metro Vancouver) economy.

18 ***ECONOMIC BENEFITS FROM TMJ DECOMMISSIONING***

19 The Application states that capital spending during decommissioning would be dependent on
20 the labour required to remove all TMJ infrastructure, foreshore restoration, and maintenance.
21 At this time, the Application states it is not possible to accurately predict the baseline labour
22 supply and demand conditions in the LAA in 30 years when the decommissioning of TMJ is
23 expected to begin. TJLP anticipates very few new direct and indirect job opportunities would be
24 created. All TMJ-related employment would cease when decommissioning is complete. After
25 TMJ ceases to operate and the infrastructure is fully dismantled and removed from the site,
26 economic benefits to local governments would return to levels similar to those under baseline
27 conditions.

28 ***PROJECT CONTRIBUTIONS TO BUSINESS DEVELOPMENT***

29 TJLP anticipates that TMJ would contribute to procurement opportunities for businesses. Goods
30 and services revenues for direct supplier industries in B.C. due to project spending for
31 constructing TMJ is estimated to be \$132.8 million over the four-year construction. Of this
32 amount, \$106.7 million is expected to go to goods and services revenues for B.C. businesses.
33 The highest share of the direct supplier revenue is expected to be in engineering and
34 construction services. Local businesses are expected to realize \$122 million in goods and

1 services contracting revenues due to TMJ over the construction. Additional spending is
2 expected to benefit economies in other parts of Canada and internationally. Total household
3 spending related to operations, over the life of TMJ, ranges from an estimated \$86.3 million to
4 \$160.1 million.

5 *COMMUNITY, ECOLOGICAL AND SOCIAL BENEFITS OF THE PROJECT*

6 With access to international shipping lanes and with navigation and safety regimes developed
7 for marine LNG bunkering and export bulk LNG carriers, TJLP views TMJ as being well-placed to
8 bring environmental, societal and economic benefits to B.C. While the TMJ is a relatively small-
9 scale project on the world-scale, in TJLP's view, TMJ would resolve a vital infrastructure
10 challenge in the LNG supply chain on Canada's west coast. Providing low carbon intensity LNG
11 to ships and overseas customers would enable meaningful emissions reductions, and other
12 environmental benefits as well as economic benefits for B.C. Without the TMJ in place and
13 delivering LNG to customers, TJLP believes the local and regional environmental benefits would
14 not be realized and this newer generation of LNG-powered vessels would be more likely to
15 serve other ports.

16 TJLP stated that LNG remains a vital fuel to reduce emissions in sectors that are difficult to
17 decarbonize such as global shipping and industrial processes. According to TJLP, TMJ would
18 support the Port of Vancouver in its ambition to create the world's most sustainable port and
19 open up B.C.'s natural resources to markets that need low-carbon energy to displace coal. By
20 providing LNG from the Tilbury LNG Plant as a marine fuel and as a fuel to displace coal, TJLP
21 considers TMJ as a significant step in reducing greenhouse gas emissions and air pollution
22 locally and overseas and represents an important economic opportunity. TJLP notes that TMJ
23 can offer LNG from the Tilbury LNG Plant, which has a carbon intensity that is about 30 per cent
24 lower than global average LNG because it is powered by electricity from renewable sources,
25 mainly hydroelectricity. LNG from the Tilbury LNG Plant is up to 27 per cent lower in GHG
26 emissions than conventional marine fuel. FortisBC is a provider of renewable natural gas (RNG),
27 a carbon neutral form of energy that can be used as a drop-in fuel to lower carbon intensity
28 even further.

29 According to TJLP, TMJ would generate the following potential benefits:

- 30 • **Improving air quality:** Providing LNG as a lower-emission alternative to oil-based marine
31 fuel in the Port of Vancouver would reduce harmful air pollutants and improve human
32 health
- 33 • **Reducing greenhouse gas emissions:** Providing LNG as a lower-carbon alternative to oil-
34 based marine fuel or coal would reduce emissions and support government climate
35 targets

- 1 • **Reducing oil spill risk:** Reducing the potential for oil spills by displacing the use of oil in
2 the Port of Vancouver with LNG
- 3 • **Encouraging newer, cleaner ships:** Attract the new LNG-powered vessels being built and
4 deployed around the world that meet the latest emission reduction and vessel safety
5 standards. These vessels would feature technology to improve efficiency and reduce
6 underwater noise
- 7 • **Supporting fish and fish habitat:** Supporting the recovery of chinook, eulachon and
8 sturgeon in the Fraser River and Salish Sea by providing funding to the Indigenous led
9 First Nations Fisheries Legacy Fund
- 10 • **Habitat compensation:** restoring wetland areas impacted by past industrial practices to
11 create a net gain of this type of habitat
- 12 • **Scientific studies:** providing new information and understanding of the Fraser River
13 through new studies in cooperation with Indigenous groups and ongoing programs to
14 monitor the river and manage potential impacts

15 **Improving air quality:** The Port of Vancouver sees over 3,100 vessel calls each year along with
16 harbour tugs and dredging vessels, which currently use diesel or marine fuel oil. The global
17 shipping fleet is increasingly moving to LNG-powered vessels in response to stringent
18 International Marine Organization (IMO) sulphur emission regulations that came into effect in
19 2020, and progressive greenhouse gas emission regulations that are coming in the years ahead.
20 Until recently, almost all ships were fuelled by heavy oil or marine diesel oil, which emit high
21 amounts of air pollutants compared to cleaner burning LNG. For example, based on LNG
22 demand forecasting reported by the Port of Vancouver, a 1-million tonne LNG market in the
23 Port of Vancouver supplied by TMJ could reduce air pollutants by more than 500 tonnes locally
24 each year and more than 90,000 tonnes globally each year as ships travel to and from other
25 ports.

26 **Reducing greenhouse gas emissions – Shipping:** An estimated 90 percent of the world's goods
27 are moved by sea, and maritime trade is expected to triple by 2050. According to the IMO,
28 international shipping is a significant source of global GHG emissions and accounted for about
29 2.9 percent of the total global anthropogenic Carbon dioxide (CO₂) emissions in 2018. By
30 comparison Canada's total GHG emissions account for just 1.5 per cent of the global total as of
31 2018. The IMO has set a target to reduce international shipping CO₂e emissions by at least 40
32 percent by 2030 and 70 percent by 2050. TJLP asserts that TMJ can support this target by
33 delivering LNG from the Tilbury LNG Plant that can reduce greenhouse gas emissions from ships
34 by 21 to 27 per cent compared to conventional marine fuel. An analysis conducted by TJLP for
35 the TMJ shows that a 1-million tonne per year LNG market in the Port of Vancouver supplied by

1 the TMJ could reduce global GHG emissions by 1.2 million tonnes each year when including the
2 ships' journeys to and from other ports. TJLP believes that TMJ would unlock the potential for
3 GHG emissions reduction by enabling a ship-to-ship bunkering service for ocean-going vessels in
4 the Port of Vancouver. TJLP note that LNG from the Tilbury LNG Plant has a carbon intensity
5 that is about 30 percent lower than global average LNG. Under the CleanBC plan, TJLP asserts
6 that Tilbury LNG Plant's LNG could be 50 percent lower than the global average as upstream gas
7 production becomes increasingly electrified.

8 **Reducing greenhouse gas emissions – Overseas:** Coal is the largest source of global energy-
9 related carbon dioxide emissions, and TJLP consider that TMJ would support the displacement
10 of coal by facilitating the loading of LNG onto ships for overseas customers. LNG from Tilbury
11 has a lower carbon intensity than global average LNG and has a greater potential to reduce
12 emissions. FortisBC has been exporting LNG from the Tilbury LNG Plant via International
13 Organization for Standards (ISO) shipping containers and is seeing increased interest in B.C. LNG
14 for Asian markets. Based on an estimated annual export volume of 3 million tonnes of LNG
15 from the TMJ, TJLP estimated that the global GHG reduction would be 7 million tonnes of CO₂e
16 per year, which is roughly equivalent to taking 2.15 million cars off the road.

17 **Reducing oil spill risk:** In 2019, nearly 200,000 tonnes of marine fuel was burned in the Port of
18 Vancouver. If spilled, this fuel becomes pollution in the marine environment penetrating the
19 skin of marine life, and depending on the scale of a spill, potentially a long and costly clean up.
20 TJLP believes that TMJ would help reduce the risk of oil spills by displacing conventional marine
21 fuel with LNG. The properties of LNG make it a less harmful fuel compared with oil. LNG is non-
22 toxic so in the unlikely event of a spill, LNG would quickly vaporize leaving no residue behind on
23 the water or on land. However, TJLP acknowledges that in more than 60 years of LNG shipping
24 there has never been a major accident or spill involving a ship.

25 **Encouraging newer, cleaner ships**

26 In response to IMO emissions targets, the global shipping fleet is increasingly switching to LNG-
27 powered vessels and ports worldwide are developing infrastructure to fuel them. In 2021, 209
28 LNG vessels were ordered, more than the previous seven years combined. In addition to LNG-
29 powered engines, these ships are featuring some of the latest technology to improve efficiency,
30 reduce emissions and underwater noise. The benefits from the new generation of vessels are
31 going to those ports that have the infrastructure in place to fuel them, which highlights the
32 need for the TMJ.

1 **Supporting fish and fish habitat**

2 TJLP is proposing to make a \$2 million contribution to the First Nations Fisheries Legacy Fund²¹,
3 an Indigenous-led fish restoration initiative, to help address the underlying concern of reduced
4 fish stocks including eulachon, sturgeon and chinook. Increases in chinook salmon stocks would
5 support the recovery SRKW, which rely on chinook as their primary source of food.

6 **Habitat compensation**

7 The existing foreshore in the area near the TMJ has been disturbed by past industrial activity.
8 TJLP stated that TMJ is designed to have a limited impact in the existing riparian and foreshore
9 area, and that there is an opportunity to develop habitat enhancement at the site. The
10 opportunity could include the creation of an estuarine marsh and mudflat habitat in the area.

11 **Scientific studies**

12 TMJ would be required to undertake environmental monitoring and follow-up programs to
13 verify the accuracy of the environmental assessment. TJLP notes that these programs could
14 have the added benefit of improving understanding of the Fraser River ecosystem. In addition
15 to these programs, TJLP is committed to broader studies of issues of importance to Indigenous
16 Groups on the Fraser River. For example, TJLP conducted an eulachon spawning study of the
17 Fraser River in 2021 and is preparing for a broader eulachon study in 2023 in partnership with
18 Indigenous Groups on the Fraser River. These studies are expected to be the beginning of
19 ongoing work supported by TJLP that would improve understanding of the Fraser River.

20 **3 AUTHORIZATIONS**

21 In addition to needing an EAC, TJLP would need various authorizations from federal, provincial
22 and local governments. TJLP is not applying for concurrent permitting under the Act.

23 **3.1 FEDERAL REGULATORY ENVIRONMENT**

24 Prior to the start of construction, TJLP must obtain federal authorizations summarized in
25 Table 4.

26

²¹ TJLP's proposal for Unconventional Offsetting Accommodation for Residual Project and Cumulative Effects, dated July 5, 2021 (https://www.projects.eao.gov.bc.ca/api/document/61099898cd98620022b0832b/fetch/20210707_TilburyJettyLimitedPartnership_UnconventionalOffsetProposal.pdf).

1 **Table 4: Required Federal Authorizations**

Name of Authorization	Statute (Authorizing Agency)	Reason for Requirement
Vancouver Fraser Port Authority (VFPA) authorization	<i>Canada Marine Act</i> SC 1998, c.10	The TMJ site is within the VFPA's navigational jurisdiction.
Environmental Assessment Decision	<i>Canadian Environmental Assessment Act, 2012</i> (CEAA 2012)	TMJ, as proposed, is a designated physical activity as it meets the definition of paragraph 24(c) of the <i>Regulations Designating Physical Activities</i> of the CEAA 2012.
Section 35.1(2)(b) Fisheries Authorization (DFO)	<i>Fisheries Act</i> , RSC 1985, c. F-14 (DFO)	Proposed dredging activities, disturbance of a riparian area, and construction of jetty infrastructure may result in harmful alteration, disruption or destruction of fish habitat within the meaning of the <i>Fisheries Act</i> .
Section 15(3) Approval(s)	<i>Canadian Navigable Waters Act</i> (Transport Canada [TC])	The proposed construction and operations of the marine jetty infrastructure, and ancillary activities (including dredging and fish habitat offset works, FTBB) being located on the Fraser River have the potential to obstruct/impede navigation and may need approvals under the <i>Canadian Navigable Waters Act</i> .
Disposal at Sea Permit	<i>Canadian Environmental Protection Act, 1999</i> (Environment Canada and Climate Change)	TMJ activities may include marine disposal of dredge material during construction and operations.

2

3 **3.2 PROVINCIAL AUTHORIZATIONS**

4 Prior to the start of construction, TMJ must obtain provincial authorizations summarized in
5 Table 5 in addition to an EAC.

6 **Table 5 : Required Provincial Permits and Approvals**

Name of Authorization	Statute (Authorizing Agency)	Reason for Requirement
Environmental Assessment Certificate	<i>BC Environmental Assessment Act, 2002</i> (EAO)	TMJ is a reviewable project under Reviewable Projects Regulation, Part 8, Table 3.
Pipeline Permit	<i>Oil and Gas Activities Act and Regulation</i> SBC 2008, c.36 (BC OGC)	TMJ, as proposed, requires a permit for the 470 m pipeline.
Crown License of	<i>Land Act</i> RSBC 1996, c.245 (BC	Oil and Gas Commission is the decision-maker on and responsible for the issuance

Name of Authorization	Statute (Authorizing Agency)	Reason for Requirement
Occupation	OGC)	of land tenures for Crown land available for oil and gas activities. TMJ, as proposed, requires a involves a new waterlot lease extending 150 m along the Fraser River shoreline.
Section 11 Approval	<i>Water Sustainability Act</i> SBC 2014, c.15 (BC OGC)	TMJ, as proposed, involves activities in and around a stream including dredging, clearing, foreshore modification activities.
Heritage Investigation Permit	<i>Heritage Conservation Act</i> RSBC 1996, c.187 (FOR, Archaeology Branch)	TMJ, requires a Heritage Investigation Permit to undertake systematic study and data recovery from an archaeological site.
Heritage Inspection Permit	<i>Heritage Conservation Act</i> RSBC 1996, c.187 (FOR, Archaeology Branch)	TMJ, as proposed, requires archaeological inspections to support the EA on non-federal land, and to conduct systematic study and data recovery from an archaeological site.
Site Alteration Permit	<i>Heritage Conservation Act</i> RSBC 1996, c.187 (BC OGC)	TMJ, as proposed, may involve the alteration of an archaeological site.
Waste Discharge Authorizations	Waste Discharge Regulation under the <i>Environmental Management Act</i> SBC 2003, c.53 (BC OGC)	TMJ, as proposed, involves the discharge of waste into the environment.
Section 25(2) permit	Environmental Protection and Management Regulation under the <i>Oil and Gas Activities Act</i> SBC 2008, c.36 (BC OGC)	TMJ, as proposed, involves the disturbance of wildlife and wildlife habitats. BC OGC considers the intent of Government's Environmental Objectives specified in Part 2 of the Environmental Protection and Management Regulation in making a decision on whether to issue a permit for oil and gas activities.

1 3.3 LOCAL GOVERNMENT AUTHORIZATIONS

2 TMJ is required to apply for a rezoning of the water lot portion of the TMJ site once the EAC is
3 issued. As part of the Delta rezoning process, a review of servicing and diking requirements
4 would be conducted. Prior to the start of construction, TMJ must obtain a building permit and a
5 Development Permit for the Streamside Protection and Enhancement Development Permit
6 Area from Delta.

1 4 ASSESSMENT PROCESS OVERVIEW

2 4.1 OVERVIEW AND SCOPE OF THE ENVIRONMENTAL ASSESSMENT

3 The EAO determined that TMJ is a shoreline modification project and subject to review
4 pursuant to Part 5 (Table 9), of the Reviewable Projects Regulation because construction of TMJ
5 would result in changes to at least 2 ha of foreshore or submerged land, or a combination of
6 foreshore and submerged land, below the natural boundary of the Fraser River. Table 6
7 summarizes major milestones reached during the EA for TMJ.

8 TMJ is also subject to a federal EA as it meets the definition of paragraph 24(c) of the
9 *Regulations Designating Physical Activities* under CEAA 2012, as follows:

10 **24** *The construction, operation, decommissioning and abandonment of a new*
11 **(c)** *marine terminal designed to handle ships larger than 25 000 DWT unless the*
12 *terminal is located on lands that are routinely and have been historically used as a*
13 *marine terminal or that are designated for such use in a land-use plan that has been*
14 *the subject of public consultation.*

15 **Table 6: Major Milestones of the EA**

Date	Milestone
Apr 30, 2015	TJLP submitted their Project Description for TMJ to the EAO and the Agency.
May 6, 2015	The EAO issued a Section 10(1)(c) designating TMJ as reviewable and requiring an EA. TMJ is a shoreline modification project that would result in changes to at least two hectares of foreshore or submerged land, or a combination of foreshore and submerged land, below the natural boundary of the Fraser River, and subject to review pursuant to Part 5, Table 9, of the Reviewable Projects Regulation.
May 14, 2015	The EAO wrote a letter to the Agency requesting for substitution for the EA of TMJ under CEAA 2012.
Jul 10, 2015	The EAO received a letter from Minister Aqlukkaq, federal Minister of Environment, approving the request for substitution for the EA of TMJ.
Jul 10, 2015	The Agency posted the <i>Notice of Commencement of an Environmental Assessment and Substitution Approval</i> for TMJ on the federal Canadian Impact Assessment Registry at https://iaac-aeic.gc.ca/050/evaluations/document/129572
Jul 24, 2015	The EAO issued a Section 11 Order to specify the scope of the roles and responsibilities of TJLP and the EAO including requirements for public consultation and Indigenous consultation.
Sep 25, 2015	The EAO issued an Order under Section 13 of the Act to: <ul style="list-style-type: none"> • Make an administrative change to the definition of “Aboriginal Consultation Plan” in Section 1 of Schedule A; • Move Tsleil-Waututh Nation from Schedule C to Schedule B; and • Add the People of the River Referrals Office to Schedule C.
Nov 6, 2015	TJLP submitted an updated Project Description for TMJ to the EAO and the Agency.

Date	Milestone
Nov 20, 2015 to Dec 21, 2015	The EAO held a 30-day Public Comment Period on the draft Valued Components Selection document. The Public Comment Period included two open houses, one on December 2, 2015 in the City of Delta, and the other on December 3, 2015 in the City of Richmond.
May 11, 2016	The EAO issued a second Order under Section 13 of the Act to further amend the Section 11 Order to: <ul style="list-style-type: none"> • Move Semiahmoo First Nation from Schedule C to Schedule B; and • Move Squamish Nation from Schedule C to Schedule B.
Nov 29, 2016	The EAO issued the approved Application Information Requirements (AIR) to TJLP. The AIR establishes information that must be collected, analyzed and included as part of TJLP's Application for an EAC.
Feb 14, 2018	The EAO issued a third Order under Section 13 of the Act to remove Hwlitsum First Nation from Schedule B of the Order issued under Section 11 of the Act.
Jul 5, 2018	TJLP submitted an update to the Project Description to refine the project design for TMJ.
Oct 16, 2018	The EAO received TJLP's Application for an EAC for TMJ. The EAO began the 30-day Application screening process
Nov 15, 2018	The EAO advised TJLP in a letter that the Application received on October 16, 2018 did not satisfactorily reflect requirements specified in the approved AIR. The EAO did not accept the Application for a detailed EA review.
Feb 15, 2019	The EAO received a revised Application (https://projects.eao.gov.bc.ca/p/Tilbury Marine Jetty Project-tilbury-marine-jetty/docs) from TJLP.
Mar 15, 2019	The EAO approved the revised Application for a detailed EA review.
Mar 20, 2019	The EAO initiated the 180-day assessment of the Application under Section 16(1) of the Act.
Jul 9, 2019	The federal Minister of Environment and Climate Change required additional information under subsection 14(3) of CEAA 2012 regarding the expansion of the geographic extent of the assessment for potential effects of marine shipping activities to the 12-nautical mile limit of the territorial sea of Canada.
Jul 30, 2019	TJLP submitted a letter to the EAO requesting a temporary suspension of the EA review under Section 24(2) of the Act to provide additional time to conduct studies required to prepare a Marine Shipping Assessment Supplemental Report.
Aug 6, 2019	The EAO granted TJLP's request for a temporary suspension of the 180-day time limit for the EA review under Section 24(2) of the Act. The suspension was effective on day 139 of the 180-day review period.
Aug 6, 2019	The EAO issued a fourth Order under Section 13 of the Act to require: <ul style="list-style-type: none"> • Expansion of the marine shipping scope of include the assessment of effects of marine shipping activities from TMJ's marine terminal to the 12-nm limit of Canada's territorial sea; • Addition of Indigenous Groups for consultation as described in a new Schedule D; and • Establishment of a new Marine Shipping Working Group.
Nov 15, 2019	The EAO issued TJLP an Information Request for the supplemental assessment memo to consider potential marine shipping activities within the expanded geographic extent described by Canada.
Dec 9, 2019	TJLP submitted to the EAO the TMJ Marine Shipping Assessment Report.
August 5, 2021 to September 7, 2021	The EAO held a public comment period on a draft of its decision materials, prior to referral to Ministers.
September 17, 2021	The EAO determined that TJLP satisfied the requirements necessary to lift the suspension and resumed the timeline at day 139 of the Application review period.

Date	Milestone
November 23, 2021	TJLP submitted a letter to the EAO, informing the EAO that additional analysis is proposed to assess a bunker vessel scenario with more vessels than assessed in the Application.
December 2, 2021	The EAO issued a Section 24(4) Order under the Act, to extend the Application review time limit.
January 19, 2022	The EAO issued a fifth Order under Section 13 of the Act to further amend the Section 11 Order to: <ul style="list-style-type: none"> • add Snuneymuxw First Nation to Schedule B and • add K^wik^wə^ləm (Kwikwetlem) First Nation to Schedule C.
May 18, 2022	TJLP submitted to the EAO the final TMJ Bunker Vessel Scenario Assessment Report
TBD	[Placeholder – for public comment period on the revisions to the draft decisions materials, prior to referral to Minsters]
TBD	[Placeholder: The EAO referred TMJ to Ministers for decision on whether to issue an EAC under Section 17 of the Act].

1 4.2 ROLE OF THE ADVISORY WORKING GROUP

2 The EAO established a Working Group made up of federal, provincial and local government
3 staff or representatives with the mandates and expertise relevant to the review of TMJ, as well
4 as representatives of potentially affected Indigenous Groups listed on Schedules B of the
5 Section 11 Order. Refer to the list of Working Group members in Appendix 4: List of Working
6 Group Members.

7 The EAO sought and considered advice from the Working Group to understand and assess the
8 potential adverse effects associated with TMJ. Working Group members were responsible for
9 providing advice to the EAO on:

- 10 • Key EA documents including, but not limited to, the selection of VCs, AIR, Application,
11 the EAO's Report and proposed EAC conditions and recommended KMMs under CEAA
12 2012;
- 13 • Marine Shipping Assessment Report;
- 14 • Bunker Vessel Scenario Assessment Report;
- 15 • TJLP's *Alternatives Assessment Supplemental Report*;
- 16 • Government policy direction and/ or gaps that could affect the conduct of the EA;
- 17 • Potential conflicts with the legislation and/ or regulations of their organizations;
- 18 • EA information requirements as compared with permitting design and information
19 requirements; and
- 20 • Technical issues that were raised by the public during the public consultation process.

21 The following local governments participated in the Working Group:

- 22 • City of Delta (Delta);

- 1 • City of Richmond (Richmond); and
- 2 • Metro Vancouver Regional District.

3 The following federal departments with specialist information or expert knowledge relevant to
4 TMJ participated in the evaluation and the review of TJLP's Application:

- 5 • The Agency provided guidance and information directly to the EAO regarding the
6 substituted process and federal EA requirements under CEAA 2012. The Agency also
7 provided guidance and information directly to the EAO regarding the expanded
8 geographic extent for the MSA;
- 9 • DFO provided comments and information related to its regulatory and statutory
10 responsibilities within the themes of fish and fish habitat and marine mammals;
- 11 • Health Canada (HC) provided advice and information related to its regulatory and
12 statutory responsibilities regarding human health, with a primary focus on Indigenous
13 health;
- 14 • ECCC provided comments and information related to its regulatory and statutory
15 responsibilities within the themes of vegetation, wildlife, marine mammals, water
16 quality, human health, cumulative effects, air quality, GHG management, accidents and
17 malfunctions and Aboriginal Interests;
- 18 • Port of Vancouver provided comments and information related to its regulatory
19 responsibilities within the themes of dredging and navigation; and
- 20 • Transport Canada (TC) provided comments and information related to its regulatory and
21 statutory responsibilities within the themes of ensuring the navigability of the Fraser
22 River and marine shipping.

23 The EAO reviewed the adequacy of TJLP's responses to all comments received from Working
24 Group members during the review of the draft AIR, Application, MSA Report and BVSA Report,
25 and held various meetings with Working Group members to discuss outstanding issues and
26 concerns. In the development of this Report, proposed provincial conditions and recommended
27 KMMs under CEAA 2012, the EAO considered all comments and issues raised during the EA.

28 During the EA, the EAO received requests from Working Group members regarding the use of
29 vessel technology mitigation for TMJ-related vessels to mitigate effects to air quality and GHGs
30 and underwater noise. For vessel technology mitigation, TJLP communicated the limitations of
31 TJLP's care and control of the vessels to the EAO, the Agency and TC, including that TJLP do not
32 expect to have any commercial agreements with shipowners or builders, and would not have
33 control of the design of vessels. TJLP also expressed their perspective that requirements for
34 ships / shipping (e.g., vessel technology) should be applied across the sector and not on specific
35 projects. TJLP further noted that based on TC statements it understands that vessel technology

1 including vessel quieting technology is an ongoing area of research and development. The TMJ
2 proponent notes that they have not yet signed any contracts with LNG customers and so
3 cannot discern at the EA stage what the commercial implications would be of various
4 vessel/shipping requirements through contracts. The EAO engaged with the Agency and TC and
5 acknowledge that TJLP's perspective is reasonable. As such, the EAO has recommended KMM's
6 under CEAA 2012 that are within the care and control of TJLP for a Vessel Traffic Management
7 Plan and Air Quality Management Plan, which are described in more detail in the Marine
8 Mammal ([Section 5.7](#)) and Air Quality (5.1) chapters, respectively.

9 During the EA, several Working Group members expressed concerns about regional cumulative
10 effects, particularly in the lower Fraser River and Salish Sea. The EAO received requests from
11 Working Group members that federal and provincial governments conduct regional
12 environmental assessments for the Fraser River estuary and Salish Sea, and for that information
13 to be used to develop a long-term environmental management plans for the Fraser River Delta
14 and Salish Sea to guide future conservation efforts and sustainable development in the region.
15 The EAO has identified the broader, regional concerns raised by Working Group members with
16 provincial ministries.

17 **4.3 ROLE OF THE MARINE SHIPPING WORKING GROUP**

18 The Section 13 Order issued on August 6, 2019, established the EAO Marine Shipping Working
19 Group, an advisory sub-committee of the Working Group made up of representatives of
20 Indigenous Groups identified in Schedule B and Schedule D, and federal, provincial and local
21 government agencies. The purpose of the Marine Shipping Working Group was to provide input
22 as requested by the Project Assessment Lead on aspects of the EA regarding matters related to
23 potential adverse effects that may result from the movement of TMJ-related vessels along the
24 marine shipping channel to and from the pilot station at Sand Heads to the 12-nm limit of
25 Canada's territorial sea.

26 **4.4 INDIGENOUS CONSULTATION**

27 On May 15, 2015, the EAO issued an Order establishing the scope and procedures of the EA
28 (Section 11 Order) which specified the consultation activities that both the EAO and TMJ must
29 undertake with all identified Indigenous Groups potentially affected by TMJ.

30 At the initial stages of the EA for TMJ, the EAO conducted a preliminary assessment to
31 determine whether an Indigenous Group would be included on Schedule B or C of the Section
32 11 Order.

1 Indigenous Groups in Schedule B²² of the Section 11 Order were consulted at the deeper end of
2 the *Haida* consultation spectrum, and provided the following opportunities to participate in the
3 EA:

- 4 • Participation in the Working Group;
- 5 • Participation in meetings to identify and discuss the exercise of proven and asserted
6 Aboriginal Interests that may be affected by TMJ and potential measures to avoid,
7 mitigate, address or otherwise accommodate effects;
- 8 • Opportunities to review and comment on key documents, including the draft Section 11
9 Order, draft AIR, TJLP's Application, TJLP's MSA Report, TJLP's BVSA Report, and the
10 EAO's proposed conditions and recommended KMMs under CEAA 2012, Summary and
11 Assessment Reports including the Aboriginal Consultation Report (Part C);
- 12 • Submission of a document outlining the Indigenous Group's views on the Summary and
13 Assessment Reports to be included in the package of materials sent to Ministers when
14 TMJ is referred for decision;
- 15 • Notification of key milestones such as the issuance of the AIR, acceptance of the
16 Application for review, timing of public comment periods (including open house) – when
17 the final Assessment Report is referred to Ministers and the resulting decision;
- 18 • Invitation to meet with the EAO to discuss any Aboriginal Interests in the TMJ area; and
- 19 • The option to submit a separate report describing the Indigenous Group's views on
20 TJLP's EAC Application and their view on whether an EAC should be issued. If an
21 Indigenous Group provides a separate report, the report will be included in the package
22 of materials the EAO sends forward to Ministers for decision.

23 Hwlitsum First Nation was initially listed on Schedule B in the Section 11 Order. On February 14,
24 2018, the EAO wrote to Hwlitsum First Nation to advise that the EAO had decided to remove
25 Hwlitsum First Nation from Schedule B of the Section 11 Order as a result of the court's
26 decision on *Hwlitsum First Nation v. Canada (Attorney General)*, 2017 BCSC 47. The EAO
27 encouraged Hwlitsum First Nation to engage in the EA process through the public consultation
28 process.

29 During the EA, the EAO received additional information with respect to the Snuneymuxw First
30 Nation's assertion of Aboriginal rights and title in the area in which TMJ would be constructed.
31 As such, Snuneymuxw First Nation were added to Schedule B of the Section 11 Order on
32 January 19, 2022, for the remainder of the EA, related to the BVSA.

²² Schedule B Indigenous Groups are described in Section 2.2.1 of this Report.

1 Indigenous Groups in Schedule C²³ of the Section 11 Order were consulted at the lower end of
2 the *Haida* consultation spectrum, and provided the following opportunities to participate in the
3 EA:

- 4 • Notification of key milestones – such as the issuance of the AIR, acceptance of the
5 Application for review, timing of public comment periods (including open houses) –
6 when the final Assessment Report is referred to Ministers and the resulting decision;
- 7 • Invitation to meet with the EAO to discuss any Aboriginal interest in the TMJ area; and
- 8 • Invitation to review and comment on the EAO’s draft Summary and Assessment Reports,
9 including the Aboriginal consultation Report.

10 During the EA, Kwikwə́łəm (Kwikwetlem) First Nation expressed an interest in engaging in, and
11 learning more about, the EA for TMJ. As such, Kwikwetlem First Nation were added to Schedule
12 C of the Section 11 Order on January 19, 2022, for the remainder of the EA, related to the BVSA.

13 Indigenous Groups in Schedule D²⁴ of the Section 11 Order were consulted at the deeper end of
14 the *Haida* consultation spectrum. The EAO provided Schedule D Indigenous Groups the
15 following opportunities to participate in the EA:

- 16 • Participation in the Marine Shipping Working Group;
- 17 • Review and comment on TJLP’s MSA Report that TJLP developed and submitted
18 regarding potential effects from marine shipping for TMJ;
- 19 • Identify Aboriginal Interests that may be adversely affected by marine shipping activities
20 associated with TMJ and measures to avoid, mitigate, or otherwise address or
21 accommodate potential adverse effects on Aboriginal Interests, as appropriate;
- 22 • Opportunities to review and comment on key documents, including the EAO’s proposed
23 conditions and recommended KMMs under CEAA 2012, Summary and Assessment
24 Reports including the Aboriginal Consultation Report (Part C); and
- 25 • The option to submit a separate report describing the Indigenous Group’s views on
26 TJLP’s EAC Application and their view on whether an EAC should be issued. If an
27 Indigenous Group provides a separate report, the report will be included in the package
28 of materials the EAO sends forward to Ministers for decision.

²³ Schedule C Indigenous Groups are described in Section 2.2 of this Report

²⁴ Schedule D Indigenous Groups are described in Section 2.2 of this Report.

1 4.4.1 MEETING THE CROWN'S DUTY TO CONSULT AND ACCOMMODATE 2 INDIGENOUS GROUPS

3 The EAO is required to ensure that the honour of the Crown is discharged by ensuring
4 appropriate consultation and accommodation of potential effects of TMJ on the exercise of
5 proven Aboriginal rights and asserted Aboriginal Interests in respect of the decision by
6 Ministers as to whether to issue an EAC. Although the TMJ EA was conducted under the 2002
7 Act, the EAO has integrated aspects of the 2018 Act in the TMJ EA process, including seeking
8 consensus with Indigenous Groups throughout the EA.

9 In accordance with the *Memorandum of Understanding on Substitution of Environmental*
10 *Assessments*²⁵, on substituted projects, the EAO is responsible for the procedural aspects of
11 consultation on behalf of Canada and is required to ensure that consultation is carried out in a
12 manner consistent with Canada's determination of the scope and content of consultation.
13 Indigenous Groups' comments and interests in terms of consultation and specific consideration
14 of the Crown's duty of consult and accommodate Aboriginal Interests are factored into the
15 analysis of Part C of this Report.

16 There is often considerable overlap between the interests of Indigenous Groups and the
17 assessment of environmental, economic, social, heritage and health effects. Indigenous Groups'
18 comments and interests that directly relate to the environmental, economic, social, heritage
19 and health assessments are discussed in this Report. More details regarding consultation with
20 Indigenous Groups are provided in Part C of this Report.

21 4.5 PUBLIC CONSULTATION

22 Public consultation is an important aspect of the EA process. The EAO required TJLP to prepare
23 a Public Consultation Plan. The plan describes TJLP's consultation objectives and activities.

24 On November 19, 2015, TJLP submitted a Public Consultation Plan²⁶ (PCP) to the EAO. TJLP
25 designed the PCP to meet the public consultation requirements under the Section 11 Order for
26 both the pre-Application and Application review phases of the EA for TMJ and in accordance
27 with the Public Consultation Policy Regulation.

²⁵ <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/working-with-other-agencies/substitution-links/eao-ceaa-substitution-mou.pdf>

²⁶ <https://projects.eao.gov.bc.ca/api/document/5886b134e036fb01057695e4/fetch/WesPac%20Midstreams%20Public%20Consultation%20Plan%20for%20the%20proposed%20WesPac%20Tilbury%20Marine%20Jetty%20Project%20-%20November%202015%20%28Updated%20Nov%2019%2C%202015%29.pdf>

1 4.5.1 SUMMARY OF CONSULTATION ACTIVITIES LED BY TJLP

2 Based on the location of TMJ, TJLP focused their public consultation activities on communities
3 in Delta and Richmond. TJLP identified potentially affected stakeholders on the basis of
4 proximity to the TMJ site, anticipated interest in potential effects, review of consultation
5 activities undertaken by other proponents in the same communities, and feedback from early
6 stakeholder consultation.

7 TJLP established six categories of key stakeholders:

- 8 • Federal and provincial regulatory agencies;
- 9 • Federal and provincial elected officials;
- 10 • Municipalities including elected officials and staff;
- 11 • Adjacent land owners;
- 12 • Economic development and marine organizations and users; and
- 13 • Members of the public.

14 Details on the six categories of key stakeholders are in Section 13 of the Application.

15 TJLP's Public Consultation Plan describes key activities and timelines for each of four phases:
16 Initial engagement, pre-Application consultation, Application review consultation, and post-EA
17 Certificate engagement. The Public Consultation Plan and all Public Consultation Reports²⁷ are
18 posted on the EAO's Project Information Centre (EPIC).

19 **INITIAL ENGAGEMENT**

20 Initial engagement was conducted from May 2014 to June 2015, prior to and outside the formal
21 EA process. The purpose of initial engagement was to identify key stakeholder, inform the
22 development of project website and information brochures, and to identify preliminary
23 concerns and questions that need to be addressed during project development.

24 **PRE-APPLICATION CONSULTATION**

25 TJLP consulted with key stakeholders via phone calls, meetings and other forms of
26 communication. The purpose of pre-Application consultation was to inform the development of
27 public consultation materials on candidate VCs, TMJ, and the scope of technical studies. During
28 this phase, TJLP participated in the Public Comment Period on the draft VC Selection document

²⁷<https://projects.eao.gov.bc.ca/api/document/5886b1b1e036fb01057695f9/fetch/Public%20Consultation%20Report%20%231%20dated%20July%202016.pdf>

1 that included two EAO-led Open Houses, one in North Delta and one in South Richmond. TJLP
2 considered public comments received during the Public Comment Period²⁸ and responded to
3 those comments in a tracking table²⁹. This phase of public consultation was conducted during
4 the formal EA process throughout Q2 2015 and Q2 2016.

5 Appendix A of the Application is TJLP's Record of Consultation which provides a summary of
6 themes that TJLP understood to be main public concerns, based on comments received during
7 the pre-Application Public Comment Period. The following are some of the themes summarized
8 in TJLP's Table 5 in the Application that are specific to TMJ:

- 9 • Marine navigation safety;
- 10 • Cumulative effects;
- 11 • Effects on property values;
- 12 • Effects on orcas and marine mammals;
- 13 • Potential loss of farmland;
- 14 • Effects of dredging.

15 **APPLICATION REVIEW CONSULTATION**

16 TJLP continued to consult with key stakeholders via phone calls, meetings and other forms of
17 communication. This phase of public consultation was conducted during the formal EA process
18 beginning in Q2 2016. The focus of this phase in TJLP's public consultation plan was to inform
19 the development of public consultation materials on the TMJ EAC Application. TJLP participated
20 in the Public Comment Period on the Application that included two EAO-led Open Houses, one
21 in South Delta and one in South Richmond. TJLP considered public comments received during
22 the Public Comment Period and responded to those comments in a tracking table³⁰.

23 **POST-ENVIRONMENTAL ASSESSMENT CERTIFICATE ENGAGEMENT**

24 TJLP has committed in its Public Consultation Plan to providing updates and undertake
25 information-sharing activities to inform key stakeholders and the public on issues and concerns

²⁸ <https://projects.eao.gov.bc.ca/api/document/5d793fb0fa1745001ad6d1c7/fetch/WesPac%20Tilbury%20Marine%20Jetty-%20Collected%20Public%20Comments%20-%20VC%20Selection%20Document%20-%2020151221.pdf>

²⁹ <https://projects.eao.gov.bc.ca/api/document/5886b1a6e036fb01057695f6/fetch/Public%20Comment%20Period%20Tracking%20Table%20dated%20August%202016.pdf>

³⁰

https://www.projects.eao.gov.bc.ca/api/public/document/60f83c4e4222de00226ef2e8/download/20210713_WesPac_Public%20Comments%20Tracking.pdf

1 regarding construction, operations, and decommissioning. TJLP committed to undertaking post-
2 EAC engagement if an EAC is granted for TMJ.

3 ***THE EAO'S CONCLUSION ON THE ADEQUACY OF PUBLIC CONSULTATION***

4 Based on consideration of TJLP's Public Consultation Plan and Reports, the EAO is satisfied with
5 TJLP's understanding and responsiveness to public interests. Public comments from Public
6 Comment Periods and TJLP's responses are posted on the EAO's EPIC website for the pre-
7 Application and Application review phases.

8 **4.5.2 SUMMARY OF CONSULTATION ACTIVITIES LED BY EAO**

9 ***PRE-APPLICATION PHASE***

10 During the pre-Application phases, the EAO held a 31-day Public Comment Period from
11 November 20, 2015 to December 21, 2015, on the draft VC Selection document, which
12 describes how key areas of studies were selected for assessment. During the 31-day Public
13 Comment Period, the EAO held two Open Houses, one in South Delta on December 2, 2015 (50
14 attendees) and a second Open House in South Richmond on December 3, 2015 (31 attendees).
15 A total of 791 comments were received during the Public Comment Period.

16 ***APPLICATION REVIEW PHASE***

17 During Application review, the EAO held a 45-day Public Comment Period on the TMJ EA
18 Certificate Application from April 2, 2019 to May 17, 2019. During the 45-day Public Comment
19 Period, the EAO held two Open Houses, one in North Delta on April 9, 2019 (24 attendees), and
20 one in South Richmond on April 10, 2019 (17 attendees). TJLP considered public comments
21 received during the Public Comment Period and responded to those comments in a tracking
22 table³¹. A total of 506 comments were received from the public during the Public Comment
23 Period which are posted on EPIC.

24 Below is a summary of the key issues or themes raised by the public during the Pre-Application
25 and Application review phases:

- 26 • **Project location/ siting** – Concerns that TMJ would be located close to communities
27 along the South Arm of the Fraser River in Richmond and Delta and in a constrained
28 waterway with active fisheries;

³¹https://www.projects.eao.gov.bc.ca/api/public/document/60f83c4e4222de00226ef2e8/download/20210713_WesPac_Public%20Comments%20Tracking.pdf

- 1 • **Public safety** – Concerns about accidents and malfunctions and risks to public safety and
2 the surrounding properties;
- 3 • **Air quality and human health** – Concerns about emissions from TMJ and potential
4 effects on the local airshed and human health and a concern for the LNG processes of
5 fracking in northern B.C.;
- 6 • **Economic benefits** – Concerns that the amount of tax revenues and creation of jobs
7 would be insufficient compared to the potential for adverse effects of TMJ. Questions
8 about the financial viability of the LNG industry in B.C.;
- 9 • **Industrialization of the Fraser River** – Concerns that TMJ would jeopardize the overall
10 health of the Fraser River and Fraser River estuary, including fish and marine mammals,
11 wildlife and migratory birds, through industrial discharges to the marine environment;
- 12 • **Health of Fraser River** – Concerns that TMJ would jeopardize ongoing restoration and
13 the overall health of Fraser River through increased marine traffic and the potential for
14 marine spills;
- 15 • **Marine fish** – Concerns that vessel size, scour, dredging and fish habitat would affect
16 local populations of marine fish, specifically sturgeon and salmon;
- 17 • **Effects to marine mammals** – Concerns that underwater noise and collisions with LNG
18 carriers would have negative effects on marine mammal populations;
- 19 • **Hydraulic fracturing, greenhouse gas emissions and climate change** – Concerns about
20 the potential environmental effects of upstream gas production and associated
21 pipelines. Concerns about the GHG emissions from TMJ and potential effects to climate
22 change;
- 23 • **Government oversight, regulation, compliance and enforcement** – Apprehension that
24 under the current regulatory regime there is insufficient government oversight and
25 regulation of LNG facilities and shipping of LNG in B.C. Concern that there would be a
26 lack of compliance by TJLP and limited enforcement capability by the regulators to
27 ensure compliance;
- 28 • **EA process** – Comments and questions related to the rigour of the EA process such as,
29 technical review, neutrality of the EAO and transparency; and
- 30 • **Public consultation process** – Concerns that there has not been significant public input
31 and that no detailed project information was available at the open houses. Questions
32 and comments about the format and locations of the open house events. Concerns that
33 the public comments would not be considered in the decision by the Ministers.

1 During Application review, the EAO held a 30-day Public Comment Period on a draft of the
2 referral materials from August 5, 2021 to September 7, 2021. The draft referral materials for
3 public comment consisted of the draft Assessment Report, draft Summary Assessment Report,
4 proposed provincial Conditions and Certified Project Description of the Environmental
5 Assessment Certificate, and the potential federal Conditions of the federal Decision Statement.
6 A total of 1,817 comments were accepted from the public during the Public Comment Period
7 which are posted on EPIC, including 33 letters of support.

8 Below is a summary of the key issues and themes raised by the public during the Public
9 Comment Period:

- 10 • **Economic benefits** – Support for TMJ’s potential to create jobs, investment, and other
11 regional economic benefits;
- 12 • **Emissions reduction** – Support for LNG as a vessel fuel and its potential to reduce GHG
13 emissions and reduce concentrations of atmospheric pollution when compared to
14 conventional vessel fuel types, and LNG’s potential to provide a transitional fuel while
15 greener solutions are developed; and
- 16 • **Indigenous rights and title** – Concerns about TMJ’s impacts to Indigenous rights and
17 title;
- 18 • **Economic viability** – Concerns about the long-term economic viability of TMJ;
- 19 • **Marine wildlife** – Concerns about the impacts of dredging and vessel traffic to marine
20 life – particularly for salmon, eulachon and SRKW;
- 21 • **Cumulative effects** – Concerns about the cumulative effects from multiple projects and
22 industrialization of the lower Fraser region;
- 23 • **Emissions and Climate change** – Concerns about GHG emissions related to TMJ,
24 including upstream gas production, and the consequential impacts from climate change;
- 25 • **Public safety** – Concerns about potential accidents and malfunctions and risks to public
26 safety; and
- 27 • **EA process** – Concerns about the linkage between TMJ and Tilbury Phase 2 LNG
28 Expansion Project, and about the neutrality and transparency of the EAO.

29
30 Following the BVSA Report, the EAO revised the draft referral materials and is holding a 30-day
31 Public Comment Period on the updates to the draft referral materials from July 14, 2022 to
32 August 15, 2022. The referral materials for public comment consist of the draft Assessment
33 Report, draft Summary Assessment Report, proposed provincial Conditions and Certified
34 Project Description of the Environmental Assessment Certificate. The EAO also prepared a
35 “Road Map” summary document to describe the assessment and updates made to the draft
36 referral materials since the last Public Comment Period in August 2021.

1 4.5.3 SUPPLEMENTAL REQUESTS FOR INFORMATION DURING APPLICATION 2 REVIEW

3 During Application review, the EAO requested additional reference materials and supplemental
4 information from TJLP to support the EA. The EAO's requests for additional information were
5 primarily driven by concerns raised and requests submitted by the public, Working Group and
6 Indigenous Groups.

7 Key information that was provided to the EAO by TJLP, in addition to responses to comments
8 raised by the Working Group, during Application review included:

- 9 • The MSA Report;
- 10 • *Alternatives Assessment Supplemental Report – WesPac Tilbury Marine Jetty Project;*
11 and
- 12 • BVSA Report.

13 During Application review, TJLP's responses to the Working Group comments on the
14 Application and supplemental information, MSA Report and BVSA Report were captured in the
15 tracking table posted to the EPIC.

16 In the development of this Report, the EAO considered comments received from the public,
17 Working Group and Indigenous Groups, and TJLP's responses to those comments.

18 The EAO hosted Working Group meetings during Application review where TJLP was required to
19 respond to questions and concerns. The summary meeting notes were posted to EPIC.

20 All TMJ-related information was made available to the public on EPIC.

1 PART B – ASSESSMENT OF POTENTIAL ADVERSE EFFECTS

2 5 ASSESSMENT OF ENVIRONMENTAL EFFECTS

3 5.1 AIR QUALITY

4 5.1.1 BACKGROUND

5 This chapter assesses the potential effects TMJ would have on the Air Quality VC. Air Quality
6 was chosen as a VC due to its importance to Indigenous Groups, the public, stakeholders,
7 regulators, as well as the requirement under Section 5(1)(c) of the CEAA 2012. For the EAO's
8 assessment of potential effects of dredgeate disposal to the Air Quality VC, refer to
9 [Section 2.2.5](#) (Alternative Means of Undertaking the Project) of this Report.

10 The Application evaluated the following air quality parameters because they are predicted to be
11 emitted as a result of TMJ and have applicable Metro Vancouver, B.C. or federal ambient air
12 quality criteria:

- 13 • Nitrogen dioxide (NO₂);
- 14 • Sulphur dioxide (SO₂);
- 15 • Carbon monoxide (CO);
- 16 • Fine particulate matter (PM) with a diameter of less than 2.5 microns (PM_{2.5}); and
- 17 • Respirable PM with a diameter of less than 10 microns (PM₁₀).

18 The Air Quality VC assessment supports the assessment of TMJ's effects on the Human Health
19 VC in [Section 6.1](#) of this Report. It is also considered in the assessments of potential effects to
20 Socio-Community ([Section 8.1](#)), Land and Marine Resource Use ([Section 8.2](#)), Federal Lands,
21 Other Provinces, and Outside Canada ([Section 11.1](#)), Health and Socio-Economic Conditions of
22 Indigenous Peoples ([Section 11.3](#)), and Current Use of Land and Resources for Traditional
23 Purposes (Current Use) ([Section 11.4](#)) of this Report.

24 **MARINE SHIPPING ASSESSMENT**

25 The MSA presents the potential effects of TMJ-related shipping between Sand Heads and the
26 12-nautical mile limit on the Air Quality VC. The MSA evaluates the same air quality parameters
27 as the original scope.

28 The Air Quality MSA supports the assessment of TMJ marine shipping effects on the Human
29 Health MSA assessment in [Section 6.1](#) of this Report.

1 **5.1.1.1 REGULATORY CONTEXT**

2 The Application considered the following key regulatory requirements, guidelines, standards
3 and Best Management Practices (BMPs) informed the scope and methods of the Air Quality
4 effects assessment for TMJ:

- 5 • Metro Vancouver's Ambient Air Quality Objectives;
- 6 • B.C. Ambient Air Quality Objectives;
- 7 • Canadian Ambient Air Quality Standards;
- 8 • B.C. Air Quality Dispersion Modelling Guidelines; and
- 9 • Greater Vancouver Regional District Air Quality Management Bylaw No. 1082.

10 The Application made comparisons to the most stringent Ambient Air Quality Objectives at the
11 time. Comparison was made to Metro Vancouver's Ambient Air Quality Objectives in the effects
12 assessment for all compounds with the exception of one-hour and eight-hour CO which were
13 compared with the B.C. Ambient Air Quality Objectives.

14 **MARINE SHIPPING ASSESSMENT**

15 The same key regulatory requirements, guidelines, standards and BMPs listed above informed
16 the scope of the MSA with the addition of the International Convention for the Prevention of
17 Pollution from Ships (MARPOL) Annex VI³².

18 **5.1.1.2 BOUNDARIES**

19 The LAA for the Air Quality VC includes a 10 km by 10 km area centered on the TMJ site and
20 extends along the proposed LNG shipping route, 1 km on either side (2.5 km wide in total),
21 between the TMJ site and Sand Heads. The Regional Assessment Area (RAA) includes a 25 km
22 (north-south) by 30 km (east-west) rectangle comprising the TMJ site and the LAA.

23 **MARINE SHIPPING ASSESSMENT**

24 The MSA LAA (MLAA) for the Air Quality VC extends along the shipping lanes, 5 km on either
25 side (10 km width) between Sand Heads and the 12-nautical mile limit. The MSA RAA (MRAA)
26 corresponds to the Salish Sea area which includes the southern part of the Georgia Strait,
27 Rosario Strait, Middle Channel and Juan de Fuca Strait from north of Puget Sound to the 12-
28 nautical mile limit. This is considered a separate and additional assessment area from the
29 original scope.

³² International Maritime Organization. 2019. MARPOL Annex VI, 2019.

1 5.1.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE 2 APPLICATION

3 5.1.2.1 BASELINE INFORMATION

4 In the Application, the existing air quality conditions were assessed through existing ambient air
5 quality data gathered from local and regional monitoring stations in the greater Vancouver area
6 (Richmond South Station and Burnaby South Station), as well as Baseline Case model
7 predictions.

8 The Baseline Case represents the predicted air quality conditions without TMJ but including the
9 Tilbury LNG Plant as an existing source (including predicted emissions from the approved and
10 proposed Phase 2 plant expansions). The maximum emissions from the Tilbury LNG Plant were
11 included in the modelled emissions and were therefore considered very conservative. In the
12 Application, Baseline Case modelling predictions show that the one-hour and annual SO₂ and
13 NO₂, and one-hour and eight-hour CO were below the relevant Ambient Air Quality Objectives.
14 Baseline Case modelling predictions for 24-hour and annual PM_{2.5} and PM₁₀ were well below
15 the Metro Vancouver Ambient Air Quality Objectives. Potential effects are quantified by the
16 changes in the predicted concentrations between the Baseline Case and Application Case (air
17 quality after the addition of TMJ).

18 *MARINE SHIPPING ASSESSMENT*

19 The MSA stated that existing conditions were determined through the use of data from regional
20 monitoring stations. The background concentrations of NO₂, SO₂, CO and PM₁₀ for all averaging
21 periods in the MSA were below the Ambient Air Quality Objectives. 24-hour PM_{2.5} exceeded the
22 objective by up to 28 percent at certain monitoring locations mainly due to forest fires in B.C.
23 during the summer of 2018 (comparison against the Metro Vancouver Ambient Air Quality
24 Objectives were used for SO₂, B.C. Ambient Air Quality Objectives for CO and both objectives
25 for PM_{2.5} and PM₁₀ as the objectives are the same).

26 5.1.2.2 POTENTIAL PROJECT EFFECTS

27 The potential effects of TMJ on air quality were assessed in the Application through air
28 dispersion modelling of emissions associated with operations, as the Application stated that
29 emissions during this phase of TMJ would be the most substantial. Two scenarios were
30 identified in the Application to represent operations: The Normal Operations Scenario which
31 represents the typical operation at the facility (LNG carrier and bunker vessel calls and loading,
32 security boat and tug activity as well as fugitive emissions from the pipeline) and the Dredger
33 Operations Scenario which represents the two-week period of maintenance occurring once per

1 year where dredging would take place at the TMJ site (no LNG vessels would call during this
2 period).

3 The Application noted that the majority of emissions from TMJ in the LAA for the Normal
4 Operations Scenario would be intermittent, short-term emissions from diesel engines on board
5 marine vessels (one LNG carrier and associated tugs or one bunkering vessel are expected every
6 three days) and fugitive emissions from the pipeline system. Emissions would occur from the
7 Dredger Operations scenario during the yearly, two-week maintenance dredging period.
8 Dredger emissions are mostly due to dredger diesel engine combustion sources.

9 The Application noted that predicted emissions were modelled conservatively, particularly the
10 one-hour and 24-hour scenarios. For short term scenarios, emissions were assumed to be the
11 worst case, that is, from the largest, diesel-powered LNG carriers. Additionally, the maximum
12 emission rates were modelled as if they were continuous in the short term. The Application
13 explained that 90 percent or more of vessels are expected to be LNG powered which would
14 produce much lower emissions, particularly Nitrogen Oxides (NO_x) emissions, than diesel
15 powered vessels. The maximum hourly emissions that were modelled for the short-term
16 scenario would occur only while the largest, diesel-powered LNG vessels are berthing and
17 departing, which would occur for only 0.16 percent³³ of the year. TJLP's NO_x modelling was
18 based on emission factors provided by ECCC for carriers and tugs that were approximately 8
19 times and 6 times, respectively, than the IMO Tier III NO_x emission standards.

20 Application Case maximum NO₂ concentrations in the RAA were predicted to exceed the one-
21 hour Metro Vancouver Ambient Air Quality Objective for a maximum of 6 hours per year
22 (Table 8), based on modelling a diesel vessel berthing for every hour of the year³⁴. The change
23 from Baseline conditions due to the addition of TMJ maximum one-hour NO₂ predicted
24 concentrations is up to 164 percent of the air quality objective during the Normal Operations
25 Scenario. TMJ emissions would bring NO₂ levels from below to above the air quality objective.
26 The area of exceedance of the one-hour NO₂ objective is in the LAA over the Fraser River and
27 slightly onto land on the north bank of the Fraser River just north of the TMJ site boundary and
28 contains one discrete receptor (indicating a sensitive location). Maximum predicted Application
29 Case annual NO₂ concentrations are below Metro Vancouver's Air Quality Objective at all

³³ The Application conservatively assumed the maximum hourly emissions for berthing/ de-berthing for all 137 project vessel calls (LNG and diesel-powered vessels), resulting in the estimated maximum hourly emissions occurring for approximately 3% of the year. TJLP informed the EAO that, more realistically, the maximum hourly emission rate would only occur when diesel-powered LNG carriers with tug assist call to TMJ (68 vessel calls) which equates 0.16% of the year.

³⁴ TJLP informed the EAO that, more realistically, the maximum emission rates are only expected to occur during berthing and departing activities for 274 hours a year, and concentrations are predicted to be above the 1-hour NO₂ criteria less than one hour per year.

1 receptors. The change due to TMJ is predicted to be 0.16 percent of the annual air quality
 2 objective in the Normal Operations Scenario. During the Dredger Operations Scenario, one-
 3 hour NO₂ emissions are predicted to exceed Metro Vancouver Air Quality Objectives at a
 4 maximum of 2 hours per year affecting a small area over water on the Fraser River. Annual
 5 emissions were not assessed for the Dredger Operations Scenario as the dredging activities are
 6 planned to take place only once per year for a period of two weeks.

7 In the Application, CO maximum one-hour and 8-hour Application Case predictions were shown
 8 to increase slightly from the Baseline while remaining well below both the one-hour and 8-hour
 9 Metro Vancouver Ambient Air Quality Objectives in both the Normal and Dredger s scenarios.
 10 The change due to TMJ was equivalent to approximately 3 percent and 2.5 percent of the one-
 11 hour and 8-hour objectives respectively in both the Normal and Dredger Operations Scenario.

12 Maximum predictions for SO₂, PM_{2.5} and PM₁₀ were predicted in the Application to remain
 13 below both the relevant one-hour, 24-hour and annual Metro Vancouver Ambient Air Quality
 14 Objectives for both the Normal and Dredger Operations Scenarios. For SO₂, the change due to
 15 TMJ was shown to be negligible at the maximum prediction location in both the one-hour and
 16 annual scenarios. For PM, the change due to TMJ for short term (that is, 24-hour) was
 17 equivalent to a maximum of 26 percent and 14 percent of the PM_{2.5} and PM₁₀ objectives
 18 respectively. TMJ effects on annual concentrations at the maximum prediction was shown to be
 19 negligible.

20 A summary of the maximum predicted concentrations of NO₂, SO₂, CO, PM_{2.5} and PM₁₀ in the
 21 RAA is presented in Table 7 for both the Normal Operations and Dredger Operations scenarios.

22 **Table 7: Summary of the maximum predicted air concentrations in the RAA**

Air Quality Parameter	Averaging Period	Ambient Air Quality Objective (µg/m ³)	Predicted Maximum Baseline Case (µg/m ³)	Predicted Maximum Application Case (µg/m ³) (Baseline Case plus change due to TMJ)	Predicted Max Number of Exceedances (Objective Exceedances/ year)
NO ₂	one-hour	200	95.8	Normal*: 423.2 Dredger**: 407.4	6 2
	Annual	40	25.8	Normal: 26.8	0
SO ₂	one-hour	183	20.0	Normal: 20.0 Dredger: 20.0	0 0
	Annual	13	1.5	Normal: 1.5	0
CO	one-hour	14,300	858	Normal: 1,304 Dredger: 1,329	0 0
	8-hour	5,500	725	Normal: 860 Dredger: 855	0 0

Air Quality Parameter	Averaging Period	Ambient Air Quality Objective ($\mu\text{g}/\text{m}^3$)	Predicted Maximum Baseline Case ($\mu\text{g}/\text{m}^3$)	Predicted Maximum Application Case ($\mu\text{g}/\text{m}^3$) (Baseline Case plus change due to TMJ)	Predicted Max Number of Exceedances (Objective Exceedances/ year)
PM _{2.5}	24-hour	25	17.8	Normal: 23.4 Dredger: 24.4	0 0
	Annual	8	6.2	Normal: 6.2	0
PM ₁₀	24-hour	50	23.3	Normal: 29.5 Dredger: 30.4	0 0
	Annual	20	10.1	Normal: 10.1	0

Bold text indicates Metro Vancouver Air Quality Objective exceedances.

*Normal Operations Scenario represents the typical operation at the facility (LNG carrier and bunker vessel calls and loading, security boat and tug activity as well as fugitive emissions from the pipeline).

**Dredger Operations Scenario represents the two-week period of maintenance occurring once per year where dredging would take place at the TMJ site.

1 **BUNKER VESSEL SCENARIO**

2 For the BVS, TJLP updated the LNG vessel emission rates of air quality measurable parameters
3 based on the increased bunker vessel traffic, fewer LNG carriers, and updated bunker vessel
4 information available at the time of the BVSA. The BVSA focused on changes to emissions of the
5 following criteria air contaminants: NO₂, SO₂, PM_{2.5} and PM₁₀. To assess potential effects of the
6 BVS to air quality, the 1-hour, 24-hour and annual emissions scenarios assessed in the
7 Application were reviewed to determine if the changes to bunker vessel traffic would affect
8 these maximum emission scenarios. TJLP determined that the 1-hour and 24-hour air emissions
9 scenarios assessed in the Application would still be appropriate and assessed a conservatively
10 high level of air emissions since the types of LNG carriers (e.g., engine size and capacity) are not
11 changing in the BVS. No changes are proposed for dredger operations; therefore, the Dredger
12 Scenario remains unchanged from what was assessed in the Application.

13 TJLP undertook additional assessment of annual emissions to determine the effects to Air
14 Quality due to annual increase in bunker vessel traffic for the Normal Operation Scenario. For
15 Project Emissions, compared to the Application, TJLP determined the increase in bunker vessels
16 would decrease TMJ NO_x emissions by 19%, increase TMJ SO₂ emissions by 28%, and decrease
17 TMJ PM_{2.5} and PM₁₀ emissions by 18%. For the Application Case, TJLP concluded that the
18 Application Case annual NO₂ predictions have decreased by 10% from that predicted in the
19 Application, due to the reduction in NO_x emissions realized with the updated bunker vessels
20 (i.e., elimination of three tugs per bunker vessel and using the IMO Tier II NO_x factor for the
21 ATB). TJLP concluded that there are minor changes to the SO₂ (less than 1% decrease), PM_{2.5}
22 (4% decrease) and PM₁₀ (4% decrease) predictions when compared to the Application, as the
23 TMJ emissions do not have a measurable change on the maximum predictions because they are

- 1 being driven by other regional background contributions.
- 2 Consistent with the Application, TJLP confirmed that the BVS is predicted to result in an
- 3 increase in annual NO₂, SO₂, PM_{2.5}, PM₁₀, and that there were no changes to the
- 4 characterization, and that the conclusions of the Application remain unchanged.

5 **MARINE SHIPPING ASSESSMENT**

6 In the MSA, potential effects were modeled using a screening-level air dispersion model to
7 predict ambient concentrations as a result of TMJ at the closest shoreline receptor point to a
8 TMJ-related vessel. The air quality modelling in the MSA considered two emission scenarios and
9 predicted the following:

- 10 • Normal Operations Scenario (LNG powered carrier with a tethered diesel tug): One-hour
- 11 SO₂, one-hour and eight-hour CO, and 24-hour PM_{2.5} and PM₁₀ would be less than
- 12 one percent of the relevant air quality objective. The concentration of NO₂ is predicted
- 13 to increase to 21.1 percent of the B.C. Ambient Air Quality³⁵;
- 14 • Abnormal Operations Scenario³⁶ (Diesel powered carrier with a tethered diesel tug):
- 15 One-hour and eight-hour CO and 24-hour PM₁₀ would be less than one percent of the
- 16 relevant air quality objectives. One-hour SO₂ would be approximately 2.1 percent of the
- 17 Metro Vancouver Ambient Air Quality Objectives. The concentration of NO₂ is predicted
- 18 to increase to 22.7 percent of the B.C. Ambient Air Quality Objective; and
- 19 • Normal and Abnormal Scenario: 24-hour PM_{2.5} would exceed the Metro Vancouver and
- 20 B.C. Ambient Air Quality Objectives in both the Baseline and Application Cases as
- 21 background concentrations are already higher than the air quality objectives. The
- 22 predicted change from Baseline Case concentrations is around one percent of the air
- 23 quality objective.

24 **5.1.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

25 The Application proposed the following mitigation measures to avoid or minimize the potential
26 adverse effects of TMJ on Air Quality:

- 27 • Project Design mitigations would reduce emissions through technology/ component
- 28 selection, process design, fugitive emissions management, as well as cryogenic systems

³⁵ Comparison against the Metro Vancouver Ambient Air Quality Objectives were used for SO₂, B.C. Ambient Air Quality Objectives for CO and both objectives for PM_{2.5} and PM₁₀ as the objectives are the same.

³⁶ TJLP expects that all LNG carriers and bunker vessels would be LNG powered; however, there could be occasions for diesel powered LNG carriers (a predicted maximum of 10 percent diesel fueled vessels, or 13 vessels per year).

- 1 designed to avoid leaks (Project Design mitigations are already incorporated into TMJ
2 emissions used in the assessment);
- 3 • LNG fueled vessels will comprise 90% of the vessels called to TMJ and that up to 10%
4 may primarily be diesel fuel powered;
 - 5 • It is TJLP's intention that LNG vessels and barges would meet MARPOL, 1973 as
6 Modified by the Protocol of 1978, Annex VI, Tier III emission requirements for the
7 priority elements, where applicable, to a specific vessel type;
 - 8 • Mitigation measures designed to minimize potential adverse effects to Air Quality would
9 be included in relevant management plans; and
 - 10 • The Air Quality Management Plan would be put in place to manage air emissions and
11 fugitive dust during facility construction, operations, and decommissioning.
- 12 No additional mitigation measures were proposed by TJLP as part of the MSA or BVSA.

13 **5.1.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 14 **IDENTIFIED DURING APPLICATION REVIEW**

15 The following key issues related to the assessment of Air Quality for TMJ were identified during
16 Application review and based on feedback from the Working Group:

- 17 • Assessment criteria;
- 18 • Assessment of construction emissions; and
- 19 • Assessment of annual air quality effects in the MSA;
- 20 • Use of shore power as mitigation measure; and
- 21 • Bunker Vessel Scenario Assessment.

22 **ASSESSMENT CRITERIA**

23 Tsleil-Waututh Nation, ECCC, HC, Metro Vancouver and the BC OGC requested the constituents
24 of potential concern for TMJ be compared to the 2025 Canadian Ambient Air Quality Standards
25 (CAAQS) (coming into effect when TMJ is operational) which are the most stringent air quality
26 objectives and that this comparison be considered when determining significance of effects for
27 both the original and MSAs. ECCC noted the following in making this request: CAAQS are
28 applicable throughout Canada; CAAQS were developed in consideration of both human health
29 and the environment; and the operations phase of TMJ would occur post-2025.

30 Particular concerns were expressed regarding the assessment of NO₂ effects due to TJLP's
31 predictions of high magnitude effects for the one-hour average period. HC noted that NO₂ is a
32 non-threshold contaminant (meaning health effects may occur at any level of exposure).
33 Furthermore, Metro Vancouver and ECCC stated that Metro Vancouver has now adopted more

1 stringent Ambient Air Quality Objectives for NO₂ which align with the federal 2020 CAAQS. The
2 previous, less stringent Metro Vancouver Ambient Air Quality Objectives which were used in
3 the Application are no longer applicable.

4 Metro Vancouver and ECCC disagreed with TJLP's view that the assessment is overly
5 conservative and indicated that the most conservative method was not used to calculate the
6 background concentrations and near-road environments were not considered. Tsleil-Waututh
7 Nation stated that although the CAAQS are generally used for airshed management and not at a
8 project-level, TMJ cannot be considered in isolation and these TMJ-related effects need to be
9 considered when managing an airshed.

10 In response to the concerns raised, TJLP provided a supplemental memo³⁷ which included
11 comparison of annual and one-hour NO₂ against the 2020 and 2025 CAAQS, consideration
12 of this comparison in TJLP's significance determination of NO₂ effects and justification for
13 why the CAAQS are not, in TJLP's view, an appropriate metric to evaluate TMJ effects. The
14 memo included the following:

- 15 • Comparison of potential NO₂ concentrations to the CAAQS: The memo predicted
16 exceedances for both the one-hour and annual NO₂ standards. Baseline Case one-hour
17 NO₂ concentrations already exceed the CAAQS. The predicted change in the maximum
18 one-hour concentration of NO₂ due to TMJ was 152 percent of the CAAQS. Both the
19 Baseline Case and Application Case predicted 358 hourly exceedances per year, meaning
20 there were no predicted increases in the number of exceedances from baseline due to
21 TMJ;
- 22 • Use of CAAQs for TMJ EA: In TJLP's view, the CAAQS are not an appropriate metric to
23 evaluate TMJ effects as they are designed to be used for airshed management, not for
24 assessing maximum concentrations outside the TMJ area at a local scale (the LAA and
25 RAA are not representative of an airshed). TJLP noted that the Canadian Council of
26 Ministers of the Environment (CCME) stated CAAQS were not developed for assessing
27 individual project-related effects at a local scale and that achievement of the CAAQS is
28 to be compared against an airshed or air zone;
- 29 • Air quality conclusions: TJLP indicated that the conclusion that one-hour NO₂ emissions
30 would not have a significant effect is appropriate even though there are exceedances of

³⁷ TJLP's NO₂ Supplemental Memo, dated September 16, 2019

https://projects.eao.gov.bc.ca/api/public/document/60a49221148b4a00233060fa/download/20190916_ECCC_MV_OGC_TW_N_AQ_NO2%20Assessment.pdf.

1 the most stringent air quality criteria because of the conservative nature of the short-
2 term NO₂ assessment (air dispersion modelling used the largest LNG carrier, the longest
3 LNG loading duration, diesel powered LNG carriers and maximum one-hour NO₂
4 emission rates) as well as the short duration of the air quality effects; and

- 5 • Mitigations: TJLP stated that comparison against the CAAQS would not facilitate
6 additional mitigation measures as the majority of TMJ one-hour NO₂ emissions are from
7 the tugs not under operational control of TJLP. Therefore, it would not be feasible to
8 include more mitigations than those already presented in this assessment.

9 The EAO considered this information and found that comparison of NO₂ against the CAAQS
10 would not change the EAO's overall assessment of TMJ effects on air quality. TMJ effects on
11 one-hour NO₂ were one of the primary air quality concerns for the Working Group. These
12 predictions were conservatively based on the largest diesel operated LNG carrier, with the
13 longest LNG loading duration and the maximum one-hour NO₂ emission rates. In reality, most
14 vessels would be LNG powered with varying engine sizes. Maximum emission rates were
15 modelled as if continuous (that is, emission sources emitting at their maximum hour emission
16 rates every hour of the year), when in reality, the maximum emissions would only occur when
17 LNG vessels are berthing and departing (only 0.16 percent of the year) leading to a reduction in
18 likelihood of one-hour NO₂ concentrations being as high as modeled in the Application.

19 One-hour and annual SO₂ were compared to the 2025 CAAQS in the Application and found that
20 both the one-hour and annual predictions for the Normal Operations and Dredger Operations
21 were below the CAAQS.

22 The EAO notes that comparison against the 2025 CAAQS was conducted in the assessment of
23 human health for the original Application area and the MSA which incorporates risk and
24 exposure to constituents of potential concern ([Section 6.1](#) of this Report). The EAO is satisfied
25 that this issue is adequately resolved for the purposes of the EA. The EAO is proposing
26 Condition: 19: Air Quality Management Plan, which would include mitigation measures TJLP
27 would implement to reduce adverse effects to air quality, require TJLP to estimate or measure
28 air quality parameters attributable to TMJ, and include triggers that would cause TJLP to take
29 corrective action to reduce those parameters. The EAO is also recommending a KMM under
30 CEAA 2012 for an Air Quality Management Plan, which would include how TJLP is participating
31 in the identification and implementation of regional environmental management measures and
32 cumulative effects monitoring to manage air quality, including relevant initiatives that might
33 exist in the future that have a role for marine terminal operators. The EAO also recommends a
34 non-LNG vessel limitation KMM under CEAA 2012, requiring that the number of LNG vessels,
35 excluding LNG barges driven by tugs, calling on the jetty that use crude oil-based fuels (such as

1 diesel) as their primary fuel shall not exceed 13 calls annually. This KMM captures TJLP's
2 assumption used in the air quality analysis in the Application that up to 10% of the 137 vessel
3 calls would be diesel-powered.

4 **ASSESSMENT OF CONSTRUCTION EMISSIONS**

5 ECCC, Metro Vancouver and Tsleil-Waututh Nation expressed concerns that TJLP did not assess
6 emissions from construction and decommissioning and only qualitatively stated that they
7 would not be the phases with the largest air quality effects, thereby making operations the
8 "bounding" phase. These Working Group members felt that insufficient justification was
9 provided in the Application to substantiate this claim and that minimal explanation was
10 provided on how emissions from construction would be mitigated. Tsleil-Waututh Nation
11 indicated that they would like to see further efforts to reduce emissions during construction.
12 Metro Vancouver stated that, because PM_{2.5} emissions would be the highest during
13 construction, PM_{2.5} either needs to be modeled to understand the effect on ambient air quality
14 or monitored during construction. Additional information to justify limiting the assessment to
15 TMJ's operations only and details on mitigation measures to limit the emissions during
16 construction were requested.

17 TJLP provided a supplemental memo³⁸ detailing the construction activities and
18 quantified air emissions, including a comparison of construction emission rates against
19 predicted Normal Operations and Dredger Operations Scenario emission rates. The
20 memo from TJLP concluded that the maximum one-hour NO_x emission rates during
21 construction would be slightly greater than Dredger Operations but less than Normal
22 Operations. Maximum construction one-hour SO₂ and CO construction emission rates
23 would be less than both the Normal and Dredger Operations scenarios. Maximum 24-
24 hour PM_{2.5} and PM₁₀ emission rates during construction would be slightly greater than
25 both the Project Normal and Dredger Operations scenarios. Maximum construction
26 annual NO_x, CO, PM_{2.5} and PM₁₀ emission rates would be greater than the Normal
27 Operations scenario while annual SO₂ would be slightly lower. TJLP stated that
28 construction activities associated with TMJ would be relatively small. TJLP noted that it
29 is important to consider that construction emission rates are expected to be highly
30 variable and intermittent over the three-year construction. Therefore, the comparison
31 of the maximum short-term (one-hour and 24-hour) emission rates between

³⁸ TJLP's Construction Phase – Air Quality Supplemental Memorandum, dated December 9, 2019
(https://www.projects.eao.gov.bc.ca/api/public/document/60a4941b148b4a0023306116/download/20191209_MV_TWN_AQ%20Construction%20Assessment.pdf).

1 construction and the Normal Operations Scenario is the most important. In the context
2 of total regional emissions, the annual construction emissions would be less than
3 0.1 percent of the regional emissions and would likely be masked by any existing trucks
4 on the road. TJLP also noted that the emission rates presented are maximum emission
5 rates that assume all construction activities that can happen concurrently are active,
6 which is a highly conservative approach. The supplemental memo also listed the
7 construction mitigation measures which included industry standard mitigation measures
8 such as air quality and fugitive dust management plans (which would include site-
9 specific mitigation measures and recommendations for action in order of effectiveness)
10 which were already incorporated into the emission rates. No additional mitigation
11 measures were proposed.

12 The EAO is of the view that sufficient information on the TMJ construction activities and
13 emission rates was provided by TJLP and that the issue discussed is adequately resolved for the
14 purposes of the EA. Although emission rates of some air quality parameters during construction
15 were predicted to be higher than operations during certain times, estimates of these rates were
16 highly conservative as they assumed all construction activities would be happening
17 concurrently, which is an unlikely scenario given the multi-staged approach inherent to the
18 construction schedule. Construction activities for TMJ contribute little to the total regional
19 emissions. In addition, TJLP have committed to implementing standard management practices
20 for the control of fugitive dust at the TMJ site. The EAO is proposing Condition 19: Air Quality
21 Management Plan, Condition 20: Greenhouse Gas Reduction Plan, and recommending KMM
22 under CEAA 2012 for an Air Quality Management Plan.

23 ***ASSESSMENT OF ANNUAL AIR QUALITY EFFECTS IN THE MARINE SHIPPING ASSESSMENT***

24 HC and Fraser Health expressed concern that TJLP did not consider annual air quality effects in
25 the MSA; only one-hour and 24-hour averaging periods were assessed. HC stated that while
26 emissions from the vessels associated with TMJ may be intermittent, exposure to air
27 contaminants is expected on a regular basis for a number of years, which makes considering the
28 chronic health effects of this exposure appropriate. HC found TJLP's rationale for not including
29 the annual air quality assessment insufficient and this remains an area of uncertainty in the
30 MSA.

31 In response to this concern, TJLP indicated that annual air quality effects were not
32 considered in this assessment because the TMJ-related shipping traffic compared to the
33 existing marine traffic is minimal. TMJ-related shipping would result in 236 vessel
34 movements per year (less than one per day) in the MSA. The number of all TMJ-related
35 vessel movements ranges from 0.2 percent to 1.1 percent over the shipping corridor in

1 the Marine Shipping Assessment Area (MSAA).

2 The EAO is satisfied with TJLP's response to HC's request and conclude that an annual
3 assessment of effects to air quality is not necessary. This is due to the prediction that TMJ-
4 related shipping traffic compared to existing marine traffic would be minimal and the EAO is
5 therefore of the view that TMJ would have a negligible effect on annual air quality effects.

6 ***USE OF SHORE POWER AS MITIGATION MEASURE***

7 ECCC and Metro Vancouver requested that TMJ-related vessels calling to TMJ be required to
8 connect to shore power as a mitigation to reduce GHGs and air quality effects while the vessels
9 are at berth, and Delta expressed interest in a provincial condition requiring TJLP to investigate
10 the feasibility of providing shore power to LNG carriers and bunkering vessels.

11 In response, TJLP stated that connecting an LNG carrier to shore power has to be
12 reviewed against all applicable codes, standards and detailed risk assessments for the
13 facility. TJLP noted that the design, certification and approval is not yet available for the
14 shore power of LNG carriers and may not be compatible with emergency un-berthing
15 requirements. Although there are a few early adaptors, the BC OGC, as a regulator,
16 would need to be consulted and may not be receptive to the introduction of a new,
17 unproven practice which is not widely used in other jurisdictions. In a meeting with the
18 EAO on November 6, 2020, TJLP explained that shore power would not mitigate the
19 main source of one-hour NO₂ emissions as the peak emissions are heavily influenced by
20 the tugs during berthing and would only minimally mitigate annual NO₂ emissions. TJLP
21 stated that they could report on NO₂, PM_{2.5} and GHG emissions related to operations
22 and include a plan to ensure that these emissions were not above levels in the
23 Application.

24 The EAO is satisfied with TJLP's response, and concludes that the use of shore power should not
25 be required for TMJ.

26 ***BUNKER VESSEL SCENARIO ASSESSMENT***

27 During the BVS review, Metro Vancouver noted that the assessment relied on a background
28 value for annual NO₂ (2012-2016), which is no longer representative of current air quality in the
29 study areas. Metro Vancouver noted that NO₂ levels have steadily improved in the study area
30 over the years, the outdated data is no longer relevant to the current or future air quality in the
31 study areas, and the background is not appropriate for the BVSA. Using more recent (2019-
32 2021) data, Metro Vancouver stated that the predicted maximum annual concentrations for the
33 Baseline Case do not exceed the 2025 annual NO₂ CAAQS, while the Application Case does.
34 Metro Vancouver submits that this results in a "high" magnitude rating for annual NO₂.

1 TJLP responded that the assessment approach used the same methods and existing
2 conditions as the Application to allow for comparison between the Application scenario
3 and BVS. On an annual basis, TJLP concluded that the BVS resulted in slightly lower
4 offsite annual NO₂ concentrations compared to the Application. As such, TJLP stated
5 that the magnitude assignment of annual NO₂ in the BVSA is in line with that assigned in
6 the Application. TJLP noted that the background annual NO₂ concentrations used in
7 both the Application and BVSA are conservative (i.e., higher), which adds to the
8 conservatism of the Application and BVSA.

9 The EAO acknowledges that the NO₂ levels in the region have improved and the background
10 values for annual NO₂ have changed since the Application was submitted in 2019. Given that
11 the BVSA was conducted to understand how the predicted residual effects changed from the
12 Application scenario to the BVS, the EAO supports the comparison using the same data. The
13 EAO concludes that use of more current background NO₂ values would not result in any
14 additional provincial conditions or recommended KMMs under CEAA 2012.

15 **5.1.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

16 The EAO evaluated the potential effects to air quality by considering construction, operations
17 and Decommissioning activities that could affect air quality due to the increase in combustion
18 exhaust from LNG carriers and bunker vessels while berthing, loading and departing; associated
19 vessels such as tugs and security vessels, as well as fugitive emissions from the pipeline system.
20 These effects may result in residual adverse effects from increased one-hour and annual NO₂
21 and CO emissions as well as increased 24-hour PM_{2.5} and PM₁₀. One-hour and annual SO₂
22 emissions as well as annual PM_{2.5} and PM₁₀ have a negligible effect on Air Quality and were
23 therefore not carried forward to significance determination.

24 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

25 Based on mitigations proposed in the Application and issues raised during Application review,
26 the EAO proposes the following provincial conditions and recommends KMMs under CEAA
27 2012:

- 28 • Conditions 10: Construction Environmental Management Plans (provincial condition);
- 29 • Condition 11: Operations Environmental Management Plans (provincial condition);
- 30 • Condition 19: Air Quality Management Plan (provincial condition) and Air Quality
31 Management Plan (KMM) with best management practices to mitigate effects to air
32 quality; and
- 33 • Non-LNG vessel limitation KMM

1 **Residual Effects:** After considering the proposed mitigation measures, the EAO concludes that
 2 TMJ would result in the following residual adverse effects to Air Quality during operations for
 3 the Application scenario and BVS (MSA residual effects are considered separately below as they
 4 cannot be readily combined with predictions from the jetty to Sand Heads):

- 5 • One-hour and annual NO₂;
- 6 • One-hour and annual CO; and
- 7 • 24-hour PM_{2.5} and PM₁₀.

8 The EAO’s characterization of the predicted residual effects of TMJ on Air Quality is summarized
 9 below and reflects the EAO’s level of confidence in the effects determination (including their
 10 likelihood and confidence).

11 **Table 8: Summary of residual effects for Air Quality (Jetty to Sand Heads)**

Criteria	Assessment Rating	Rationale
Context	Low to Moderate Sensitivity	Predicted maximum Baseline Case data indicated that air quality in the region is well below Metro Vancouver’s Ambient Air Quality Objectives, with the exception of 24-hour PM _{2.5} (which is at 89 percent of the Ambient Air Quality Objective) indicating that sensitivity to TMJ effects are considered Low to Moderate. Additionally, effects from TMJ are not expected to occur off-site where humans are present, with the exception of one-hour NO ₂ . Human activity is possible at one of the single discrete receptors in the Normal Operations Scenario, but no residences, schools or hospitals are at this location.
Magnitude	Annual NO₂: Low One-hour NO₂: High CO: Low to Moderate 24-hour PM_{2.5}: Moderate 24-hour PM₁₀: Moderate	<p>The magnitude of the annual averaging period for NO₂ is considered low as concentrations would remain below the air quality objective with an increase to two percent of the air quality objective. The magnitude of residual effects for the one-hour averaging period of NO₂ concentration is assessed as high as TMJ emissions have the potential to increase the concentration to up to 164 percent of the Metro Vancouver air quality objective. These magnitude ratings apply to the Application scenario and BVS.</p> <p>For the Application, scenario the magnitude of CO concentrations is low for both the one-hour and annual averaging periods as the increase due to TMJ from the Baseline Case is two percent and three percent, respectively. For the BVS, the one-hour remains the same as the Application, and for annual averaging periods TMJ is predicted to contribute approximately 11% respectively of existing marine emissions along the South Fraser resulting in a moderate magnitude .</p> <p>The 24-hour PM_{2.5} and PM₁₀ residual effects are classified as moderate as the contribution from TMJ sources would be 26 percent and 14 percent of the Metro Vancouver Ambient Air Quality Objectives, respectively bringing the 24-hour PM_{2.5} predicted Application Case concentrations to 97 percent of the Metro Vancouver Ambient Air Quality Objective and 24-hour PM₁₀</p>

Criteria	Assessment Rating	Rationale
		<p>Predicted Application Case concentrations to 59% of the Metro Vancouver Ambient Air Quality Objective. These magnitude ratings apply to the Application scenario and BVS.</p> <p>During construction, the magnitude for NO₂, CO and 24-hour PM_{2.5} and PM₁₀ would be the same as during operations as the emission rates between the two phases are similar.</p>
Extent	Local	Effects on Air Quality from TMJ are expected to be localized in the LAA as maximum concentrations and any exceedances of the relevant air quality objectives occur within the LAA for both construction and operations.
Duration	<p>Normal Operations: Long-term</p> <p>Dredger Operations: Long-term</p> <p>Construction: Medium-term</p>	<p>The duration of the effect of TMJ on Air Quality during the Normal Operations scenario is classified as long-term as effects would persist throughout the entire life of TMJ but are not expected to surpass that.</p> <p>The duration of the effect of TMJ on Air Quality during the Dredger Operations scenario is classified as long-term as effects would persist for up to two weeks per year during maintenance dredging for the life of the TMJ.</p> <p>The duration of the effect of TMJ on Air Quality during construction is classified as medium-term as effects would persist for just over 3 years.</p>
Reversibility	Reversible	Residual effects on air quality for both construction and operations would cease following decommissioning. Note that any consequent health effects may not be reversible.
Frequency	<p>Normal Operations: Frequent</p> <p>Dredger Operations: Infrequent</p> <p>Construction: Frequent</p>	<p>For the Application scenario and BVS, the greatest emission sources, such as LNG bunker vessels and carriers, during the Normal Operations scenario are not continuous but would be present frequently in the LAA. Residual effects are predicted to be frequent, however, the frequency of one-hour NO₂ exceedances would be infrequent as exceedances of one-hour NO₂ are predicted to occur for a maximum of 6 hours per year for the Application scenario and BVS.</p> <p>Dredging would only occur once per year for a duration of up to two weeks during operations.</p> <p>Effects of TMJ on Air Quality during construction is classified as frequent as effects from construction would occur regularly over around a 3-year period.</p>
Likelihood	There is a high likelihood of effects to air quality during construction, Normal Operations and Dredging Operations scenarios.	
Confidence	The EAO has a high level of confidence that, based on the conservative nature of the NO ₂ , SO ₂ , CO, PM ₁₀ and PM _{2.5} emission estimates, TMJ actual effects would be lower than predicted. The one-hour predictions were based on emissions from the largest diesel operated LNG carrier, with the longest LNG loading duration and the maximum one-hour NO ₂ emission rates. In reality, most vessels would be LNG powered with varying engine sizes. Maximum emission rates were modelled as if continuous (that is, emission sources emitting at their maximum hour emission rates every hour of the year), when in reality, the maximum emissions would only occur when LNG carriers are berthing and departing (up to 0.16 percent of the year in the	

Criteria	Assessment Rating	Rationale
		Application scenario, and less frequent considering the BVS) leading to a reduction in likelihood of one-hour NO ₂ concentrations being as high as modeled in the Application and BVS.
Significance		In consideration of the above analysis and the conditions identified in the Table of Conditions (TOC) (which would become legally binding if an EAC is issued) and recommended KMMs under CEAA 2012 (Appendix 1), as well as the conservative nature of the modelling of effects, the EAO concludes that TMJ would not have significant adverse residual effects on the Air Quality VC from the jetty to Sand Heads.

1 **MARINE SHIPPING ASSESSMENT**

2 After considering the proposed mitigation measures, the EAO concludes that the TMJ would
 3 result in residual adverse effects to Air Quality due to an increase in the following air quality
 4 concentrations during operations: One-hour NO₂, one-hour SO₂, one-hour and eight-hour CO,
 5 and 24-hour PM_{2.5} and PM₁₀.

6 The EAO’s characterization of the predicted residual effects of TMJ on Air Quality in the MSA is
 7 summarized below and reflects the EAO’s level of confidence in the effects determination
 8 (including their likelihood and confidence).

9 **Table 9: MSA Summary of residual effects for Air Quality**

Criteria	Assessment Rating	Rationale
Context	Low to High sensitivity	Predicted maximum Baseline Case data indicated that air quality in the region is well below the Ambient Air Quality Objectives, with the exception of 24-hour PM _{2.5} (which is at 127 percent of the Ambient Air Quality Objective due to the B.C. forest fires in 2018) indicating that sensitivity to TMJ effects are considered Low to High.
Magnitude	Negligible - Moderate	<p>Normal Operations Scenario (considered LNG powered carriers with a tethered diesel tug): Residual effects of one-hour NO₂ are assessed as moderate as the percent of change of the B.C. Ambient Air Quality objective due to TMJ is 21 percent (remaining below the B.C. Ambient Air Quality Objective). All other constituents were assessed as negligible as the percent of change of the objective is 0.4 percent or less.</p> <p>Abnormal Operations Scenario (considered diesel powered carriers with a tethered diesel tug): Residual effects of one-hour NO₂ are assessed as moderate as the contribution from TMJ sources would be 23 percent of the air quality objective. One-hour SO₂ and 24-hour PM_{2.5} are assessed as low as the contribution from TMJ sources would be 2.2 percent and 1.2 percent respectively of the air quality objective. All other constituents are assessed as negligible as the contribution from TMJ sources are 0.7 percent or lower of the air quality objective.</p>
Extent	Local	Predicted concentrations for Air Quality were assessed at the closest receptor locations (shoreline) to the shipping corridor (or vessel location)

Criteria	Assessment Rating	Rationale
		geographically set in the MLAA. Predicted concentrations at other receptor locations are expected to be lower as they are a greater distance from the shipping corridor.
Duration	Long-term	The duration of the effect of TMJ on Air Quality for the MSA is classified as long-term as effects would persist throughout the entire lifespan of TMJ but are not predicted to surpass that.
Reversibility	Reversible	Residual effects on Air Quality would cease following the decommissioning of TMJ. Note that any consequent health effects may not be reversible (Please see the Human Health in Section 6.1 of this Report).
Frequency	Normal Operation: Frequent Abnormal Operation: Infrequent	The Normal Operations Scenario's effects are defined as frequent as effects from the vessels on Air Quality would occur intermittently (approximately once every three days) over the life-span of TMJ. The Abnormal Operations Scenario's effects are defined as infrequent as diesel powered LNG carrier vessel calls would be infrequent (maximum of approximately 13 vessels per year).
Likelihood	There is a high likelihood of air quality effects during the Normal Operations and Abnormal Operations scenarios.	
Confidence	The EAO has a high level of confidence that effects have not been underestimated based on the conservatism of the emission inventory, the screening level dispersion modelling approach, and the conservative approach to establishing baseline conditions. Based on this conservatism in the assessment, the EAO finds it likely that air quality effects would be lower than modeled.	
Significance	In consideration of the conditions identified in the TOC and other KMMs, as well as the conservative nature of the modelling of effects, the EAO concludes that TMJ MSA would not have significant adverse residual effects on the Air Quality VC.	

1 5.1.5 CUMULATIVE EFFECTS ASSESSMENT

2 There are four existing and reasonably foreseeable future projects and activities that have the
3 potential to interact cumulatively with TMJ's residual effects on Air Quality in the original
4 Application area (that is, jetty to Sand Heads).

5 Past, present and reasonably foreseeable future projects and activities that were considered in
6 the cumulative effects assessment for the Air Quality VC include:

- 7 • Vancouver Airport Fuel Facilities Corporations Fuel Delivery Project (VAFFC);
- 8 • Seaspan Ferries Tilbury Terminal Expansion;
- 9 • Tilbury Phase 2 LNG Expansion Project (this project was not included in TJLP's
10 Application for the original Application area, but was requested by Working Group
11 members that the EAO consider it in the cumulative effects assessment);

- 1 • Delta Grinding Facility (this project was not included in TJLP’s Application for the original
2 Application area, but was requested by Working Group members that the EAO consider
3 it in the cumulative effects assessment); and
- 4 • RBT2 (TJLP determined this project would not have any potential interaction with TMJ
5 due to approximate distance from TMJ. The Working Group requested that the EAO
6 consider it in the cumulative effects assessment).

7 The emissions of the VAFFC and the Seaspan Ferries Tilbury Terminal Expansion are similar to
8 those of TMJ. Construction on these two projects are expected to be completed before the
9 start of TMJ, therefore, interactions during operations were the focus of the cumulative effects
10 assessment. For the Application scenario and BVS, the maximum predicted change in
11 concentration of one-hour NO₂ due to the addition of TMJ sources at the location of these
12 future projects is 22 percent of the Metro Vancouver Ambient Air Quality Objective, 3 percent
13 for 24-hour PM_{2.5}, and 2 percent for annual NO₂ and 24-hour PM₁₀. For one-hour and
14 eight-hour CO, the maximum predicted change is less than 1 percent for the Application
15 scenario and BVS. The extent of the residual effects at the reasonably foreseeable future
16 projects for all measurable parameters and averaging periods was determined to be within the
17 LAA, similar to TMJ based on the similarity in emission sources. The mitigation measures to
18 assist in minimizing the cumulative effects of the projects would be the same as those
19 described above in [Section 5.1.2.3](#). The residual cumulative effects for the Application scenario
20 and BVS are assessed as long-term, and frequent. The magnitude for one-and-eight-hour CO
21 would be negligible as less than a 1 percent change compared to the relevant Ambient Air
22 Quality Objective due to the projects for the Application and BVS scenario. Annual NO₂ and 24-
23 hour PM_{2.5} and PM₁₀ would be affected at a low magnitude at 2-3 percent of the relevant
24 Ambient Air Quality Objective for the Application and BVS scenario. One-hour NO₂ would be
25 affected at a moderate magnitude at 22 percent of the relevant Ambient Air Quality Objective
26 for the Application and BVS scenario. No additional mitigation measures have been proposed.

27 Emissions from the Delta Grinding Facility which could affect air quality in the region include
28 road and marine traffic, the use of mobile equipment and process equipment on site as well as
29 routine dredging activities. Potential pollutants expected to be generated during these activities
30 include NO_x, SO₂, CO, PM_{2.5}, PM₁₀, Diesel Particulate Matter (DPM) and Volatile Organic
31 Compounds (VOCs). The Delta Grinding Facility’s March 2019 project description estimates 10-
32 14 marine vessel movements per year. The EAO is not yet aware of the predicted air quality
33 effects associated with these vessel movements, but there is the potential for TMJ to act
34 cumulatively with these activities. The Delta Grinding Facility is currently in the provincial EA
35 process and TMJ effects could be considered in the cumulative effects assessment for that
36 project, should residual effects be predicted for Delta Grinding.

1 Emissions from the RBT2 which could affect air quality in the region include air emissions from
2 fuel combustion in diesel, propane and gasoline powered equipment and activities, as well as
3 marine shipping. Potential pollutants expected to be generated during these activities include
4 NO_x, SO₂, CO, PM_{2.5} and PM₁₀. The federal panel concluded that construction and operations of
5 RBT2 would result in exceedances of the applicable air quality standards and guidelines for NO₂
6 and PM_{2.5}. The federal panel concluded that ambient air pollution conditions in the marine
7 shipping area are unlikely to be materially affected by project associated marine shipping as it
8 would emit a very small fraction of total pollutants in the marine shipping area. RBT2 is
9 anticipated to be operational by 2025 and overlaps geographically with both the TMJ air quality
10 RAA and the MRAA indicating a potential cumulative effect within the airshed.

11 As indicated in FortisBC's Initial Project Description for the Tilbury Phase 2 LNG Expansion
12 Project, emissions from the Tilbury Phase 2 LNG Expansion Project which could affect air quality
13 in the region include operations of the electric drive compression liquefaction facility, gas-and
14 diesel-powered operational vehicles and equipment, thermal oxidizers, gas flare and fired
15 heaters. Other sources of air emissions may include transportation, TMJ site maintenance and
16 equipment operations. Potential pollutants expected to be generated during these activities
17 include NO, CO₂, SO₂, hydrocarbons and PM. The EAO is not yet aware of the predicted air
18 quality effects associated with these activities, but there is the potential for TMJ to act
19 cumulatively. The Tilbury Phase 2 LNG Expansion Project is currently in the EAO EA process and
20 TMJ effects could be considered in the cumulative effects assessment for that project, should
21 residual effects be predicted for Tilbury Phase 2 LNG Expansion Project. The effects of the
22 FortisBC Tilbury LNG Facility Expansion Project (Phase 1) on emissions were considered in the
23 assessment of baseline emissions and were therefore already assessed under residual effects.

24 The Fraser Surrey Docks Direct Transfer Coal Facility, Pattullo Bridge Replacement (PBRP),
25 Fraser River Tunnel Project, VFPA Habitat Enhancement Program, TMX and Delta Link Business
26 Park projects were all considered in the cumulative effects assessment but were determined to
27 not have any potential interaction with TMJ due to either the distance to TMJ or low
28 contribution of air quality parameters.

29 **MARINE SHIPPING ASSESSMENT**

30 Reasonably foreseeable future projects and activities which have a vessel transit component
31 along the marine shipping corridor were identified as having the potential to act cumulatively
32 with MSA Air Quality residual effects. Consideration in the MSA Application was given
33 specifically to the cumulative effects assessment undertaken for RBT2 and TMX MSAs.

34 The air quality parameters that were considered in the cumulative effects assessment include
35 one-hour NO₂ under the Normal Operations (LNG powered carrier and tethered tug), and NO₂,

1 SO₂ and PM_{2.5} under the Abnormal Operations Scenario (diesel powered carrier and tethered
2 tug). The MSA Application predicted the total projected increase in vessel traffic from 2017 to
3 2030. As a percentage of future total vessel movements in 2030, the number of all TMJ-related
4 vessel movements ranges from 0.4 percent to 1.7 percent over the shipping corridor.

5 To further consider the potential cumulative effects, the MSA Application included the
6 cumulative effects assessment undertaken for the TMX. The TMX is expected to add 710 diesel
7 powered tanker vessel movements plus 710 tug vessel movements annually. The TMX MSA
8 concluded that the cumulative effects from marine vessel traffic is of low magnitude, long-term
9 duration, periodic frequency and short-term reversibility. The overall significance
10 determination for cumulative effects to the Air Quality VC was not significant. The RBT2 project
11 is expected to add 520 diesel powered container vessel movements annually. RBT2 considered
12 the potential cumulative effects on air quality, but air quality was included as an intermediate
13 component, not a VC, so an overall significance determination of cumulative effects was not
14 defined.

15 The EAO concludes that TMJ would not have significant adverse residual cumulative effects on
16 the Air Quality VC for both the original Application area and MSA area.

17 **5.1.6 CONCLUSIONS**

18 Considering the above analysis, and having regard to the mitigation measures identified in the
19 provincial TOC including Condition 10: Construction Environmental Management Plan,
20 Condition 11: Operations Environmental Management Plan, Condition 19: Air Quality
21 Management Plan (which could become legally binding as conditions of the provincial EAC) and
22 recommended KMM under CEAA 2012 for an Air Quality Management Plan (Appendix 1), the
23 EAO is satisfied that TMJ would not have significant adverse residual or cumulative effects on
24 the Air Quality VC.

25 **5.2 GREENHOUSE GAS MANAGEMENT**

26 **5.2.1 BACKGROUND**

27 Greenhouse Gas Management was selected as a sub-component of the Air Quality VC due to its
28 importance to Indigenous Groups, the public, other stakeholders and its regulatory importance.

29 **5.2.1.1 REGULATORY CONTEXT**

1 The Government of Canada has set a target of reducing Canada’s total GHG emissions by 40 to
2 45 percent from 2005 levels by 2030. At present, ECCC requires that any facility emitting more
3 than 10 kilotonnes (kt) of carbon dioxide equivalents (CO₂e) report their annual GHG emissions
4 online. In the fall of 2019, the Government of Canada announced further commitments to
5 strengthen existing measures and introduce new actions to exceed Canada’s 2030 emission
6 reduction target and to develop a plan to set Canada on a path to achieve a net-zero emissions
7 future by 2050.

8 In 2019, the provincial government passed the *Climate Change Accountability Act*, (updating
9 the *Greenhouse Gas Reduction Targets Act*) requiring the province to achieve GHG emission
10 reductions of 40, 60, and 80 percent below 2007 emission levels by 2030, 2040 and 2050,
11 respectively. The provincial government has also committed to legislating a province-wide net-
12 zero emission reduction target for 2050. Achieving these targets will require emission
13 reductions from all sectors of the economy. In October 2021, the provincial developed the
14 CleanBC Roadmap to 2030 that outlined the path to achieve the 2030 target and put us on the
15 path to achieve future emission reduction targets. As new emission sources come online,
16 climate policy will need to become incrementally more stringent to lower Provincial emissions
17 by the amount added by a project. At the current time, there are no project-level emission
18 reduction requirements and level of emissions alone is not being used to determine the
19 acceptability of a project. For this reason, the Roadmap also contained a commitment to
20 require new industrial facilities to develop a plan to achieve net-zero emissions by 2050 and to
21 consider the project’s implications for the 2030 and 2040 targets. In the Province’s Greenhouse
22 Gas Emissions Inventory Report (the 2019 inventory), B.C.’s 2019 net CO₂e emission levels were
23 reported at 68.6 million tonnes of carbon dioxide equivalent (CO₂e), 4.5 percent above 2007
24 levels (65.7 Mt CO₂e). To achieve the legislated GHG reduction goals, B.C. has designed and
25 implemented a suite of policy, regulatory, and legislative measures to reduce emissions across
26 the province. Using the public information in the 2019 inventory, the specific emission levels
27 would be 39.42 Megatonnes (Mt) in 2030 (40% reduction), 27.44 Mt in 2040 (60% reduction)
28 and 13.72 Mt in 2050 (80% reduction). At the current time, a net-zero plan is not yet required
29 of new facilities and the level of a project’s emissions alone is not being used to determine the
30 acceptability of a project.

31 CEAA 2012 Sections 5(1)(b)(i)(iii) pertain to the assessment of changes in the environment on
32 federal lands, in a province outside that of a project, or outside of Canada. This includes
33 potential TMJ-related contributions to GHGs which are global in nature and have the potential
34 for effects beyond the TMJ boundaries. In addition, an assessment of upstream GHGs is
35 required under Canada’s Interim Approach that was announced on January 27, 2016 and is
36 consistent with objectives of Canada’s Strategic Assessment of Climate Change initiative. ECCC

1 informed the EAO that an upstream GHG assessment provides important information on how a
2 project will influence upstream emissions from all stages of production from the point of
3 resource extraction to the project under review. Unlike direct GHG emissions, upstream GHG
4 emissions are outside the project scope and, therefore, are included neither in the federal
5 determination of significant adverse environmental effects nor in the EAO's characterization of
6 effects and determination of significance of effects on GHG emissions. However, the
7 assessment of upstream GHG emissions is required as it helps to inform the federal decision-
8 making process.

9 **MARINE SHIPPING ASSESSMENT**

10 GHG Management is included as a VC for the MSA because vessel movements between Sand
11 Heads to the 12 nm limit would result in GHG emissions from LNG carriers, bunker vessels and
12 tug boats during transit.

13 **5.2.1.2 BOUNDARIES**

14 GHG management spatial boundaries are not defined as GHG and climate change are, by
15 nature, both regional and global. Boundaries for GHG management correlate with the
16 provincial and federal GHG policy, regulations and legislation.

17 **5.2.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 18 **APPLICATION**

19 **5.2.2.1 BASELINE INFORMATION AND POTENTIAL PROJECT EFFECTS**

20 TJLP considers that TMJ would help lower provincial, national and global GHG emissions by
21 supporting the transition from higher carbon intensity fuels used in marine shipping or for
22 power generation to lower carbon intensity. Without the LNG bunkering infrastructure
23 proposed by TMJ, TJLP expect regional and global shipping would continue to burn marine
24 grade oil and diesel fuels. TJLP stated that ship to ship LNG fueling, enabled by TMJ, would
25 enable local marine users to convert to LNG fuel through 'onboard' refueling from LNG truck
26 tankers to ship would reduce GHG and other air quality pollutants. TJLP concluded that TMJ
27 aligns with B.C. and Canada GHG reduction targets.

28 TMJ has the potential to emit GHGs throughout all phases of TMJ. Only the GHG emissions that
29 occur during operations were considered, as annual GHG emissions are expected to be largest
30 during this phase. In the Application, TJLP calculated that during operations, approximately
31 15.25 kt of CO₂e would be released annually (Table 10). This included direct emissions from
32 fugitive losses, dredging vessel combustion, pump and thruster emissions and security vessel
33 combustion emissions and indirect emissions from purchased electricity, marine vessel traffic

1 within the TMJ boundary, marine vessel traffic between TMJ and Sand Heads, and domestic
 2 marine vessels from the MSA. In the Application, TJLP reported this would increase B.C.'s
 3 emissions total by 0.02 percent and Canada's emissions total by 0.002 percent over 2017
 4 levels³⁹.

5 **Table 10: Comparison of GHG emissions during TMJ Operations to baseline conditions**
 6 **(Application scenario)**

Source	Annual GHG Emissions (kt CO ₂ e/yr)	Project Total as a Relative Percentage (%)	
Direct Emissions			
Fugitive losses	4.16	N/A	
Dredging	1.03		
Security vessels	0.03		
Indirect Emissions			
Purchased electricity	0.06		
LNG carrier (within project boundary)	0.19		
LNG bunker vessel (within project boundary)	0.02		
Tugs	0.66		
Supply chain marine vessel combustion (between TMJ site and Sand Heads)	6.56		
Marine Shipping Assessment			
Domestic Marine Vessels	2.54		
International Marine Vessels	14.03		
Project Total with Domestic Marine Vessels	15.25		
Project Total with International Marine Vessels	29.28		
British Columbia (2017)	62,100	0.02	
Transportation – domestic navigation (Canada)	4,380	0.3	
Fugitive sources – natural gas (Canada)	13,000	0.1	
Canada (2017)	716,000	0.002	

7 **BUNKER VESSEL SCENARIO**

8 For the BVS, TJLP updated annual TMJ emission rates based on the increased bunker vessel calls
 9 per year and updated bunker vessel information. Consistent with the Application, TMJ has the
 10 potential to emit CO₂, methane (CH₄) and nitrous oxide (N₂O), which were recalculated for the
 11 BVS. For the BVS, TJLP calculated that 17.91 kt of CO₂e would be released annually during
 12 operations. The GHG emissions sources considered for the BVS are consistent with those in the
 13 Application for direct and indirect emissions described above. As in the Application, operations

³⁹ In the Application, TJLP used the provincial Greenhouse Gas Emissions Inventory Report (2017) that was the most up to date at the time. In Section 5.2.4 of this Report (Table 11), the EAO also compared the increase in B.C.'s emissions from TMJ to the 2019 levels based on the provincial Greenhouse Gas Emissions Inventory Report (2019), and concluded they were 0.02 percent over 2019 levels.

1 is expected to be the bounding phase (e.g., phases resulting in the highest GHG emissions) for
2 the BVS; therefore, construction and decommissioning emissions were not assessed.

3 The estimated direct and indirect GHGs for operations were estimated for the two bounding
4 operation conditions for the BVSA: 1) 307 LNG Powered Bunker Vessels with a capacity of 7,600
5 m³ and 2) 307 diesel powered ATBs with a capacity of 4,000 m³. The GHG emissions from the
6 307 LNG Powered Bunker Vessels with a capacity of 7,600 m³ results in the higher annual GHG
7 emissions for the increase in bunker vessel traffic at TMJ. In comparison with the Application,
8 the change in bunker vessel traffic increased the anticipated TMJ-related GHG emissions by
9 approximately 20% ([see Table 19 in Appendix B of TJLP's BVSA Report](#)). TJLP explained that the
10 higher GHG emissions are largely due to increased LNG bunker vessel traffic between the TMJ
11 site and Sand Heads (i.e., supply chain emissions), as well as a minor increase in LNG bunker
12 vessel GHG emissions during activities at the TMJ site (i.e., berthing, loading, departing).

13 TJLP considered the proposed GHG emission mitigation measures for TMJ as part of proposed
14 federal and provincial conditions for TMJ and did not propose additional mitigation measures
15 for GHG management as part of the BVSA. TJLP concluded, considering the BVSA, that all
16 residual effect characterization parameters remain unchanged from those determined in the
17 Application. In the BVSA Report, TJLP reported that the BVS would increase B.C.'s emissions
18 total by 0.02 percent and Canada's emissions total by 0.002 percent over 2017 levels⁴⁰.

19 **MARINE SHIPPING ASSESSMENT**

20 The MSA determined that during operations the amount of emissions from TMJ-related vessels
21 traveling along the marine shipping corridor would be 16.57 kt of CO₂e/yr. This included
22 indirect emissions from both domestic marine vessels and international marine vessels. The
23 marine shipping emissions would increase both B.C. and Canada's emissions totals by
24 <0.01 percent.

25 **UPSTREAM GHG ASSESSMENT**

26 The upstream GHG emissions information is not included in the EAO's characterization of
27 effects or considered in the determination of significance of TMJ effects on GHG emissions
28 because upstream GHG emissions are outside the scope of the TMJ and are considered only for

⁴⁰ In the BVSA Report, TJLP used the provincial Greenhouse Gas Emissions Inventory Report (2017) that was the most up to date at the time at the time of the Application, for comparison purposes. In Section 5.2.4 of this Report (Table 11), the EAO also compared the increase in B.C.'s emissions from TMJ to the 2019 levels based on the provincial Greenhouse Gas Emissions Inventory Report (2019), and concluded they were 0.02 percent over 2019 levels.

1 context. TJLP's upstream GHG assessment analysis concluded that upstream annual GHG
2 emissions would range from 1,750 – 2,164 kt CO₂e in 2023 to 1,689 – 2,414 kt CO₂e in 2053.
3 These values do not necessarily represent an increase in upstream production for export. The
4 values include all emissions upstream of TMJ that are to be sent for export and the gas
5 currently being processed at the Tilbury LNG plant and sent out via other means.

6 As part of the upstream GHG assessment, ECCC required a discussion of how much of the
7 upstream emissions would occur if TMJ was not built. The assessment includes Tilbury LNG
8 Plant Phase 1 and 2. TJLP stated that, regardless of the development of TMJ, the same volume
9 of gas would be extracted from the gas field and transported to the Tilbury LNG Plant for
10 liquefaction. TJLP's No Project Case consisted of the current transportation methods of the
11 Tilbury LNG Plant (i.e., mixture of truck transport for local and national end users, and ISO
12 containers for sea transportation). The Project Case consisted of the shipment of all LNG to
13 international and domestic markets using a mixture of barges and carriers.

14 **5.2.2.2 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

15 TJLP proposed mitigation that focuses on avoidance and minimization of GHG emissions
16 through project design, management plans and BMPs. KMM recommended included:

- 17 • Implementation of a leak detection and repair program for the LNG conveyance system;
- 18 • Ongoing routine maintenance of vehicles/ vessels, implementation of engine idling time
19 restrictions, and reduced engine use where practical on vehicles/ vessels; and
- 20 • Technology and component selection, process design and managing fugitive emissions.

21 No additional mitigation measures were proposed by TJLP as part of the BVSA.

22 During the MSA review, TJLP acknowledged an additional mitigation measure:

- 23 • LNG carriers and bunkering vessels would have a mechanism to handle boil-off gas
24 during vessel transit to prevent GHG emissions, through direct use or re-liquefaction
25 into LNG during transit.

26 **5.2.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 27 **IDENTIFIED DURING APPLICATION REVIEW**

28 The following key issues related to the assessment of GHG management for TMJ were
29 identified during Application review and based on feedback from the Working Group:

- 30 • Fugitive emissions;
- 31 • No project case;
- 32 • Offsetting and GHG comparisons; and

- 1 • Shipping mitigation measures.

2 In addition to feedback received through the Working Group on key issues related to the
3 assessment of GHG management, Indigenous Groups also provided feedback related to climate
4 change and impacts from upstream natural gas extraction activities. See [Section 13.2.3](#) of Part C
5 for more information on concerns raised by Indigenous Groups related to GHGs and climate
6 change.

7 **FUGITIVE EMISSIONS**

8 The City of Richmond raised concerns about fugitive emissions from the boil-off line, venting for
9 maintenance and repairs as well as boil-off from tank cooling on ships prior to loading and after
10 loading not being accounted for in the emissions estimate. Kwantlen First Nation also
11 requested that mitigations be put into place to prevent fugitive emissions of methane and
12 ongoing monitoring for GHG emissions throughout the life of TMJ.

13 TJLP responded that fugitive emissions from TMJ infrastructure which included the LNG
14 supply pipeline, loading pipeline and return line have been estimated in the assessment.
15 The boil-off line is a closed loop system with a return line back to the FortisBC Tilbury
16 facility for processing. The FortisBC Tilbury LNG Plant was not the subject of this
17 assessment. Prior to maintenance activities on the LNG supply or return line, the LNG
18 within the lines would be evacuated back to the Fortis Facility using nitrogen. Any
19 maintenance activities undertaken on the pipelines after the nitrogen evacuation is
20 expected to result in minimal fugitive emissions.

21 In terms of the shipping related boil-off, TJLP responded that the larger LNG export
22 carriers that would visit TMJ would be LNG powered and would utilize boil-off gas within
23 the engines. LNG carriers and bunkering vessels are not under the direct control of TJLP
24 and were therefore considered within the indirect GHG emissions estimate. The vessel
25 emissions were quantified using emission factors from ECCC's National Marine
26 Emissions Inventory Tool, which provides one factor for each vessel type in a geographic
27 region. The majority of all vessels visiting TMJ (90 percent) would be LNG powered.

28 The EAO is proposing Condition 19: Air Quality Management Plan and is recommending a KMM
29 under CEAA 2012 for an Air Quality Management Plan, and Condition 20: Greenhouse Gas
30 Reduction Plan. Plans include measures to reduce emissions including requirements for routine
31 maintenance of vehicles/ vessels, implementing a designed leak detection, repair programs for
32 TMJ's LNG conveyance system, and a mechanism to handle boil-off gas.

33 TC and ECCC requested that TJLP include fugitive methane emissions from LNG vessels in the
34 MSA estimate of GHG emissions. ECCC recommended that TJLP calculate the total methane

1 emissions resulting from fugitive releases from both the LNG carriers and the LNG bunkering
2 vessels (including any loading or unloading of LNG from bunkers) in the marine shipping area
3 out to the 12 nm limit and update the total marine shipping GHGs and total GHGs for TMJ.

4 In response, TJLP derived the emission factors for three different engine types⁴¹ and the
5 emissions factors included emissions from methane slip as well as combustion
6 emissions. In comparison, the GHG emission factor (617 g CO₂e/kWh) used for LNG
7 powered vessels within the MSA assessment was higher. The GHG calculations in the
8 MSA for the LNG carrier are considered conservative.

9 The EAO is of the view that the issue discussed is adequately resolved for the purposes of the
10 EAO. The EAO does not propose any related conditions specific to the issue identified.

11 ***NO PROJECT CASE***

12 ECCC requested information demonstrating that the chosen No Project Case is a reasonable
13 baseline case, including evidence that it would be economically feasible for the facility to
14 produce and ship 2.6 M tonnes (75 percent of the 3.5 M tonnes throughput) by ISO container
15 trucks and through an alternate port. ECCC also requested that TJLP provide examples of the
16 relative costs and competitiveness of ISO container trade.

17 Tsleil-Waututh Nation was of the view that TMJ and the proposed Tilbury Phase 2 Expansion
18 project are interconnected, and that one project would not occur without the other. Tsleil-
19 Waututh Nation stated that it is important for their own decision-making process to understand
20 if the projects are inter-dependent and if TMJ is causing an increase in upstream GHGs. Tsleil-
21 Waututh Nation does not accept the amount of uncertainty provided in TJLP's "No Project
22 Case" and requested more information on whether the LNG plant would operate at full capacity
23 if it were only shipping LNG using ISO containers. If not, then Tsleil-Waututh Nation would like
24 to understand how TMJ is encouraging upstream production as a new source of demand as
25 opposed to how it is currently being considered as an alternative way of transporting LNG.

26 TJLP responded that, according to the Port of Vancouver, over 3,100 vessels call on
27 Vancouver ports annually. Shipments are projected to increase to over 4,000 vessels in
28 the next five years. The addition of 66 vessels carrying ISO containers would not be a
29 significant addition to these numbers. The additional container traffic would represent

⁴¹ Emission factors were derived from Pavlenko, N., Comer, B., Zhou, Y., Clark, N., & Rutherford, D. (2020). The climate implications of using LNG as a marine fuel. International Council on Clean Transportation. January 2020. The CO₂e emission factors derived for the three engine types were 1) 565 g CO₂e/kWh, 2) 474 g CO₂e/kWh and 3) 400 g CO₂e/kWh.

1 only an eight percent increase in container volume handled by the port in 2018 and
2 would not tax ports currently operating below capacity. Containers could be shipped
3 from any port in the Vancouver area and may entail use of multiple ports.

4 FortisBC currently delivers an increasing amount of LNG to both marine bunkering and
5 exporting customers through trailers and trailer mounted containers (ISO tanks). To
6 meet this growing demand FortisBC has significantly expanded its truck loading capacity
7 in the past 3 years and plans to further expand its truck loading capacity in the coming
8 year. The ISO container export business has grown rapidly in the last 12 months.
9 FortisBC is developing opportunities with other customers interested in this specific
10 mode of delivery as an alternative to bulk LNG delivery. TJLP provided additional
11 information on market factors driving the growing demand for shipping LNG by ISO
12 containers including the availability of customers, reliability, not requiring expensive
13 LNG infrastructure, and price competitiveness.

14 TJLP noted that there is uncertainty related to markets associated with the No Project
15 Case ISO container markets. Similar uncertainty exists for all markets TJLP is pursuing for
16 the marine jetty including the bunkering and bulk export markets. Due to the relatively
17 small capacity of TMJ, TJLP is pursuing niche markets.

18 ECCC replied that their view is that the TJLP's base scenario is reasonable, although some
19 uncertainty remains. FortisBC's agreement to supply 53,000 tonnes of LNG via ISO container to
20 China is evidence that shipping LNG to Asia via ISO container can be economical, at least for
21 some volumes. ECCC would have more confidence in the base scenario if more detailed cost
22 and price evidence demonstrating that shipping ISO from Canada to Asia via ISO container
23 would be economical for the 2.6 million tonnes included in the base scenario. Tsleil-Waututh
24 Nation communicated to the EAO that this issue is not resolved, and Tsleil-Waututh Nation
25 continues to be concerned with the interconnection between TMJ and increased LNG
26 production related to Tilbury Phase 2 Expansion project, and associated questions on upstream
27 GHG emissions. Tsleil-Waututh Nation noted the importance for Tsleil-Waututh Nation
28 decision-making to have a full sense of GHG emissions (upstream, downstream and indirect).

29 Maa-nulth First Nations and Esquimalt First Nation considered that upstream GHG emissions
30 should have been included in the EAO's conclusions on GHG management and that the no
31 baseline case for upstream GHG emissions was unfounded given the uncertain economic
32 viability of shipping that volume of LNG via truck and ISO container.

33 The EAO is of the view that the issue discussed is adequately resolved for the purposes of the
34 EA. The EAO understands that the capacity of Tilbury Phase 2 would exist regardless of TMJ,
35 and that TMJ is not FortisBC's only path to serve LNG customers. TJLP confirmed that TMJ does

1 not require any of the Phase 2 expansion to proceed and that the storage tank for Tilbury Phase
2 2 would proceed whether the TMJ is build or not. The EAO concludes that TJLP has provided
3 sufficient information about the relationship between TMJ and the Tilbury Phase 2 Expansion
4 project, and although there is some uncertainty in the shipment of LNG via ISO container, TJLP
5 has provided reasonable information about the economic viability of the alternative
6 transportation of LNG. The EAO does not propose any related conditions specific to the issue
7 identified.

8 **OFFSETTING AND GHG COMPARISONS**

9 Richmond, Metro Vancouver, Tsawwassen First Nation, Maa-nulth First Nations, Malahat First
10 Nation and Tsleil-Waututh Nation requested that TMJ offset its GHG emissions. During both
11 Application and MSA review, Tsleil-Waututh Nation requested that GHG emissions be
12 compared to municipal, provincial and federal climate targets, and requested more information
13 on how TJLP intends to support the IMO targets of reducing GHG emissions.

14 TJLP responded that the requirement to offset annual GHG emissions from TMJ is
15 beyond the current regulatory requirements applicable to TMJ. Mitigation measures
16 have been put in place to avoid and minimize GHG emissions as much as possible. There
17 is currently no plan for offsetting GHG emissions for TMJ.

18 TJLP produced a technical memorandum⁴² about comparing emissions to reduction targets
19 and how it intends to support the IMO emission reduction targets. TJLP summarized the
20 relevant municipal, provincial and federal emissions targets, and explained why the MSA did
21 not compare TMJ emissions to these targets:

- 22 • The emission reduction targets apply to a specific geographic region as a whole, not an
23 individual source or project within that region;
- 24 • TMJ-related shipping between Sand Heads and the 12 nm limit does not take place
25 within a municipal jurisdiction; therefore, a municipal target does not apply;
- 26 • GHG emissions associated with international navigation are not accounted for within
27 provincial and federal inventory totals. Reduction targets use this inventory as a
28 baseline; therefore, comparing emissions from international shipping to reduction
29 targets that do not include marine shipping emissions in their baseline would be
30 inconsistent; and

⁴² TJLP response to TWN comments on the Marine Shipping Assessment Information Request dated January 15, 2020 (https://projects.eao.gov.bc.ca/api/public/document/60a5644e7429e10022397849/download/20200115_TWN%20MSA%20R%20Supplemental.pdf).

1 • The IMO sets out air emission limits and fuel restrictions for international shipping.
2 TJLP also noted in the memo that they would comply with any future regulations from IMO
3 around GHG emissions.

4 TJLP highlighted goals in the 2018 CleanBC Plan that are aimed at reducing emissions while
5 balancing economic growth in transportation corridors and promoting the use of clean fuel
6 sources in transportation corridors and ports. The intention of B.C. to expand the BC Low
7 Carbon Fuel Standard (LCFS) to apply to marine fuels, which TJLP noted could be
8 instrumental in driving change in the marine transportation sector, was described in the
9 CleanBC Roadmap. Specifically, the LCFS requires fuel suppliers to progressively decrease
10 the average carbon intensity of the fuels they supply to users in B.C. New amendments to
11 provincial *Low-Carbon Fuels Act* include provisions to incent demand for LNG as a marine
12 fuel via the LCFS. TJLP understands that B.C. is now in the process of developing the
13 associated regulations to fully enable this tool to incent the use of lower carbon fuels like
14 LNG and bio LNG in B.C. It is TJLP's view that TMJ is aligned with this provincial policy
15 direction as it provides critical infrastructure to enable the use of LNG as an alternative to
16 conventional marine fuel. With a ready supply of lower-carbon LNG from B.C., TJLP stated
17 that TMJ can support the decarbonization of the shipping industry.

18 TJLP has also outlined its conceptual approach to be net zero by 2050 for TMJ. TMJ would
19 enable a local and regional net reduction in GHG and criteria air contaminant emissions by
20 promoting transition from oil-based marine fuel to the cleaner LNG marine fuel, and it has
21 relatively low direct and acquired emissions (<6 kt CO₂(e)/yr operating at full capacity). TJLP
22 expects that detailed design incorporating energy efficiency and GHG reduction
23 considerations, as well as operations and maintenance practices, would be the best
24 opportunities to manage the direct GHG emissions associated with TMJ (of which most are
25 fugitive emissions). TJLP notes that the TMJ facility concept is very efficient, relying on
26 electrification of pumps and compressors, and incorporating modern fugitive emissions
27 management and prevention techniques. While design has not been finalized, with the
28 combination of modern design, operating techniques, and relatively low direct emissions,
29 TJLP anticipates that offsetting approaches would be employed to manage residual GHG
30 emissions and achieve net zero by 2050.

31 The provincial Climate Action Secretariat (CAS) informed the EAO that TMJ emissions were
32 compared with current provincial emission totals to demonstrate the level to which they would
33 contribute, upon beginning of operations, to Provincial emissions. As the Province moves
34 towards its 2030, 2040 and 2050 targets, climate policies and programs will be implemented
35 Province-wide to help B.C. achieve its targets. Some of these programs will likely affect the

1 emissions related with TMJ. As a result of the incremental climate policy required to meet the
2 targets that would affect TMJ's emissions, it is inappropriate to compare current projections of
3 a facility's emissions with future emission target levels.

4 The EAO does not currently require GHG offsetting because the Province has legislated GHG
5 reduction targets, a plan for GHG reductions (CleanBC), and a wide variety of regulatory tools to
6 help achieve these targets. The EAO is of the view that the issues discussed are adequately
7 resolved for the purposes of the EA and does not propose any related conditions specific to
8 GHG offsetting. The EAO proposes Condition 20: Greenhouse Gas Reduction Plan, which
9 includes mitigation measures to reduce GHGs during operations, require TJLP to estimate or
10 measure GHG parameters attributable to TMJ, include triggers that would cause TJLP to take
11 corrective action to reduce GHG parameters, and describe how TMJ would achieve any
12 municipal, provincial, national or international government GHG regulations or objectives that
13 are made mandatory for TMJ. The EAO is also proposing Condition 19: Air Quality Management
14 Plan and recommending a KMM under CEEA 2012 for an Air Quality Management Plan.

15 **SHIPPING MITIGATION MEASURES**

16 Tsleil-Waututh Nation disagreed with TJLP's approach to excluding vessels visiting TMJ from the
17 application of mitigation measures for GHGs. They noted that even if the vessels are not
18 directly owned or operated by TJLP, vessel traffic must be included when assessing the effects
19 of TMJ on the environment and required mitigation. During the MSA review, Metro Vancouver
20 also requested that, at a minimum, mitigation measures should be identified to address all
21 marine vessel emissions.

22 TJLP responded that further mitigation measures are not feasible since TJLP does not
23 directly own or operate the visiting vessels. The minimal mitigation measures present
24 represent the extent to which TJLP can influence the behavior of users (LNG fueling) at
25 their facility (that is, through management practices and contractual agreements). One
26 of the mitigation measures noted in the Application was ensuring the majority of vessels
27 calling at TMJ would utilize LNG as a fuel. TJLP made a commitment that 90 percent of
28 visiting carriers would be LNG powered.

29 The EAO proposes Condition 19: Air Quality Management Plan which requires TJLP to include
30 how the mitigation measures in Section 4.4.1.6.3 of the Application would be implemented
31 including the mitigation measure ensuring that the majority of vessels calling at TMJ would use
32 LNG as a fuel. The EAO proposes Condition 20: Greenhouse Gas Reduction Plan which requires
33 TJLP to include how mitigation measures in Section 4.4.2.4.3 of the Application would be
34 implemented, including a process for TJLP to identify additional mitigation to minimize GHG
35 emissions.

1 5.2.4 THE EAO'S ANALYSIS AND CONCLUSION ON EFFECTS TO GREENHOUSE 2 GAS MANAGEMENT

3 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
4 on GHGs.

5 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

6 Based on the mitigation measures proposed in the Application and issues raised during
7 Application review the EAO proposes the following provincial conditions and KMM under CEAA
8 2012:

- 9 • Condition 10: Construction Environmental Management Plan (provincial condition);
- 10 • Condition 11: Operations Environmental Management Plan (provincial condition);
- 11 • Condition 19: Air Quality Management Plan (provincial condition) and Air Quality
12 Management Plan (KMM); and
- 13 • Condition 20: Greenhouse Gas Reduction Plan (provincial condition).

14 **Residual Effects**

15 After considering all relevant proposed mitigation measures, the EAO concludes that TMJ would
16 have residual adverse effects due to increased GHG emissions for the Application scenario and
17 BVS. The EAO's characterization of the expected residual effects of TMJ on GHG Management is
18 summarized below and reflects the EAO's level of confidence in the effects determination
19 (including their likelihood and confidence).

20
21 **Table 11: Summary of residual effects to Greenhouse Gas Management.**

Criteria	Assessment Rating	Rationale
Context	Moderate to high sensitivity	The Intergovernmental Panel on Climate Change (IPCC) has confirmed that GHG emissions are at levels that are affecting the global climate.
Magnitude	Low	For Application scenario and BVS, the maximum GHG emissions associated with TMJ-related vessels traveling from the TMJ site to the 12 nm limit may range from up to 29.22 to 31.64 kt CO ₂ e/yr, depending on the mix of domestic and international vessels. Total TMJ emissions, including only domestic vessels, are expected to be 15.25 kt CO ₂ e/yr for the Application scenario and 17.91 kt CO ₂ e/yr for the BVS. Both scenarios increase B.C.'s provincial GHG emissions by 0.02 percent over 2019 levels.
Extent	Global	The geographic effect of GHG emissions from TMJ is cumulative globally.

Criteria	Assessment Rating	Rationale
Duration	Long-term	CO ₂ constitutes the majority of TMJ's GHG emissions. CO ₂ remains in the atmosphere for 100 years or more.
Reversibility	Irreversible	Given current technology and the persistence of CO ₂ in the atmosphere, the effects of the GHG emissions are effectively irreversible.
Frequency	Frequent to Continuous	The greatest emission sources, such as LNG bunker vessels and carriers, during operations are continuously emitting GHGs.
Likelihood	There is a high certainty that TMJ would emit GHGs.	
Significance Determination	In consideration of the conditions identified in the TOC and KMMs recommended under CEAA 2012 (Appendix 1), as well as the conservative nature of the predicted effects, the EAO concludes that TMJ would not have significant adverse effects on GHG Management.	
Confidence	The EAO has a high level of confidence in the magnitude of the residual effects based on the conservative nature of the GHG emissions. The GHG emissions estimates used a worst-case scenario based on the maximum expected vessel calls (i.e., 365 vessel calls) in any given year.	

1 5.2.5 CUMULATIVE EFFECTS ASSESSMENT

2 GHG emissions are a global issue, and the Intergovernmental Panel on Climate Change (IPCC)
3 has produced several scenarios projecting potential global GHG emissions trajectories and the
4 potential effects associated with these emissions levels. As such, the EAO did not require TMJ's
5 Application to include a cumulative effects assessment for GHG emissions and the EAO did not
6 conduct a cumulative effects assessment for the same reasons.

7 5.2.6 CONCLUSIONS

8 Considering the above analysis and having regard to the mitigation measures identified in the
9 provincial TOC, including Condition 10: Construction Environmental Management Plan,
10 Condition 11: Operations Environmental Management Plan, and Condition 19: Air Quality and
11 Management Plan, and Condition 20: Greenhouse Gas Reduction Plan (which could become
12 legally binding as conditions of the provincial EAC) and recommended KMM under CEAA 2012
13 for an Air Quality Management Plan (Appendix 1), the EAO is satisfied that TMJ would not have
14 significant adverse residual effects on GHG Management.

1 5.3 RIVER PROCESSES

2 5.3.1 BACKGROUND

3 River Processes was assessed because TMJ components and activities, such as the jetty
4 structure and dredging, have the potential to affect sediment processes, river currents, and
5 geomorphology. River Processes was assessed as a Pathway Component (PC) as it has the
6 potential to influence changes in end-of-pathway VCs including Water Quality ([Section 5.5](#)), Fish
7 and Fish Habitat ([Section 5.6](#)), Marine Mammals ([Section 5.7](#)), Vegetation ([Section 5.8](#)), Wildlife
8 and Wildlife Habitat ([Section 5.9](#)), Heritage Resources ([Section 7.1](#)), Land and Marine Resource
9 Use ([Section 8.2](#)), and Current Use ([Section 11.4](#)) sections of this Report.

10 5.3.1.1 REGULATORY CONTEXT

11 The provincial *Water Sustainability Act* applies to the use and protection of water resources,
12 including requirements with respect to any changes in or about a water course. The federal
13 *Fisheries Act* provides for the protection of fish and fish habitat from harmful changes to and
14 from depositing deleterious substances into habitats. The CEAA 2012 Section 5(1)(a)(i) requires
15 an assessment of environmental effects on fish and fish habitat as defined in subsection 2(1) of
16 the *Fisheries Act*. The federal *Canadian Navigable Waters Act* deals with interferences to
17 navigation on navigable waters. TC administers this legislation and issues approvals to construct
18 or place works in navigable waters. TC and VFPA are responsible for matters relating to
19 dredging. VFPA are responsible for matters related to navigation in the lower Fraser River; it
20 does not have regulatory obligations for TMJ.

21 5.3.1.2 BOUNDARIES

22 The LAA for River Processes includes the area upstream (approximately 4 km) of the TMJ site to
23 the extent of the salt wedge (approximately the western tip of Annacis Island) and downstream
24 of the TMJ site to Sand Heads. The RAA includes the entire south arm of the Fraser River from
25 New Westminster (approximately 10 km upstream of the TMJ site), including a portion of the
26 Annacis channel, downstream to Sand Heads.

27 5.3.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE 28 APPLICATION

29 5.3.2.1 BASELINE INFORMATION

30 River processes in the Fraser River have been affected since the early 20th century by
31 development activities including flood protection dikes, bank hardening, and dredging. An
32 annual navigational dredging is conducted by the VFPA in the Fraser River, which removes

1 approximately 170,000 m³ of dredge material from the Gravesend Reach where the TMJ site is
2 located.

3 In the Gravesend reach, river bed material composition, changes in turbidity and total
4 suspended solids (TSS), hydrology and water levels are largely affected by river discharge (flow
5 rate through an area) and tidal influence from the Strait of Georgia. The maximum turbidity and
6 TSS levels occur during the annual freshet but fluctuate daily due to the tides and river
7 discharge. Water movement at the TMJ site is also affected by the formation of a salt wedge
8 (mass of saline sea water underneath freshwater flowing downstream). The Application stated
9 that turbidity and TSS levels caused by annual navigational dredging are not discernible from
10 baseline levels, indicating that the natural processes like river discharge and tidal forces are the
11 primary causes to changes in TSS and turbidity levels.

12 Geomorphology at the TMJ site is affected by sediment transport, which can influence
13 bedforms, and by anthropogenic effects (e.g., dredging) which can create longer term changes.
14 The Application noted that although there were changes in the Gravesend Reach bed elevation
15 from year to year, there were no significant trends in scour or deposition from 2001 to 2017. In
16 comparison, a channel bank comparison indicated that the TMJ site is an area of active
17 deposition with infilling of salt marshes, formation of sediment bars and some channel
18 migration and erosion.

19 **5.3.3 POTENTIAL PROJECT EFFECTS**

20 This section provides a summary of potential effects identified in the Application for River
21 Processes during construction, operations and decommissioning of TMJ.

22 The Application included a Fraser River vessel wake assessment that estimated that wake
23 generated by TMJ-related vessels would be less than those produced by other existing vessels
24 in the LAA. "Wakewash" (the waves produced from the sides of the boats) at 50 m from the
25 sailing line were estimated to be 0.03 m for LNG carriers and 0.17 m for LNG barges (similar or
26 less than wake from current vessels in the Fraser River). The vessel wake assessment concluded
27 that TMJ-related vessels travelling at their proposed speeds would have a very small effect on
28 overall wake height in the river and vessel wake was not assessed further in the Application.

29 ***LOCAL CHANGES IN HYDRAULICS AND SEDIMENTATION RESULTING FROM THE DREDGE AREA*** 30 ***AND SCOUR PROTECTION***

31 During construction and operations, the Application predicted velocities of the river current
32 (velocities) would be reduced by around 0.2-0.3 metres per second (m/s) in the berth area and
33 adjacent navigation channel. The Application also predicted that velocities would be increased
34 on the mudflat (sidebar) downstream of the berth area by up to 0.05-0.10 m/s. The Application

1 explained that the typical annual variation in channel velocities was 2.8 m/s (ranging from -1
2 m/s to 1.8 m/s); therefore, the predicted changes from TMJ would be within baseline variation.

3 In terms of local morphological changes, the Application estimated the dredge area would have
4 depths ranging from 0 to 5 m below the present river bed level. Over a period of two years,
5 sediment would accumulate in the dredge area (up to 2.5 m), necessitating maintenance
6 dredging. Dredging would result in an increase in sediment accumulation behind the dredge
7 area at the shoreline and an increase in erosion at the downstream edge of the dredge cut and
8 on the upstream flat. During decommissioning, the Application predicted that there would be
9 natural (and manual, if needed) infilling such that the river would re-equilibrate with
10 surrounding conditions. The Application compared predicted effects from TMJ to historical
11 bathymetric changes and concluded that the modelled changes were within the baseline
12 variation of river bed changes of plus or minus several metres.

13 **LOCAL CHANGES IN HYDRAULICS AND SEDIMENTATION AROUND IN-RIVER STRUCTURES**

14 The Application reviewed effects of neighbouring in-river structures on patterns of
15 sedimentation as the morphological model was not able to predict effects on in-river structures
16 and floating objects. The Application stated that during construction, the FTBB would extend a
17 similar distance into the river as the existing timber piles such that expected changes in local
18 sedimentation and erosion from these changes would be within baseline conditions.

19 **RELEASE OF FINE SEDIMENTS**

20 The Application described the two main pathways, dredging and propeller wash, for the
21 mobilization and suspension of fine sediments, which might increase TSS and turbidity in the
22 LAA.

23 Dredging during construction would remove approximately 500,000 m³ of material and could
24 increase TSS and turbidity by releasing fine sediments. The Application compared estimated
25 increases in TSS at a distance of 100 m from TMJ dredging with estimated TSS increases at a
26 distance of 100 m from historical channel maintenance dredging (the latter were not
27 distinguishable from ambient TSS levels outside of freshet). The Application predicted that
28 dredging during construction would cause:

- 29 • negligible additional fine sediment suspension during high flows (increases of 2-4
30 milligram per litre [mg/L] in flows >3,000 cubic metres per second [m³/s]); and
- 31 • non-negligible fine suspended sediment (same order of magnitude as “baseline”
32 conditions) during low flows (increases of 8-15 mg/L of sediment in flows <3,000 m³/s).

1 The Application estimated that over 14,000 vessel transit pass the TMJ site annually, but that
2 there is no baseline information on the propeller (prop)-wash⁴³ from these vessels. TMJ would
3 increase vessel traffic by approximately 2 percent in that reach of the Fraser River. A
4 supplemental report⁴⁴ provided by TJLP to assess propeller scour found that sediment mobility
5 associated with prop-wash would vary with a variety of factors (for example, the vessel power,
6 water flow). Baseline water velocity near the river bed ranged from 0.95 m/s in low flows to
7 1.64 m/s in an ebb tide. The maximum incremental change from TMJ -related vessels accessing
8 and egressing from the jetty to baseline water velocity near the river bed from propellers was
9 predicted to vary from 0.25 m/s for a tug boat in low flows to 1.8 m/s for an LNG carrier in the
10 freshet ebb tide scenario (the latter would be the result of the combined influence of the prop-
11 wash and natural river forces). The supplemental report also predicted that scour effects would
12 be minor (up to 8 millimetres [mm] scour depth per vessel) and would be short term (the
13 duration of each vessel manoeuvre), but that this would be within the existing levels of
14 variation in the TMJ area.

15 **REGIONAL CHANGES IN SEDIMENTATION**

16 Sediment input enters the Fraser River through suspended sediments in river flow from the
17 upper reaches of the river and removals occur through dredging or sediment leaving the river
18 and depositing in the Strait of Georgia. TJLP predicted that the existing requirement for
19 navigational dredging combined with TMJ maintenance dredging would total 295,000 m³/year
20 at Gravesend Reach. Although there is large uncertainty and high variability in the annual
21 sediment budget, the Application predicted that the proposed dredging during construction
22 and operations (295,000 m³/year) would be a small fraction of the available sediment surplus
23 predicted for the Gravesend Reach (8.5 million m³/year) and that TMJ would not result in
24 regional morphological changes.

25 **BUNKER VESSEL SCENARIO**

26 For the BVSA, TJLP considered whether the proposed increased bunker activity would change
27 the characterization of effects on river currents, sediment processes, and geomorphology from
28 vessel loading, berthing and departure activities.

⁴³ The term for the currents behind the propeller of vessels, which could cause scour disturbance to the river bed, shorelines and intertidal areas.

⁴⁴ TJLP's Propeller Scour Assessment dated July 11, 2019
(https://projects.eao.gov.bc.ca/api/public/document/60a489f9148b4a0023306081/download/20190711_Prop%20Scour_River%20Processes.pdf).

1 For vessel loading, similar to the Application, berthed vessels were treated as floating
2 structures that may affect local river currents and, as a result local river geomorphology and
3 sedimentation. TJLP stated that the effect of vessel calls, which are transient in nature, on river
4 currents is anticipated to be small in comparison to the effects of in-water structures and
5 dredging proposed for TMJ. The effects of LNG carriers on river currents are considered small
6 compared to the effects of in water structures, and bunker vessels are smaller (approximately
7 14 times smaller in terms of DWT) with a shallower draft and narrower beam. As such, bunker
8 vessels and ATBs are expected to have less of an effect on river currents than LNG carriers. TJLP
9 noted the average time for vessel loading, from berthing to departure, is shorter for the bunker
10 vessels and ATB (7 to 12.3 hours) than for LNG carriers (22.0 hours).

11 For berthing and departure activities, it is expected that bunker vessels would have near-river
12 bed propeller-generated velocities and scour potential similar to those of tugboats that were
13 modelled as part of the Application. TJLP expects bunkering to result in scour of <1 mm, which
14 is predicted to be within the natural variation of the system, while LNG carriers may result in
15 minor scour (7.2 mm). Because of the short duration of each vessel maneuver in the river, TJLP
16 expected river flow to dominate the morphologic changes in the river over longer time scales.

17 In the Application, wake associated with TMJ-related vessels was estimated to be less than the
18 wake of other vessels operating in the Fraser River shipping lanes and the interaction was
19 assessed as negligible. TJLP concluded that the increased frequency of vessels would not
20 change the magnitude of the effect (e.g. the wake waves associated with the bunker vessels are
21 not large enough to have an impact in the BVSA); as such the interaction remains negligible,
22 consistent with the Application.

23 TJLP considered the proposed mitigation measures for TMJ as part of proposed federal and
24 provincial conditions for TMJ and did not propose additional mitigation measures for River
25 Processes. TJLP concluded that the BVSA is not predicted to change the residual effects or
26 characterization presented in the Application, and that the effects to river currents and river
27 geomorphology as a result of the BVSA are predicted to be negligible.

28 5.3.4 MITIGATION MEASURES PROPOSED IN THE APPLICATION

29 The Application did not propose any mitigation measures for river processes; however, the
30 following monitoring and follow-up programs were proposed:

- 31 • **Annual sounding surveys:** Annual monitoring of the river bed covering the extent of the
32 TMJ site to monitor potential changes in scour and erosion. The surveyed river bed
33 elevations would be regularly compared to evaluate short and long terms trends; and
- 34 • **Analysis of reach-wide bathymetry data:** A reach-wide bathymetry comparison to
35 identify any long-term effects in river bed morphology from removing sediment
36 conducted approximately every five years during operations.

1 No additional mitigation measures were proposed by TJLP as part of the BVSA.

2 **5.3.5 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 3 **IDENTIFIED DURING APPLICATION REVIEW**

4 The following key issues related to the assessment of River Processes for TMJ were identified
5 during Application review and based on feedback from the Working Group:

- 6 • Potential effects on dike infrastructure;
- 7 • River bed monitoring and mitigation; and
- 8 • Effects assessment and mitigation.

9 **POTENTIAL EFFECTS ON DIKE INFRASTRUCTURE**

10 Richmond raised concerns about potential effects of TMJ's dredging on Richmond's existing and
11 future diking infrastructure across the river from the TMJ site. Richmond requested a
12 liquefaction and geotechnical analysis to quantify effects of dredging to Richmond's dike
13 infrastructure.

14 TJLP noted that TMJ dredging would not extend north beyond the existing navigation
15 channel; therefore, it would be unlikely that any TMJ-related effects would negatively
16 affect Richmond's flood protection infrastructure. TJLP explained that dredging and the
17 associated steepening of river banks can affect the stability of shoreline slopes under
18 both static and seismic conditions. The steeper part of the TMJ dredge cut would be
19 closer to the south bank, which would limit instability effects and lateral spreading
20 hazards mostly to the area local to the south bank (that is, to the Delta side). TJLP
21 explained that the dredging would flatten out the existing river bed slope, which would
22 reduce liquefaction-induced geohazards on the Richmond side. TJLP issued a memo⁴⁵
23 signed and sealed by a consulting engineer that included this information and concluded
24 that the effect of the dredge with respect to geo-hazards would be very much limited to
25 the south bank of the river with minimal effects to the north (Richmond) side.

26 Richmond informed the EAO that it was satisfied with the information provided and the EAO is
27 of the view that this issue has been adequately addressed for the purposes of the EA.

⁴⁵ Response to City of Richmond Comments CoR-01.1 and CoR-11.1 dated September 25, 2019
(https://projects.eao.gov.bc.ca/api/public/document/60a492b2148b4a0023306103/download/20190925_CoR_River%20Processes.pdf).

1 **RIVER BED MONITORING AND MITIGATION**

2 Musqueam Indian Band, Tsawwassen First Nation, and Tsleil-Waututh Nation requested that
3 the monitoring programs for river processes include follow-up plans to address potential
4 variation from predicted effects, in addition to mitigation and offsetting measures. Tsleil-
5 Waututh Nation also recommended that bathymetry surveys be combined with other
6 environmental surveys to fully understand TMJ-related changes at the ecosystem level.

7 TJLP responded that the Application predicted residual effects to river processes due to
8 uncertainty surrounding the sediment budget due to its seasonal and annual variability.
9 TJLP concluded that changes to river bed morphology would be within natural variability
10 and limited to the LAA; therefore, monitoring of river beds was an adequate and
11 conservative response. TJLP noted that mitigation measures to address changes in
12 morphology within the LAA could include scour protection or changes in dredging
13 (volume, schedule). The monitoring measures would be provided in the operations
14 Plans would be developed in consultation with Indigenous Groups, including
15 Tsawwassen First Nation, Tsleil-Waututh Nation and Musqueam Indian Band.

16 **EFFECTS ASSESSMENT AND MITIGATION**

17 Tsawwassen First Nation and Musqueam Indian Band raised concerns about the assessment of
18 effects on river processes and the implications of these effects on other VCs and their rights.
19 These concerns included the following:

- 20 • Lack of clarity on the how Indigenous knowledge was used in the understanding of
21 baseline conditions;
- 22 • Lack of consideration of how location-specific effects on river processes would affect
23 vegetation, fish (e.g., eulachon, juvenile salmonids and sturgeon) and fishing; and
- 24 • Need to assess cumulative effects on the river system, using Indigenous knowledge.

25 The Application noted that the Indigenous knowledge obtained through consultation with
26 Indigenous Groups and available through other sources provided no specific information on
27 River Processes.

28 Location-specific effects to fish and fish habitat and vegetation are assessed in Fish and Fish
29 Habitat chapter ([Section 5.6](#)) and Vegetation chapter ([Section 5.8](#)). The EAO assessed the
30 incremental effects of TMJ based on current ecological conditions. The EAO does not assess the
31 effect of a proposed project compared to a historic baseline (i.e., pre-industrial conditions), but
32 notes that the effects of past activities are reflected in current conditions. Potential effects to
33 Indigenous Interests and Treaty Rights are assessed in Part C and draw from the findings of Part
34 B (effects assessments on VCs).

1 The EAO proposes Condition 13: River Bed Monitoring Plan to address adverse effects to the
2 river bed, including monitoring and mitigation of effects caused by dredging and a requirement
3 that it be developed by a Qualified Professional (QP) in consultation with Indigenous Groups,
4 including Tsawwassen First Nation. The plan would require monitoring parameters related to
5 fish habitat. The EAO also recommends KMMs under CEAA 2012 for Fish Mitigations to Reduce
6 Harm and Mortality, and River Processes Monitoring that would include consideration of
7 location-specific effects on bathymetry and fish habitat. In addition, most of the conditions/
8 plans would also include requirements to consider additional traditional use information shared
9 by an Indigenous Nation. Based on the above analysis, the EAO is of the view that the
10 assessment and mitigation of effects to river processes is adequate for the purposes of the EA.

11 5.3.6 THE EAO'S ANALYSIS AND CONCLUSIONS

12 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
13 to River Processes.

14 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

15 Based on mitigations proposed in the Application and issues raised during Application review,
16 the EAO proposes the following provincial conditions and recommends KMMs under CEAA
17 2012:

- 18 • Condition 10: Construction Environmental Management Plan (provincial condition); and
- 19 • Condition 13: River Bed Monitoring Plan (provincial condition) and River Processes
20 Monitoring (KMM) to monitor for and mitigate potential adverse effects to the river bed
21 caused by dredging.

22 **Residual Effects:** After considering the proposed mitigation measures, the EAO concludes that
23 TMJ would result in the following potential residual adverse effects to the River Processes for
24 the Application scenario and BVS:

- 25 • Change in sediment processes:
 - 26 ○ Construction and operational dredging could cause increases of fine sediments,
27 as compared to historical maintenance dredging ("baseline"); and
 - 28 ○ Prop-wash could cause a short-term effect of up to 8 mm of scour depth per
29 vessel and increased sediment mobility near the river bed from propeller-
30 induced near river bed velocities;
- 31 • Change in river currents:
 - 32 ○ Construction and operations dredging could cause a reduction of river velocity in
33 the berth area and in the adjacent navigation channel; and
 - 34 ○ An increase in velocity downstream of berth area;

- 1 • Change in geomorphology:
 - 2 ○ Increase in deposition behind the dredge area at the shoreline; and
 - 3 ○ Increase in erosion at the downstream edge of the dredge cut and on the
 - 4 upstream flat.

5 The EAO’s characterization of the expected residual effects of TMJ on the River Processes PC
 6 (Table 12) is summarized below, as well as the EAO’s level of confidence in the effects
 7 determination (including likelihood).

8 **Table 12: Summary of Residual Effects to River Processes**

Criteria	Assessment Rating	Rationale
Context	Moderate resilience	Levels of TSS and turbidity in the Fraser River, including the Gravesend Reach, vary seasonably. Levels are affected primarily by river discharge and tidal forces. Seasonal flow conditions are highly dynamic
Magnitude	Low to Moderate	<p>Changes to sediment processes:</p> <ul style="list-style-type: none"> • Dredging low tides - Moderate: the predicted increases to TSS (8-15 mg/L) are the same order of magnitude as baseline conditions. • Dredging high tides - Low: the predicted increases to TSS from dredging (2-4 mg/L) are within baseline conditions. • Prop-wash - Low: the predicted increases to near river bed velocities and scour effects are within or less than the range of natural river morphology change. <p>River currents - Low: Predicted changes to river currents of +/-0.3 m/s would be within the range of baseline variation (-1 to 1.8 m/s).</p> <p>Local Geomorphology - Low: Predicted effects to local sedimentation and erosion due to the dredge area and scour protection would be within the baseline levels of variation plus or minus several metres.</p>
Extent	Local	All predicted effects would be limited to the LAA.
Duration	Long-term	Predicted effects in increased suspended sediments disturbances from prop-wash, changes to river currents and local erosion and sedimentation are anticipated for the life of the TMJ.
Frequency	Frequent/ Continuous	<p>Frequent: Increases to suspended sediments would occur annually during dredging and disturbances from prop-wash would occur during vessel operations for both Application scenario and the BVS, in particular during LNG carrier operations.</p> <p>Continuous: Predicted changes to river currents and local patterns of sedimentation and erosion would be continuous throughout the life of the TMJ.</p>
Reversibility	Reversible	Effects would be reversible, once dredging and vessel operations cease, and infrastructure removed.
Likelihood	There is a high likelihood of increase in turbidity and suspended sediments, effects from prop-wash, changes to river currents and local patterns of erosion and sedimentation.	

Criteria	Assessment Rating	Rationale
Confidence		There is a moderate degree of confidence that sediment processes, river currents and geomorphology would change due to TMJ. There is a high level of natural variability in Fraser River flows and sediment transport yields regular changes of several metres in bed levels and introduces a high degree of inherent uncertainty in model predictions.

1 *Note: Criteria and assessment ratings are defined in Appendix 54: Residual Effects Characterization Definitions.*

2 **5.3.7 CUMULATIVE EFFECTS ASSESSMENT**

3 As River Processes is a PC, there is no requirement for a cumulative effects assessment. The
 4 residual effects from River Processes are incorporated into the assessments of linked VCs,
 5 which is where cumulative effects assessment would occur.

6 **5.3.8 CONCLUSIONS**

7 River Processes is a PC. Therefore, the significance of residual effects is assessed in the linked
 8 VCs.

9 **5.4 VESSEL WAKE**

10 **5.4.1 BACKGROUND**

11 Vessel Wake was selected as a PC to be included in the MSA due to the possibility of LNG carrier
 12 and bunker vessel movement creating wake waves which could potentially cause shoreline
 13 erosion, affect fish habitat or otherwise affect heritage resources, vegetation, and nearshore
 14 areas. Environmentally sensitive areas in the MSA include Important Bird Areas, wildlife critical
 15 habitat, rockfish conservation areas, national parks and park reserves, and provincial parks,
 16 sanctuaries and management areas. Tsawout First Nation has reported that vessel wake can
 17 cause disruptions and visibility challenges during seafood harvesting. Cowichan Nation
 18 Alliance⁴⁶ has also raised concerns regarding potential risk of vessel wake-associated erosion
 19 near a number of the Gulf Islands.

⁴⁶ Cowichan Nation Alliance represents Cowichan Tribes, Halalt First Nation, Penelakut Tribe and Stz'uminus First Nation.

1 The vessel wake assessment is related to the following VCs: Marine Fish ([Section 5.6](#)), Marine
2 Mammals ([Section 5.7](#)), Marine Birds ([Section 5.10](#)), Heritage Resources ([Section 7.1](#)), Marine
3 Use ([Section 8.2](#)), and Current Use ([Section 11.4](#)).

4 The vessel wake assessment conducted by TJLP was based on two indicators:

- 5 • Increase in wave energy at shoreline – annual wave energy at affected shorelines due to
6 TMJ-Related Vessel Wake (as a Percentage of Existing Annual Wind Wave Energy); and
- 7 • Increase in wave power at shoreline – annual wave power at affected shorelines due to
8 TMJ-Related Vessel Wake (as a Percentage of Existing Annual Wind Wave Power).

9 Wave energy is defined as the amount of energy transported in each wavelength, while wave
10 power is the rate of transmission of wave energy through a wave group.

11 **5.4.1.1 REGULATORY CONTEXT**

12 Though no legislation or guidelines speak specifically to vessel wake, TJLP considered the
13 following legislation and guidelines as relevant to the Vessel Wake PC:

- 14 • *Canada Fisheries Act*;
- 15 • CEAA 2012 including Section 5(1)c;
- 16 • *Migratory Birds Convention Act, 1994*; and
- 17 • Vancouver Fraser Port Authority Project & Environmental Review Guidelines – Habitat
18 Assessment Guidelines.

19 **5.4.1.2 BOUNDARIES**

20 The spatial boundary of the MSA Area, which includes the area of the vessel wake assessment,
21 covers the extent of TMJ-related inbound and outbound shipping that would take place
22 between Sand Heads and the 12 nm limit. The MSA Area considers areas where effects might
23 be expected from vessel wake, from source vessels in the shipping lane to shorelines. The MSA
24 Area was separated into segments A through G to better understand the potential effects in
25 smaller, discrete areas.

26 **5.4.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 27 **APPLICATION**

28 **5.4.2.1 BASELINE INFORMATION**

29 The MSA assessed the existing vessel wake conditions using the following information sources:

- 1 • RBT2 Environmental Impact Statement⁴⁷;
- 2 • RBT2 Marine Shipping Supplemental Report⁴⁸;
- 3 • Port of Vancouver responses to Federal Panel Information Requests (Information
- 4 Request Package 7 from the Review Panel for the RBT2 EA)⁴⁹;
- 5 • TransMountain Expansion Study⁵⁰; and
- 6 • TJLP's Navigation Study for TMJ on LNG Cargo Loading and Marine Transit Risk
- 7 Assessment in keeping with the Technical Review Process of Marine Terminal Systems
- 8 and Transshipment Sites (TERMPOL) requirements under Element 3.13 Risk
- 9 Assessment⁵¹.

10 The MSA vessel wake assessment did not include information on Indigenous knowledge.
11 However, the EAO heard directly from Indigenous Groups about their lived experience with
12 respect to vessel wake, including and via the RBT2 Panel process, which has been captured
13 below.

14 In the assessment, wind wave energy was assumed to be the same for RBT2, as TMJ and RBT2
15 assessed effects using the same MSA area. Wave energy was calculated using the estimated
16 number of vessel-generated waves that would affect shorelines annually under both calm
17 conditions and all wind wave conditions. The wave energy data then informed the vessel wake
18 model conducted for the MSA area. The model included assumptions related to vessel speed
19 (12.5 knots), annual vessel movement (236 vessel movements), number of waves per vessel
20 movement (5), design vessel shape and other factors.

21 Through this analysis, three zones within Segment B were identified as being susceptible to
22 effects from erosion caused by vessel wake due to the proximity of shorelines to the shipping
23 lanes (Figure 4):

- 24 • Zone 1: Eastern ends of Tumbo and Saturna Islands:
 - 25 ○ Low energy wave climate; predominately North West and South East waves

⁴⁷ Roberts Bank Terminal 2 (RBT2) Environmental Impact Statement (<https://iaac-aeic.gc.ca/050/evaluations/document/101482?culture=en-CA>).

⁴⁸ RBT2 Marine Shipping Supplemental Report (<https://iaac-aeic.gc.ca/050/evaluations/document/103683?culture=en-CA>).

⁴⁹ Port of Vancouver responses to Federal Panel Information Requests (Information Request Package 7 from the Review Panel for the RBT2 EA), dated November 20, 2017 (<https://iaac-aeic.gc.ca/050/documents/p80054/121106E.pdf>).

⁵⁰ TransMountain Expansion Study; and Full study (<https://apps.cer-rec.gc.ca/REGDOCS/Item/View/2392873> and Marine Transportation (http://transmountain.s3.amazonaws.com/application/V8A_1_of_4_1_TO_4.2.9_MAR_TRANS_ASSESS.pdf).

⁵¹ TJLP's TMJ Tilbury Termpol Element 3.13 Risk Assessment dated August 2018 (https://projects.eao.gov.bc.ca/api/document/5cb902471e9bd50024762621/fetch/1.0-1_Navigation_Study.pdf).

- 1 • Zone 2: Western end of Stuart Island:
- 2 ○ Low energy wave climate; predominately South and South East waves
- 3 • Zone 3: Vancouver Island in the vicinity of Victoria/ Discovery, Chatham, Chain and Trial
- 4 Islands:
- 5 ○ Higher energy wave climate; predominately South West waves.

6 **5.4.2.2 POTENTIAL PROJECT EFFECTS**

7 ***VESSEL TRANSIT - WAKE***

8 Waves generated by vessel wake from TMJ-associated shipping have the potential to affect
9 shorelines at Zones 1-3. Potential effects were expressed as a percentage increase over the
10 existing wave energy and power to determine the magnitude of change in the wave
11 environment.

12 The MSA showed that the increase in wave power and energy due to vessel wake were very
13 small in comparison to the existing natural wave environment, or wave climate, with a majority
14 of wake waves predicted to be between 10 and 12.5 cm in height once they arrive at shorelines
15 in Zones 1 through 3. The greatest predicted increase in wave energy and power would occur in
16 Zone 3.

17 The total TMJ-related increase in wave energy at all affected shorelines per year for all three
18 zones combined was predicted to result in a 0.0013 percent increase when considering only
19 calm conditions and a 0.0050 percent increase when considering all wave conditions. The total
20 annual increase in wave power was calculated to be 0.00079 percent under calm conditions,
21 and 0.0030 percent under all conditions. The MSA also predicted the increase in wave energy
22 and power at potentially affected shorelines is expected to be very small in comparison to the
23 current wave climate at all three zones. The MSA concluded that the effect of vessel wake
24 caused by TMJ-related shipping would be negligible in comparison to baseline conditions.

25 **5.4.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

26 TJLP did not propose any mitigation measures as the wave energy caused by TMJ-related vessel
27 wake was expected to be negligible in comparison to baseline wave energy, based on the
28 current estimates of vessel speed, size, shipping volume and shipping route.

29 **5.4.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 30 **IDENTIFIED DURING APPLICATION REVIEW**

31 The following key issues related to the assessment of Vessel Wake for TMJ were identified
32 during Application review and based on feedback from the Working Group.

1 ***STUDY DESIGN AND MODELLING***

2 Marine Shipping Working Group members and the Agency had several questions regarding how
3 the vessel wake study was designed and potential implications of these design choices in the
4 study's conclusions. For instance, the Agency sought clarification regarding how the number of
5 vessels per week in the outbound shipping lane was calculated and inquired whether there
6 would be the potential for bunker vessels to result in greater wake effects than the LNG
7 carriers.

8 Tseil-Waututh Nation questioned why vessel wake was only assessed within Segment B, noting
9 other segments were within reach of cultural sites or the shoreline generally and could be
10 potentially affected, and why Pender Island and Mandarte Island were not included in the
11 assessment. Pacheedaht First Nation commented about the design of the study, noting
12 concerns about higher vessel speeds and closer distances to LNG vessels in the area of
13 Swiftsure Bank, and of differences between the direction and frequencies of wake-generated
14 waves compared to natural waves. Tsawwassen First Nation informed the EAO that potential
15 changes in wave conditions, real or perceived, may affect Tsawwassen First Nation members'
16 use of and experiences in their traditional territory. Additionally, the EAO reviewed the RBT2
17 Panel report and notes that Ditidaht First Nation, Maa-nulth First Nations, Cowichan Nation
18 Alliance, Pauquachin First Nation, and Tsawout First Nation raised concerns about vessel wake
19 and safety in the RBT2 process.

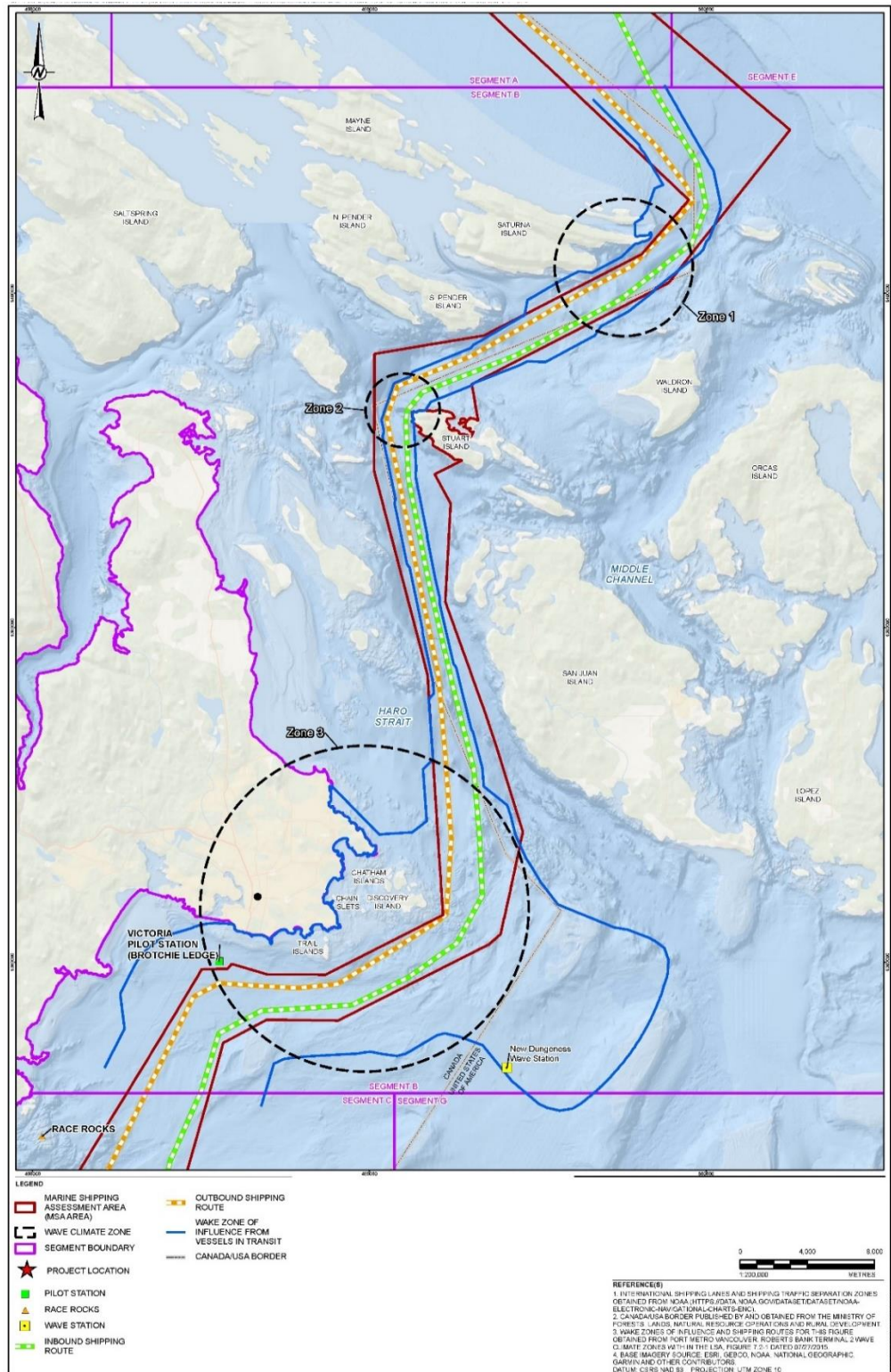


Figure 4: Wake Zone of Influence

1

1 TJLP responded that the vessel wake analysis was expected to be conservative as the
2 modelling of the vessel wake zone of influence assumed both LNG carriers and
3 bunkering vessels to be operating at faster cruising speeds than would actually occur
4 during operations. Consequently, the model overestimates the area which would be
5 affected by discernible wake waves. Additionally, the wave energy analysis
6 overestimated the number of measurable wake waves predicted as a result of each
7 vessel movement (5 waves vs. 3 waves). This means that the potential wave energy and
8 power predicted in the assessment are greater than the number expected to occur
9 during operations. Additionally, TJLP provided information to demonstrate that the
10 assumed speed of 12.5 knots would be conservative, as escorted carrier vessels are
11 expected to travel at 10 knots, while bunker vessels would travel at 12 knots. TJLP also
12 noted that the waves generated by vessel wake from TMJ-related shipping would be
13 expected to be well within the natural variation of the wave environment in the MSA
14 area, as the predicted increases in wave energy due to TMJ are very small. Another
15 factor which is also expected to reduce vessel speeds at key times is the VFPA-led ECHO
16 Program seasonal slowdown initiatives, which TJLP has committed to.

17 Regarding the assessment being limited to the area of Segment B, TJLP responded that
18 Segment B was determined to be the only area where waves generated in the shipping
19 channel could reach the shore and the only area with a calmer wave climate where
20 vessel wake might have an effect. TJLP noted that waves would be expected to be
21 indistinguishable from the existing wave climate at the greater distances and higher
22 energy wave climates in the other Segments – for example, Race Rocks (in Segment C) is
23 located over 4 km from the shipping lane, and by the time waves from the shipping lane
24 reach Race Rocks, they would be so small as to be indiscernible from the natural wave
25 environment. Even in Segments where the shoreline is closer to the shipping lanes,
26 wake waves generated by TMJ vessels are expected to be well within the normal level of
27 variability in the natural wave environment.

28 In Segment D (which includes Swiftsure Bank), TJLP compared the modelled wave
29 heights against natural wave heights as recorded in the area at National Oceanic and
30 Atmospheric Administration (NOAA) Wave Buoy #46087. Modelling indicated that TMJ
31 vessel-generated wake waves would be expected to be indistinguishable from the high-
32 energy natural wave conditions present on Swiftsure Bank. TJLP provided additional
33 analysis in response to further concerns from Indigenous Groups about the PIANC
34 model potentially underestimating wave heights at Swiftsure Bank due to the shallower
35 water depth in that area. The additional analysis used a version of the PIANC model that
36 uses shallow water depths, which assumed a 40 m water depth at Swiftsure Bank. The
37 results of this analysis showed that TMJ-related vessel wake waves, when received at
38 350 m from the source vessel, are expected to be 0.13 m high if the vessel is travelling at

1 12.5 knots and 0.31 m if the vessel is travelling at 15.5 knots. TJLP noted that both are
2 within the normal variability of the wave environment at Swiftsure Bank.

3 The EAO is satisfied with TJLP's responses to questions and clarifications about study design and
4 modelling of vessel wake. In consideration of Pacheedaht First Nation's concerns regarding the
5 effects of vessel wake on traditional activities, the EAO considers this issue to the assessment of
6 potential effects of Current Use ([Section 11.4](#)) of this Report.

7 **5.4.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

8 Having considered the information provided by TJLP and comments provided by Marine
9 Shipping Working Group members, the EAO is of the view that vessel wake is expected to be
10 within the range of natural variation and does not predict any residual adverse effects. As no
11 residual effects are expected, and as this is a PC, the EAO has not conducted a cumulative
12 effects analysis related to vessel wake. Concerns raised by Indigenous Groups regarding the
13 effects of vessel wake are also addressed in Current Use ([Section 11.4](#)) and in Part C of this
14 Report.

15 **5.5 WATER QUALITY**

16 **5.5.1 BACKGROUND**

17 Water Quality was selected as a VC due to its importance to public health and Indigenous
18 Groups, its potential to affect fish, wildlife, and aquatic habitats, and water is a regulated
19 resource. Water Quality was assessed through surface water quality, sediment quality and
20 aquatic health.

21 Results of the water quality assessment were incorporated into the assessments of potential
22 effects to Fish and Fish Habitat ([Section 5.6](#)), Marine Mammals ([Section 5.7](#)), and Human Health
23 ([Section 6.1](#)) of this Report. For the EAO's assessment of potential effects of dredge disposal
24 to Water Quality, refer to the Alternative Means of Undertaking the Project chapter ([Section](#)
25 [2.2.5](#)) in this Report. The potential effects of accidents and malfunctions are assessed in the
26 Accidents and Malfunctions chapter ([Section 9](#)) of this Report.

27 The MSA did not assess potential effects to Water Quality as the EAO does not predict potential
28 pathways of effect from marine shipping to water quality. The EAO notes that potential effects
29 from bilge or ballast water discharge would be sufficiently managed through adherence to
30 federal regulations (*Canada Shipping Act, 2001*) and international conventions (for example,
31 the MARPOL Convention) that prohibit these activities in the MSA. Similarly, grey water

1 discharge is regulated through the Vessel Pollution and Dangerous Chemicals regulation of the
2 *Canada Shipping Act, 2001*.

3 5.5.1.1 REGULATORY CONTEXT

4 The provincial *Water Sustainability Act* applies to the use and protection of water resources,
5 including requirements with respect to any changes in or about a water course. The BC
6 *Environmental Management Act* prohibits the introduction of waste into the environment
7 unless the introduction of that waste is conducted in accordance with a permit, approval, order
8 or regulation. The federal *Fisheries Act* protects fish and fish habitat from harmful changes and
9 deposition of harmful substances. Disposal of dredged material at sea is subject to the DAS
10 Regulations under the *Canadian Environmental Protection Act*.

11 The Application references a variety of science-based provincial and federal water and
12 sediment quality guidelines, including the CCME Canadian Environmental Quality Guidelines
13 (CEQG), the BC Ministry of Environmental and Climate Strategy Water Quality Guidelines (BC
14 WQG) and the BC Working Water Quality Guidelines. The Application also considers ambient
15 water and sediment quality objectives specific to the South Arm of the Fraser River (Surface
16 Water Quality Guidelines [SWQGs] for sediments and Fraser River Sediment Quality Objectives
17 [FROs], and Fraser River Ambient Water Quality Objectives [FRWQO]).

18 5.5.1.2 BOUNDARIES

19 The LAA includes the aquatic areas of the TMJ site including the nearshore and foreshore
20 habitats associated with the footprint of the jetty and the dredge area, a 500 m buffer
21 upstream of the site and a 100 m buffer downstream of the TMJ site. The 500 m upstream
22 buffer was established to consider potential water quality effects upstream of TMJ site due to
23 tidal influence. Riparian areas are assessed under the Vegetation ([Section 5.8](#)) and Fish and Fish
24 Habitat ([Section 5.6](#)) VCs. The RAA includes the South Arm of the Fraser River downstream of
25 the TMJ site to Sand Heads and includes the same upstream buffer as the LAA.

26 5.5.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE 27 APPLICATION

28 5.5.2.1 BASELINE INFORMATION

29 The Application included a review of regional, provincial and federal water quality data, and
30 reported on field studies conducted by TJLP including sediment and foreshore (water)
31 characterization reports in the TMJ site area. The sampling study was comprised of 25-surface
32 grab samples taken across the site, and five sonic drill sediment cores at separate locations in
33 the dredge berth pocket.

1 SURFACE WATER QUALITY

2 The TMJ site is located in the Gravesend Reach of the Fraser River, which is slightly alkaline, has
3 seasonal patterns of dissolved oxygen concentrations (highest in winter months), and naturally
4 high levels of TSS during freshet when sediment is transported downstream. Annual
5 navigational dredging occurs in the Gravesend and neighbouring reaches of the Fraser River.
6 From 2015 to 2017, this dredging removed 306,000 to 582,000 m³ of material annually. TJLP
7 considered water quality conditions with the presence of this navigational dredge to be
8 baseline conditions. Surface water quality parameters assessed include:

- 9 • *TSS and Turbidity*: The Application noted that navigational dredging did not coincide
10 with identifiable increases in turbidity or TSS. Levels of TSS remained within the range of
11 existing variability which is primarily driven by the tide and river discharge;
- 12 • *Metals and Nutrients*: During freshet, total concentrations of aluminum, chromium,
13 copper, iron, zinc and phosphorus measured above FRWQO and BC WQG.;
- 14 • *Bacteriological Parameters*: The Application found fecal coliforms and *Escherichia coli*
15 (*E.coli*) were below FRWQOs; and
- 16 • *Organic Constituents*: Organic constituents, including pesticides, alkylphenols,
17 polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) were
18 below FRWQO and applicable water quality guidelines (that is, BC WQG and/ or CEQG)
19 near the Annacis Wastewater Treatment Plant outfall in 2018 or the TMJ site in 2014.

20 SEDIMENT QUALITY

21 In the LAA, sediment varies from fine sediment in the nearshore to unconsolidated sand with a
22 lower proportion of fines toward the centre of the river. Sediment quality parameters assessed
23 include:

- 24 • *Metals*: The Application found that arsenic, chromium, copper, iron, manganese and
25 nickel in some samples in the dredge pocket were above B.C. sediment quality
26 guidelines. However, it noted that maximum concentrations were less than 95th
27 percentile for the south arm of the Fraser River, indicating that levels are on par with
28 ambient conditions in the Fraser River that is influenced by natural geological inputs.
- 29 • *PAHs*: Concentrations of total and individual PAHs were lower than B.C. sediment quality
30 guidelines in all but three samples. In the three samples, individual PAH levels exceeded
31 guidelines and the 95th percentile for the area.
- 32 • *Dioxins and Furans*: Concentrations were above guidelines in some sediment samples,
33 but were below the 95th percentile, suggesting that levels reflect ambient conditions in
34 the Fraser River.

35 5.5.2.2 POTENTIAL PROJECT EFFECTS

36 This section provides a summary of potential effects identified in the Application for Water
37 Quality during construction, operations and decommissioning of TMJ and considered if FRWQO,

- 1 BC WQG or CEQG would be exceeded at the assessment point (defined as the outer boundary
- 2 of the work zone 100 m from the source of TMJ activities).

3 ***INCREASED SUSPENDED SEDIMENT DUE TO SEDIMENT DISTURBANCE***

4 The Fraser River naturally carries a high sediment load. The Application explained that TMJ
5 might increase TSS levels through sediment disturbance through a variety of activities, with
6 dredging potentially causing the most disturbance. The Application predicted the total initial
7 volume of materials dredged during construction would be 510,000 m³, at a rate of 14,000 m³
8 per day, over 36 working days.

9 The Application compared the predicted increases in TSS from TMJ dredging to TSS increases
10 from recent navigational dredging because it has generated suspended sediment levels that are
11 not distinguishable from downstream sediment transport in the river. The total capital dredge
12 is estimated to be twice the volume of the recent (January 2018) navigational dredge in the
13 Gravesend Reach and neighbouring reach. The Application estimated that TSS levels during
14 construction at the point of assessment (100 m from the point of discharge) would result in
15 predicted TSS levels of 14-54 milligrams per litre (mg/L), higher than the TSS increase estimated
16 from past navigational dredging (8-31 mg/L). The Application predicted that TSS levels would
17 remain within the range of natural variability at high and low flows. TSS levels are expected to
18 remain below those that would cause adverse effects to fish.

19 During operations, annual maintenance dredging is expected to be approximately 125,000 m³
20 per year which would increase the levels of TSS. Although this is considered a residual effect,
21 the lower volume of dredging involved in maintenance dredging compared to capital dredging
22 (approximately a quarter of the volume) means increases in TSS would also be expected to be
23 lower than from capital dredging. The Application also noted that propellers on arriving and
24 departing vessels could re-suspend sediments but that the effects on the re-suspension of
25 sediment would be negligible.

26 ***REMOBILIZATION OF TRACE METALS AND ORGANIC CONSTITUENTS FROM DISTURBED*** 27 ***SEDIMENTS***

28 **Metals, Dioxins, Furans**

29 The Application reported that sediment concentrations of metals (arsenic, chromium, copper,
30 iron, manganese and nickel) and dioxins and furans at depth and surface in the dredge area
31 were currently above BC sediment guidelines. The maximum concentrations of these metals
32 were less than the 95th percentile of sediment concentrations measured by the Fraser River
33 Ambient Monitoring Program (FRAMP). The Application concluded that the levels are similar to
34 those in the surrounding lower Fraser River sediment and do not represent a contaminant
35 source.

1 **Polycyclic Aromatic Hydrocarbons (PAHs)**

2 PAHs have varying degrees of toxicity to aquatic organisms. In most samples, concentrations of
3 individual PAHs were less than the SWQG and FRO with some exceptions. The distribution of
4 stations with PAH exceedances was sporadic within the berth pockets and foreshore. Maximum
5 concentrations of some PAHs in five of the 32 stations were higher than the 95th percentile of
6 ambient sediment concentrations upstream and downstream of TMJ, measured by FRAMP.
7 Therefore, additional analyses were conducted to predict the surface water concentrations of
8 PAHs that could be remobilized from disturbed sediments during dredging. Based on the 95th
9 percentile of measured sediment concentrations, predicted surface water concentrations of all
10 PAHs were less than BC and CCME long-term WQGs and applicable guidelines protective of
11 human health. The Application concluded that potential effects to aquatic and human health
12 through this pathway would be negligible. The remobilization of metals, dioxins, furans and
13 PAHs from disturbed sediments was, therefore, not carried forward as a residual effect.

14 **Other Organic Constituents**

15 The Application reported that concentrations of PCBs, VOCs and phenols in sediment from the
16 dredge area were either less than the analytical detection limits or below applicable guidelines
17 and objectives. This effect was, therefore, not carried forward as a residual effect.

18 ***RELEASE OF POLYCYCLIC AROMATIC HYDROCARBONS FROM CREOSOTE-TREATED PILES***

19 The Application noted that during construction, PAHs could be temporarily suspended and
20 transported in the water column if creosote-treated piles, their remnants, or surrounding
21 sediment are removed or disturbed, as creosote is comprised mainly of PAHs. The Application
22 predicted that the amount of PAH released would not be detectable due to the effectiveness of
23 mitigation measures that would remove the piles intact and avoid bringing contaminated
24 sediments to the surface.

25 ***RELEASE OF ALKALINE MATERIAL DURING CONCRETE WORKS***

26 Concrete works and the removal of existing concrete near or in the water during construction
27 could release cementitious material could negatively affect surface water quality. Similarly, the
28 removal of concrete infrastructure during decommissioning could also release cementitious
29 material. Construction materials containing cement, including concrete, are alkaline and can
30 have adverse effects on aquatic life. The Application predicted that with the application of
31 mitigation measures that would protect uncured concrete from contact with surrounding
32 water, the release of alkaline material into the water would be negligible. This effect was,
33 therefore, not carried forward as a residual effect.

34

1 ACCIDENTAL RELEASE OF DELETERIOUS SUBSTANCES

2 Accidents and malfunctions have the potential to occur during all phases of TMJ and cause an
3 unintentional release of deleterious substances into the environment that have the potential to
4 adversely affect fish and fish habitat quality and function. The potential effects of accidents and
5 malfunctions are assessed in the Accidents and Malfunctions chapter ([Section 9](#)) of this Report.
6 This effect was, therefore, not considered further in this Report.

7 BUNKER VESSEL SCENARIO

8 TJLP considered the interaction between vessel movement and Water Quality in the
9 Application, and TJLP predicted negligible residual effects due to vessel scour as a result
10 of vessel movement or berthing. TJLP reviewed the potential effects from the increased
11 bunker vessel traffic on scour (see Section 5.3.3) and did not predict changes in residual
12 effects or characterization of effects to River Processes from what was presented in the
13 Application. TJLP concluded that the increase in annual bunker vessels is predicted to
14 result in a negligible effect on Water Quality and the residual effects assessment in the
15 Application is expected to remain unchanged.

16 5.5.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION

17 The Application proposed the following measures to reduce the effects of TMJ on Water
18 Quality:

- 19 • *Site Management, Erosion and Sediment Control Plan*: Measures to prevent erosion,
20 sedimentation and effects to the aquatic environment;
- 21 • *Stormwater Management Plan*: Methods and design for stormwater and wastewater
22 collection, treatment and discharge;
- 23 • *In-water works management plan*: Mitigations and water quality monitoring to reduce
24 effects to water quality and aquatic life, including dredging mitigations;
- 25 • *Creosote Pile Removal Management Plan*: Creosote pile removal and storage mitigation
26 measures;
- 27 • *Scour Protection Plan*: Positioning and maneuvering of vessels and barges in a manner to
28 minimize re-suspension of riverbed sediments and avoid propeller scour;
- 29 • *Concrete Works Management Plan*: Measures to reduce the risk that concrete
30 materials or leachate from concrete enter the water; and
- 31 • *Dredging Management Plan*: Water quality monitoring and dredging practices to ensure
32 dredging practices minimize effects to the aquatic environment.

33 No additional mitigation measures were proposed by TJLP as part of the BVSA.

1 5.5.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS 2 IDENTIFIED DURING APPLICATION REVIEW

3 The following key issues related to the assessment of Water Quality for TMJ were identified
4 during Application review and based on feedback from the Working Group:

- 5 • Total suspended solids;
- 6 • Sediment sampling; and
- 7 • Discharge from vessels.

8 ***TOTAL SUSPENDED SOLIDS***

9 ECCC and Tsawwassen First Nation raised questions about predicted levels of TSS due to
10 dredging and the TJLP's proposed dredge management plan. They raised concerns about the
11 temporal nature of TSS levels in the Fraser River and whether the dredge may increase TSS
12 levels for longer periods or at different times of the year (e.g., outside of high flow conditions)
13 and thereby bring them outside the range of existing variability and have adverse effects to
14 aquatic life. ECCC also questioned the levels to which the dredge management plan would limit
15 TSS to water quality guidelines or levels predicted in the Application.

16 TJLP responded that ambient water quality guidelines and Fraser River specific water
17 quality objectives would be used in the dredge management plan as triggers for
18 implementing mitigation measures, which would be commensurate with the level of risk
19 associated with a given parameter or magnitude/ duration of guideline exceedance.

20 TJLP explained that the first response to an exceedance would be collection of
21 confirmatory measurements after a specified period of time, followed by adjustments to
22 the dredging activity if needed, up to and including stopping work. TJLP explained that
23 the Application contained a prediction of the existing variability in TSS under existing
24 conditions and the uncertainty in predicting effects to TSS from capital dredging under a
25 range of river concentrations. TJLP also committed to undertake capital dredging during
26 the least risk window specified by DFO for the lower Fraser River. TJLP considered the
27 Application's TSS predictions to be conservative for a variety of reasons, including that
28 the ambient river TSS measurements that the predictions were compared to were taken
29 at the surface of the water and close to shore (as opposed to closer to the sediment)
30 and the assessed levels did not consider the mitigation measures proposed via the
31 dredge management plan (see above mitigation section).

32 The EAO is proposing Condition 12: Water Quality Management Plan and recommending KMMs
33 under CEAA 2012 for In-water Works, to manage potential effects to TSS during construction
34 and operations during in-water works. In-water works mitigation includes real-time turbidity
35 monitoring of background and TMJ-related releases and comparison against B.C. Water Quality

1 Guidelines. If turbidity levels exceed these guidelines, pre-determined decision criteria with
2 specific management actions would be followed. The EAO is also proposing Condition 10:
3 Construction Environmental Management Plan and Condition 11: Operations Environmental
4 Management Plan, and recommending KMMs under CEAA 2012 for Erosion and Sediment
5 Control and Scour Protection.

6 **SEDIMENT SAMPLING**

7 ECCC and Tsawwassen First Nation expressed concerns that the sediment sampling and
8 screening conducted for the Application did not fully characterize the sediment volume that
9 would be dredged or adequately represent the deepest areas. ECCC explained that this
10 hindered them from commenting on the suitability of the dredgeate for re-use or disposal at
11 sea, and on the effects of dredging on sediment quality and its associated potential effect on
12 aquatic receptors. ECCC was of the view that further sampling would benefit the disposal at sea
13 application and Tsawwassen First Nation questioned why the samples were not screened
14 against DAS Regulations if disposal at sea was being considered as an option for dredgeate
15 disposal. Tsawwassen First Nation noted that although metals and organic contaminants were
16 within the 95th percentile of measured concentrations, they still posed a risk to aquatic and
17 terrestrial organisms. Tsawwassen First Nation requested additional analysis be conducted
18 prior to sediment being used for restoration or disposal at sea.

19 TJLP explained that the approach area is comprised of unconsolidated sand that is
20 subject to high river flows and scouring and that sediments in this dynamic environment
21 are subject to continual disturbance. TJLP submitted a supplemental memo⁵² to support
22 the assertion that sediment previously sampled is representative of the subsurface
23 materials in the dredge pocket. This memo explained that deeper layers of the area are
24 primarily geologic material unaffected by human interaction. TJLP noted that sampling
25 within the approach area showed low levels of organic matter, which would typically
26 have relatively low concentrations of metals and PCBs.

27 Concerning disposal at sea, TJLP noted that the sediment characterization was designed
28 to meet the requirements of the EA Application and the future ECCC requirements for
29 disposal at sea permitting. TJLP noted that the specific screening against the DAS
30 Regulations pursuant to the *Canadian Environmental Protection Act* would be reported
31 in a technical report to be included in a potential DAS Application. An initial comparison

⁵² TJLP's response to ECCC's comments, dated February 26, 2020
(https://www.projects.eao.gov.bc.ca/api/public/document/60a49719148b4a0023306131/download/20200226_EAC_ECCC-41%2C42_WQ.pdf).

1 to current disposal at sea limits found that a majority of the material would be suitable
2 for disposal at sea.

3 The EAO has considered the information presented regarding sediment sampling for the
4 purposes of the EA and notes that Tsawwassen First Nation advised that TJLP's rationale
5 regarding sufficiency of sampling is adequate for the EA. The EAO notes that TJLP is
6 contemplating disposal at sea for portions of the dredgeate and has conducted additional
7 sediment sampling pursuant to ECCC's disposal at sea permitting requirements. The disposal at
8 sea process would also involve screening of sediment against disposal at sea regulatory
9 standards. The EAO is satisfied that this issue has been satisfactorily addressed for the purposes
10 of the EA.

11 *DISCHARGES FROM VESSELS*

12 During the review of TJLP's BVSA Report, ECCC raised concerns about direct discharges from
13 ships (e.g., bilge water and scrubber effluent), and that the total volume of these discharges
14 could be larger with increased frequency of bunker vessel traffic under the BVS and could affect
15 water quality and related VCs (e.g., fish and fish habitat and marine mammals).

16 TJLP noted that discharge of scrubber effluent within the LAA is regulated by the VFPA,
17 and that VFPA's Port Information Guide includes restrictions around the discharge of
18 scrubber wash water at the Port of Vancouver and details on how VFPA regulates
19 exhaust gas cleaning system wash water. In addition the VFPA have identified plans to
20 implement further restrictions at the Port of Vancouver, including prohibiting the
21 discharge of scrubber wash water and eventually prohibiting the use of scrubber
22 systems. Given the restrictions around discharge of scrubber effluent, and that the
23 majority of vessels transiting to TMJ would either be LNG-powered or not require
24 scrubbers, TJLP anticipates that potential effects on water quality and related VCs as a
25 result of bilge water and scrubber effluent discharge would be negligible.

26 TJLP noted that prevention of oily bilge water discharge would include containment of
27 onboard oil spills and leaks, and the collection and storage of the bilge water for
28 treatment either onboard or at a receiving facility at port. Accidental discharge would
29 require the oil spill to escape both spill containment and the bilge water
30 collection/treatment system, which is very unlikely. Therefore, TMJ-related bilge water
31 discharges are not expected to release contaminants into marine waters that would
32 adversely affect marine and estuarine water quality within the RAA. As such, an
33 increased vessel traffic associated with the BVS is not anticipated to result in an increase
34 in the direct discharge of bilge water from vessels calling to TMJ, and therefore no
35 additional effects on water quality and related VCs are anticipated.

1 The EAO notes that potential effects from scrubber effluent and bilge water discharge would be
2 sufficiently managed through adherence to the VFPA's Port Information Guide, federal
3 regulations (*Canada Shipping Act, 2001*) and international conventions (for example, the
4 MARPOL Convention).

5 **5.5.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

6 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
7 on:

- 8 • The Water Quality VC; and
- 9 • CEAA 2012 Section 5(1)(a)(i): This section of CEAA 2012 requires an assessment of fish
10 and fish habitat as changes to water quality may affect fish and fish habitat.

11 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

12 Based on the mitigation measures proposed in the Application and issues raised during
13 Application review, the EAO proposes the following provincial conditions and KMMs under
14 CEAA 2012:

- 15 • Condition 12: Water Quality Management Plan (provincial condition) and In-water
16 Works mitigations (KMM) to reduce TSS from in-water works; and
- 17 • Condition 10: Construction Environmental Management Plan and Condition 11:
18 Operations Environmental Management Plan (provincial conditions), as well as Erosion
19 and Sediment Control and Scour Protection Mitigations (KMM) with best management
20 practices to mitigate effects to TSS.

21 **Residual Effects:** After considering the proposed mitigation measures, the EAO concludes that
22 TMJ would result in the following residual adverse effects to the Water Quality VC from the
23 Application scenario and BVS:

- 24 • Increased suspended sediment due to dredging. In the absence of mitigation, dredging
25 during construction is predicted to result in TSS levels of 14-54 mg/L, which would be up
26 to 8-15 mg/L above baseline levels of TSS (navigational dredge levels). With the
27 application of mitigation measures, this effect is expected to be less than the
28 unmitigated predictions; however, a precise prediction of effects post-mitigation is not
29 possible due to the variability in baseline conditions and the dynamic nature of dredging
30 effects and mitigations.

- 1 The EAO’s characterization of the expected residual effects of TMJ on Water Quality and level
- 2 of confidence in the effects determination (including likelihood and significance) are
- 3 summarized below:

4 **Table 13: Summary of Residual Effects to Water Quality – Increased TSS**

Criteria	Assessment Rating	Rationale
Context	Moderate resilience	Levels of TSS and turbidity in the Fraser River, including the Gravesend Reach, vary seasonably. Levels are affected primarily by river discharge and tidal forces. Seasonal flow conditions are highly dynamic.
Magnitude	Low	In the absence of mitigation, dredging during construction is predicted to increase TSS by 8-15 mg/L beyond baseline, which would result in total levels of TSS ranging from 14-54 mg/L. With mitigation measures, this effect is expected to be less than the unmitigated prediction, but the precise level is uncertain. Even without mitigation, the increases to suspended sediments from dredging would be within existing variation (3.4-218 mg/L) of the Fraser River under the flow conditions expected during dredging.
Extent	Local	Suspended sediment would be localized to the area of riverbed disturbance in the LAA
Duration	Short term	Predicted effects in increased suspended sediments from dredging would be short term, only during the time necessary to dredge (approximately 50 days for capital dredging and 13 days for maintenance dredging).
Reversibility	Reversible	Effects would be reversible, once dredging ceases.
Frequency	Frequent	Increases to suspended sediments would occur annually during maintenance dredging (operations) and disturbances from propeller wash would occur during vessel operations (operations), in particular LNG carrier operations. Capital dredging would be limited to construction.
Likelihood	There is a high likelihood of increases in the amount of suspended sediments in the water.	
Significance Determination	In consideration of the low magnitude of effects, local extent, short-term duration, reversible nature of effects, and the proposed provincial conditions and recommended KMM including: Water Quality Management Plan and In-Water Works Mitigations to reduce TSS from in water works; Construction and Operational Environmental Management Plans; Erosion and Sediment Control Mitigations; and Scour Protection Mitigations with best management practices to mitigate effects to TSS, the EAO concludes that increased TSS would not have a significant adverse effect on water quality.	
Confidence	The likelihood rating for residual effects is determined with high confidence. Based on the proposed mitigation measures, industry best management practices, and compliance with the proposed EAC conditions, recommended KMMs under CEEA 2012, federal and provincial guidelines and permitting requirements, there is high confidence in the residual effects assessment.	

5 *Note: Criteria and assessment ratings are defined in Appendix 5: Residual Effects Characterization Definitions.*

6 5.5.5 CUMULATIVE EFFECTS ASSESSMENT

- 7 The EAO concluded that there would be residual effects from TMJ to water quality from
- 8 increases to TSS which could occur in the LAA from dredge operations and propeller wash.

1 Although the EAO did not predict residual effects to other water quality parameters, the EAO
2 heard concerns from Tsleil-Waututh Nation about the overall, baseline water quality conditions
3 of the Fraser River.

4 Cumulative effects on water quality could occur if there is the potential a spatial and/ or
5 temporal overlap of past, present and reasonably foreseeable projects that could interact
6 cumulatively with TMJ to affect TSS. The EAO considered the following reasonably foreseeable
7 future projects and activities :

- 8 • VAFFC (1.3 km downstream);
- 9 • Vancouver Fraser Port Authority Fraser River Annual Dredging Program;
- 10 • Seaspans Ferries Tilbury Terminal Expansion (adjacent);
- 11 • Fortis Tilbury Phase 2 LNG Plant Expansion Project (adjacent); and
- 12 • Delta Grinding Facility (adjacent).

13 The EAO notes that the predicted effects to TSS from the navigational dredging program have
14 been incorporated into the TMJ water quality predictions. The Fortis Tilbury LNG Plant
15 Expansion would be an upland project but construction materials could be brought in by water.
16 The EAO conducted an EA of the VAFFC in 2012 and concluded that there would be residual
17 effects to water quality, primarily through the project's dredging activities. Given that re-
18 suspended TSS is expected to remain within the LAA it is unlikely that there would be a spatial
19 and temporal overlap with increased TSS from VAFFC. The EAO does not have specific TSS
20 predictions from the Seaspans Ferries Tilbury Terminal Expansion, Tilbury Phase 2 LNG Plant
21 Expansion or Delta Grinding Facility projects. The two projects may increase TSS levels from
22 dredging activities and/ or propeller wash as vessels berth and depart from Tilbury Island which
23 may interact cumulatively with increased TSS from TMJ. The EAO notes that both Delta
24 Grinding Facility and Tilbury Phase 2 LNG Plant Expansion Project are subject to EAs. Potential
25 effects to the aquatic environment would be assessed under those processes.

26 The EAO is proposing Condition: 12 Water Quality Management Plan and recommending KMMs
27 under CEAA 2012 for a water quality, to manage potential effects to TSS during construction
28 and operations during in-water works (for example, dredging). The plan and KMMs would
29 include TSS monitoring and management actions if TSS levels exceed B.C. water quality
30 turbidity objectives. The EAO is confident that with the implementation of this monitoring and
31 adaptive management, there would not be significant cumulative effects to the Water Quality
32 VC.

33 5.5.6 CONCLUSIONS

34 Considering the above analysis and having regard to the conditions identified in the provincial
35 TOC, including Condition 10: Construction Environmental Management Plan, Condition 11:
36 Operations Environmental Management Plan and Condition 12: Water Quality Management

- 1 Plan (which would become legally binding if an EAC is issued) and water quality mitigations
- 2 recommended as KMMs under CEAA 2012 (Appendix 1) the EAO is satisfied that TMJ would not
- 3 have significant adverse residual or cumulative effects on the Water Quality VC.

4 5.6 FISH AND FISH HABITAT

5 5.6.1 BACKGROUND

6 Fish and Fish Habitat was selected as a VC because the TMJ has the potential to have adverse
 7 effects to fish and fish habitat due to dredging, pile driving and vessel operations. Additionally,
 8 fish and fish habitat are important to Indigenous Groups and the public, and they are subject to
 9 a variety of policies and legislation.

10 The subcomponents and species for the Fish and Fish Habitat VC assessment were selected to
 11 represent differing presence at the TMJ site (seasonal anadromous fish versus year-round
 12 resident fish) and/ or species of conservation concern (Table 14).

13 **Table 14: Subcomponents and Indicators for Fish and Fish Habitat VC**

Subcomponents and species	Indicators
Original Application Area	
Anadromous Fish: chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon, steelhead trout, and eulachon	<ul style="list-style-type: none"> • Fish habitat quality, including light and shading effects, and quantity; • Fish distribution – presence/ absence; • Fish abundance; • Harm – physical injury or mortality; and • Loss or degradation of habitat, for example, underwater sound, water quality and prey species availability.
Resident Fish: coastal cutthroat trout, bull trout, white sturgeon, demersal fish, for example, flat fish and sturgeon (including green sturgeon), and shallow nearshore forage fish, for example, sculpin, minnows and pike minnows.	
Benthic invertebrates	Benthic invertebrate abundance, diversity, and community composition.
Marine Shipping Assessment Area	
Pacific salmonids: see details above	<ul style="list-style-type: none"> • Wave height/ energy – Comparison of predicted TMJ-related wave height (m) to existing wave height (that is, overall change); and • Underwater noise – Comparison of predicted TMJ-related sound levels (decibels [dB]) to published tolerance thresholds.
Shellfish: Olympia oyster, northern abalone, Dungeness crab	
Forage fish: Pacific herring and eulachon	
Intertidal habitat: shorelines, estuaries, intertidal marsh; and macroalgae, eelgrass, biofilm	

14

15 The effects assessment of Fish and Fish Habitat is informed by the Noise ([Section 6.2](#)),
 16 Vegetation ([Section 5.8](#)) and Water Quality ([Section 5.5](#)) VCs, and the River Processes PC
 17 ([Section 5.3](#)). The results of the Fish and Fish Habitat assessment are incorporated into the

1 EAO's assessment on effects to Marine Mammals ([Section 5.7](#)), Wildlife and Wildlife Habitat
2 ([Section 5.9](#)) and Current Use of Lands and Resources for Traditional Purposes ([Section 11.4](#)).

3 For the EAO's assessment of potential effects of dredgeate disposal, including to Fish and Fish
4 Habitat, refer to the Alternative Means of Undertaking the Project chapter ([Section 2.2.5](#)) of
5 this Report.

6 **5.6.1.1 REGULATORY CONTEXT**

7 Fish and fish habitat protection and pollution prevention measures are contained within the
8 federal *Fisheries Act*, including a prohibition against the harmful alteration, disruption or
9 destruction (HADD) of fish habitat; the death of fish by means other than fishing; and a
10 prohibition against the deposit of deleterious substances in water frequented by fish. The
11 federal SARA prohibits killing, harming, capturing or harassing species listed (in Schedule 1 of
12 the SARA) as endangered, threatened or extirpated and provides protection for habitat that
13 supports these species. SARA 79(2) requires the identification of adverse effects of projects on
14 the SARA listed species and their critical habitat and requires that measures be taken to avoid
15 or lessen those effects and to monitor them. CEAA 2012 Section 5(1)(a)(i) requires an
16 assessment of environmental effects on fish and fish habitat as defined in subsection 2(1) of the
17 *Fisheries Act*.

18 Other legislation, guidelines and advisory and scientific bodies relevant to fish and fish habitat
19 for TMJ include the following:

- 20 • Committee on the Status of Endangered Wildlife in Canada (COSEWIC): an advisory
21 panel that assesses and designates the conservation status of wildlife species at risk of
22 extinction in Canada. Its assessment is considered during the SARA listing process;
- 23 • B.C. Conservation Data Centre (CDC): assesses the conservation status of vulnerable
24 species and ecosystems and places them on red (extirpated, endangered or threatened)
25 and blue (special concern) lists;
- 26 • B.C. *Wildlife Act* protects all native species of animals from direct harm, except as
27 allowed by regulation; and
- 28 • Water quality guidelines: BC Approved Water Quality Guidelines for the Protection of
29 Aquatic Life (2006) and Working Water Quality Guidelines for British Columbia (2017).

30 In terms of invasive aquatic species, regulations are in place regarding anti-fouling systems to
31 mitigate the risk of introducing invasive aquatic species, such as the regular application of anti-
32 fouling paint. TC has implemented the International Convention on the Control of Harmful Anti-
33 fouling Systems on Ships (AFS Convention) through the Vessel Pollution and Dangerous
34 Chemicals Regulations which prohibits the use of harmful anti-fouling systems on ships (e.g.

1 harmful substances used in anti-fouling paints) and Canada has supported the adoption of
2 international guidelines for control and management of ships' biofouling⁵³.

3 **5.6.1.2 BOUNDARIES**

4 The LAA includes the aquatic and riparian areas of the TMJ site, including the nearshore and
5 foreshore habitat associated with the footprint of the jetty and the dredge area, a 500 m buffer
6 upstream of the site (to include government water quality monitoring stations) and a 100 m
7 buffer downstream. The 500 m upstream buffer was established to consider potential water
8 quality effects upstream of the TMJ site due to tidal influence. The RAA includes the South Arm
9 of the Fraser River downstream of the TMJ site to Sand Heads and includes a 500 m buffer
10 upstream of the site (including the monitoring stations noted above). The RAA includes the
11 foreshore, sloughs and wildlife management areas of the South Arm of the Fraser River from
12 the TMJ site's marine terminal to Sand Heads.

13 **MARINE SHIPPING ASSESSMENT**

14 The spatial boundary for marine fish in the MSA (marine fish MSA area) includes the inbound
15 and outbound marine shipping lanes and surrounding marine habitat from the high-water mark
16 from VFPA jurisdiction through the southern part of the Strait of Georgia, Boundary Passage,
17 Haro Strait and west through Juan de Fuca Strait out to the 12 nm limit. The LAA and RAA are
18 the same in the MSA area.

19 **5.6.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 20 **APPLICATION**

21 **5.6.2.1 BASELINE INFORMATION**

22 The Application stated that the shoreline habitat along the TMJ site is a mix of less-developed
23 high productivity habitat and moderate or low productivity habitat industrial areas. Existing fish
24 and fish habitat conditions in the LAA and RAA were determined by TJLP through a combination
25 of a literature review of existing background information and fish and benthic invertebrate
26 surveys.

27 The portion of the Fraser River where TMJ would be located is used by both anadromous and
28 resident fish. Salmonids would be present at the TMJ site during upstream adult migration in
29 the fall and downstream juvenile migration and rearing in the spring to mid-summer. The
30 Application noted that overfishing, changing climatic conditions, and/ or habitat perturbations

⁵³ Fisheries and Oceans Canada's Science Advice from The National Risk Assessment for Ballast Water Introductions of Aquatic Nonindigenous Species to Canada dated 2014. Available at: <https://waves-vagues.dfo-mpo.gc.ca/Library/352514.pdf>.

1 have contributed to the declines in chinook, coho and sockeye salmon and steelhead trout,
2 some populations of which have been assessed as at risk by COSEWIC⁵⁴. Eulachon (provincially
3 blue-listed, assessed as endangered by COSEWIC, and currently in the final listing phase for
4 SARA) migrate through the area during upstream movements by adults and downstream
5 dispersal of larvae, and is characterized as low suitability spawning habitat. The COSEWIC
6 Assessment and Status Report technical summary of the Fraser River Eulachon population⁵⁵ lists
7 the threats to populations and habitats as habitat damage from increasing industrialization in
8 the lower Fraser River (rip rap and other obstacles) and the dredging of spawning areas as well
9 as offshore interception and bycatch, poaching, possible extreme marine mammal predation,
10 and sensitivity to climate change impacts on river discharges, temperatures, and flow rates.

11 White sturgeon (provincially red-listed, assessed as threatened by COSEWIC) are present in the
12 area. Declines in white sturgeon may be the result of mortality from catch and release fisheries,
13 by-catch in commercial and food, social and ceremonial (FSC) salmon fisheries, reduction in
14 food availability, and continued habitat degradation⁵⁶. Other threats identified as medium level
15 risks include past in-river gravel extraction and shoreline modification⁵⁷. The CDC indicates that
16 there are three other fish species with a conservation status that may occur near the TMJ site:
17 green sturgeon (provincially red-listed and listed under SARA as special concern), coastal
18 cutthroat trout (provincially blue-listed) and bull trout (provincially blue-listed and listed under
19 SARA as special concern). These three species were all represented by the resident fish VC
20 subcomponent.

21 Indigenous Groups have noted the importance of the TMJ site for fish habitat, for example,
22 Musqueam Indian Band confirmed that sturgeon use the area. Indigenous Groups highlighted
23 that current fish populations are low compared to the recent past and that the Fraser River
24 salmon species are declining in spawning population numbers and returning as smaller fish than
25 previous years. Tsawwassen First Nation noted that over the last 100 years or more, the

⁵⁴ Twelve populations of Fraser River Chinook Salmon have been assessed as at risk (7 endangered, 4 threatened and 1 special concern). Fifteen populations of Fraser River Sockeye Salmon have been assessed as at risk, (8 endangered, 2 threatened and 5 special concern). One population of Coho has been listed as threatened (Interior Fraser Coho). Two populations of Steelhead trout are endangered (Thompson River and Chilcotin River populations).

⁵⁵ COSEWIC Assessment and Status Report on the Eulachon *Thaleichthys pacificus* in Canada (https://publications.gc.ca/collections/collection_2012/ec/CW69-14-638-2011-eng.pdf).

⁵⁶ COSEWIC Assessment and Status Report on the White Sturgeon *Acipenser transmontanus* in Canada (https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/sr_esturgeon_blanc_white_sturgeon_1113_e.pdf)

⁵⁷ DFO. 2021. Recovery Potential Assessment for Lower Fraser River White Sturgeon 2020 (https://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2021/2021_011-eng.pdf)

1 average spawning biomass of eulachon on the Fraser River declined from estimates of 1,000
2 tonnes to a historic low of only 10 tonnes in 2008. Since 2004, abundance estimates have
3 shown that the total population of white sturgeon in the Lower Fraser has declined
4 approximately 25 percent⁵⁸.

5 The Application included results from the literature characterizing benthic communities in the
6 lower Fraser River. The results of a benthic survey characterized the area to be low in
7 productivity, species diversity and abundance.

8 **MARINE SHIPPING ASSESSMENT**

9 As described in the Application, the marine fish MSA area is a highly productive marine habitat.
10 The Salish Sea supports around 200 species of marine and anadromous fish and thousands of
11 invertebrate species. Key species for fisheries include salmon, groundfish, pelagic fish (for
12 example, Pacific herring and eulachon) and shellfish (for example, Dungeness crab, spot prawn,
13 side-stripe shrimp, and many species of bivalves). The MSA reported 16 fish and invertebrate
14 species are of conservation concern in the marine fish MSA area. The north extent of the
15 marine fish MSA area includes the Fraser River estuary.

16 **5.6.2.2 POTENTIAL PROJECT EFFECTS**

17 This section provides a summary of potential effects identified in the Application and MSA to
18 Fish and Fish Habitat during construction, operations and decommissioning of TMJ. The
19 potential effects of vessel strikes was not considered in the Application; however, the potential
20 effects of vessel strikes on sturgeon has been assessed by the EAO in Section 5.6.4 below.

21 **WATER QUALITY**

22 Increased suspended sediments can adversely affect habitat quality and function. The
23 Application concluded that while TMJ might increase the suspended sediments in the Fraser
24 River during all phases of TMJ in the LAA, changes are not expected to be distinguishable from
25 existing conditions. The Application also predicted that levels of trace metals and organic
26 constituents remobilized from disturbed sediments would be within the range of existing
27 variability of the Fraser River. Refer to Water Quality ([Section 5.5](#) of this Report) for the
28 assessment of water quality parameters from TMJ.

29 The potential effects of accidents and malfunctions to water quality, along with relevant
30 mitigations and management plans, are discussed in the Accidents and Malfunctions chapter

⁵⁸ COSEWIC Assessment and Status Report on the Eulachon *Thaleichthys pacificus* in Canada
(https://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_eulachon_0911_eng.pdf).

1 ([Section 9](#)) of this Report. For information on the assessment of potential effects of dredgeate
2 disposal to Water Quality, please refer to the Alternative Means of Undertaking the Project
3 ([Section 2.2.5](#)) in Part A of this Report.

4 **INTRODUCTION OF INVASIVE SPECIES FROM BALLAST WATER EXCHANGE**

5 The release of ballast water in the LAA and RAA could introduce invasive species into the Fraser
6 River and marine environment during operations. Ballast water, which may contain fish and
7 other aquatic organisms, is pumped into the tanks of vessels at their port of origin to provide
8 stability to unladen ships. If ballast water is released at the destination port, these species may
9 also be released and damage native species and habitat. TJLP would be required to follow
10 operational requirements of the Ballast Water Regulations under the *Canada Shipping Act*,
11 2001, and TJLP noted that TMJ-related vessels would also follow additional ballast water
12 management best practices, which it noted have been successfully employed by existing marine
13 vessels. TJLP concluded that there would be a negligible likelihood of the introduction of
14 invasive species from ballast water exchange.

15 **SHADING EFFECTS**

16 The Application noted that jetty infrastructure along the TMJ foreshore, and the presence of
17 vessels at berth and those transiting to and from the TMJ site, could cause shading effects to
18 fish and fish habitat. TJLP noted that the trestle gangway is proposed to allow light to pass
19 through. Shading could affect fish behaviour by disrupting fish vision or migratory path, or by
20 decreasing prey and habitat availability, and decrease habitat for fish and benthic invertebrates
21 through the loss of vegetation. Approximately 0.11 ha during construction and 0.66 ha during
22 operations would be affected by shading. TJLP concluded that the area that would be
23 potentially affected by shading effects is already disturbed from the previous industrial
24 activities and there would be no measurable loss of aquatic vegetation. The Application did not
25 predict a measurable loss of habitat during operations due to shading effects from vessel
26 movements because of the transient nature of these effects.

27 **WAKE AND PROP-WASH**

28 The Application noted that in-water works, berthing and departure of vessels and dredging may
29 result in wake and prop-wash could potentially affect foreshore habitat. TJLP predicted that
30 degradation of fish habitat quality and function from prop-wash would be limited by the
31 installation of scour protection and restoration of the foreshore. Further, mitigation measures
32 such as the use of tug boats for maneuvering LNG vessels would manage prop-wash. Given the
33 implementation of these mitigation measures and the boat traffic that already exists in the
34 Fraser River, TJLP concluded that changes to habitat quality and function due to the increased
35 wake and prop-wash from TMJ-related vessels were predicted to be undetectable. For further
36 details on this effect, see River Processes ([Section 5.3](#) of this Report).

1 *HABITAT LOSS AND ALTERATION*

2 The Application predicted that direct habitat loss would occur from the construction of offshore
3 facilities, dredging, in river ground stabilization, pile driving, and installation of scour protection.
4 During construction, an area of around 22 ha would be affected by dredging for both the
5 temporary berth and jetty. In the dredge area, there would be scour protection along the
6 dredge pocket slopes (concrete matting or other material) and ground stabilization areas
7 needed to support the installation of TMJ infrastructure. An area of 0.017 ha would be lost due
8 to the placement of piles from the permanent jetty and FTBB. The Application proposed a fish
9 habitat offset plan for unavoidable effects to fish habitat from the TMJ footprint. Construction
10 could also affect 0.23 ha in the estuarine marsh and riparian area. The Application noted that
11 much of this area has been disturbed and altered by past industrial activities and invasive plant
12 species. The Application explained that habitat would be restored and enhanced by TJLP and
13 comparable ecosystem functions developed following construction.

14 During operations, annual maintenance dredging at the jetty site is proposed to ensure that
15 river sediments do not build up and impede TMJ-related vessels from safely berthing. Dredging
16 would remove the biologically active layer of sediments that provide living habitat for benthic
17 invertebrates and foraging habitat for animals that feed upon them, but TJLP predicted that the
18 dredged area would be re-colonized with benthic invertebrates after the re-establishment of a
19 stable sediment layer within a few months.

20 *UNDERWATER NOISE AND VIBRATION*

21 During all phases of TMJ, underwater noise from activities like dredging, pile driving, and vessel
22 operations can cause a range of effects on fish, from behavioural changes (for example,
23 avoidance) to interference in fish navigation and even immediate or delayed mortality. Based
24 on unmitigated underwater noise levels near the source for activities during construction and
25 operations, the Application predicted a range of TMJ activities would result in underwater noise
26 that would exceed the US National Marine Fisheries Service behavioural effect threshold of 150
27 decibels (dB)^{59, 60} including dredging, vibrodensification (to install stone columns for ground
28 improvement), vessel operations and pile driving. The Application predicted that none of these
29 activities would exceed the 206 dB⁶¹ injury threshold except for pile driving, which would
30 exceed the injury threshold for fish near the noise source (10-100 m from the noise source,

⁵⁹ Behavioural disturbance thresholds were developed for pile driving but have been applied to all underwater activities in the absence of other available guidelines.

⁶⁰ Measured in dB re 1 μ Pa SPL_{rms} (average root mean square pressure level over a stated time interval).

⁶¹ Underwater sound levels are expressed in decibels, which is a logarithmic ratio relative to a fixed reference pressure of 1 micropascal (dB re 1 μ Pa).

1 depending on the size of the pile). TJLP acknowledged that the underwater noise modeling did
2 not account for bathymetry or land features in the TMJ area which would affect underwater
3 sound propagation and noted that there are islands in both directions of the Fraser River from
4 the TMJ site that would limit the distance that sound would travel.

5 ***BUNKER VESSEL SCENARIO***

6 For fish habitat quality and function, TJLP concluded that the BVS would not change the
7 conclusions for shading effects, increased suspended sediments or introduction of invasive
8 species from ballast water or change effects to foreshore habitat. TJLP considered TMJ-related
9 residual effects due to underwater noise to be negligible, noting that self-propelled, LNG-
10 powered bunker vessels are anticipated to be modern and designed to incorporate emerging
11 technologies considering underwater radiated noise. TJLP acknowledged that some
12 displacement by fish may occur as bunker vessels and LNG carriers travel to the TMJ. While
13 additional bunker vessels are anticipated to transit to the TMJ under the BVS, TJLP predicted
14 the disturbance footprint for fish from bunker vessels to be substantially less than that
15 produced by LNG carriers (e.g., 12 m for bunker vessels vs. 108 m for LNG carriers). TJLP noted
16 that while vessels may displace fish, the distance a fish may be displaced by a bunker vessel is
17 substantially less than an LNG carrier and is relatively small in a system as large as the Fraser
18 River.

19 In the BVSA, TJLP assessed the increased risk of fish injury or mortality in the LAA and RAA due
20 to increased bunker vessel traffic. In the BVS, there would be fewer LNG carrier calls and an
21 increase in bunkering vessel calls, of which self-propelled bunker vessels are anticipated to have
22 propellers above the bottom of the vessel and ATBs are anticipated to have shrouded
23 propellers (i.e., the propeller is fitted within a duct or nozzle). Compared to LNG carriers,
24 bunker vessels reduce the amount of time propellers would spend rotating near the bottom of
25 the dredge pocket or near the riverbed within navigation channels. With a shallower draft, TJLP
26 concluded that bunker vessels are not anticipated to interact with sturgeon on the riverbed
27 within navigational channels but may interact with sturgeon present within the mid-water
28 column and at the surface. TJLP stated that an increase in TMJ-related bunker vessel transits
29 may increase the risk of vessel strikes on sturgeon; however, this effect is not predicted to
30 result in population level changes. In the BVSA, TJLP concluded that the residual effect was
31 considered not significant considering the proposed provincial and federal conditions.

32 ***POTENTIAL EFFECTS FROM SHIPPING IN THE MSA***

33 TMJ would increase vessel movements by approximately 236 per year in the marine fish MSA
34 area. The Application explained that noise generated by a vessel is relative to factors such as
35 the size of the ship. The Application reported on acoustic modelling conducted for RBT2, which
36 was based on a higher number of larger vessels, moving at faster speeds than TMJ vessels. This

1 assessment found that the projected mean underwater noise levels from RBT2 vessels, in
2 addition to other existing and future projects, would be between 118-122 dB in the marine fish
3 MSA Area. Which represents a 0.06 to 0.08 dB increase from existing conditions and is below
4 the threshold of behavioural effects. The modelling also indicated that behavioural responses of
5 fish would be expected only in the immediate vicinity (less than 20 m) from the noise source
6 (i.e., the vessel in transit).

7 The MSA concluded that, based on information about potential effects of underwater noise to
8 fish and the modelling conducted for RBT2, the effects of underwater noise to forage fish
9 (herring and eulachon) and salmonids would be negligible. The MSA stated that although there
10 could be potential effects to marine invertebrates through physiological and behavioural
11 mechanisms, measurable effects would be unlikely given information in the scientific literature
12 that suggests any changes would be behavioural (for example, distraction) and short-lived.

13 The MSA explained that wakes from TMJ-related vessels would be small in comparison to the
14 existing wave environment. It noted that most of the increase in waves would be near
15 Vancouver Island in the vicinity of Discovery, Chatham, Chain and Trial islands. The MSA
16 reported that this is an area of elevated levels of natural wave action and vessel wake waves
17 would likely be small in comparison, and that TMJ's contribution to shoreline erosion would
18 likely be unmeasurable.

19 **5.6.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

20 The Application proposed mitigation measures to reduce the effects of TMJ on fish and fish
21 habitat (Section 4.2.4.3 of the Application), including the following:

- 22 • *Site Management, Erosion and Sediment Control Plan*, which would include measures to
23 prevent erosion, sedimentation and effects to the aquatic environment;
- 24 • *In-water Works Management Plan*, which would describe mitigation measures, including
25 conducting in-water works during the DFO fisheries reduced-risk work window (16 July –
26 28 February) to the extent possible; however, in the event that in-water works extended
27 beyond this window, TJLP would consider additional mitigations (this would be done in a
28 post-EA setting in consultation with Indigenous groups and DFO, to protect fish during
29 sensitive life stages); the implementation of underwater noise mitigation, as well as
30 water quality monitoring to reduce effects to water quality and aquatic life;
- 31 • *Fish Habitat Offset Plan*, to offset HADD of fish habitat due to TMJ footprint disturbance;
- 32 • *Dredging Management Plan*, which would include water quality monitoring and
33 dredging practices to ensure dredging practices minimize effects to the aquatic
34 environment;

- 1 • *Concrete Works Management Plan*, which would include measures to reduce the risk
- 2 that concrete materials or leachate from concrete enter the water; and
- 3 • *Ballast Waste Management Plan* which would describe mitigations to ensure
- 4 compliance with legislated shipping requirements related to ballast water.

5 No additional mitigation measures were proposed by TJLP as part of the BVSA.

6 **5.6.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS**

7 **IDENTIFIED DURING APPLICATION REVIEW**

8 The following key issues related to the assessment of Fish and Fish Habitat for TMJ were

9 identified during Application review and based on feedback from the Working Group:

10

- 11 • Residual and cumulative effects;
- 12 • Habitat offsetting;
- 13 • Underwater noise;
- 14 • White sturgeon;
- 15 • Eulachon;
- 16 • Salmon; and
- 17 • Effects of Shading

18 **RESIDUAL AND CUMULATIVE EFFECTS**

19 The Ministry of Forests, Lands and Natural Resource Operations (FLNRORD)⁶², DFO, Musqueam

20 Indian Band, Tsawwassen First Nation, and Kwantlen First Nation questioned TJLP's assertion

21 that, following mitigation, TMJ would not have residual effects on fish and fish habitat.

22 Concerns were raised about the extent to which the TMJ site has already been affected from

23 past historical activities, the resiliency of species in the TMJ site area, and how these factors

24 might affect predicted effects from TMJ. Indigenous Groups also raised concerns that

25 cumulative effects on fish and fish habitat in the Fraser River were not adequately considered

26 and expressed specific concerns about using current conditions as a baseline, and that current

27 fish populations are at historic lows.

⁶² The EAO notes that as of April 1, 2022, the Ministry of Forests, Lands and Natural Resource Operations has been replaced by two new ministries: Ministry of Forests and Ministry of Land, Water and Resource Stewardship. References to FLNRORD are included in this Report, as FLNRORD was a participant in the Working Group on the TMJ EA.

1 The EAO agrees that TMJ is likely to have residual effects on fish and fish habitat, that the TMJ
2 site is in an area of the Fraser River affected by past and present industrial activities, and that
3 many fish species under review are facing a variety of conservation risks across life stages and
4 that, in some cases, recovery strategies and initiatives have been developed to arrest or reverse
5 declines of certain fish species in the Fish and Fish Habitat MSA area (e.g., SARA listed species).
6 The EAO assessed the incremental effects of TMJ based on current ecological conditions. The
7 EAO does not assess the effect of a proposed project compared to a historic baseline (i.e., pre-
8 industrial conditions), but notes that the effects of past activities are reflected in current
9 conditions. The EAO considers species conservation status, population threats and trends, and
10 known ecological thresholds in its conclusions on VCs.

11 The EAO acknowledges there is some uncertainty regarding how fish currently use the TMJ site,
12 how this use might be affected by TMJ activities and the level of resiliency fish in the area have
13 to these potential changes. The EAO captured uncertainty in the confidence rating in the
14 conclusions below. The EAO has heard from Indigenous Groups that information gaps relating
15 to sturgeon and eulachon are such that there can only be a low level of confidence that
16 mitigation measures put forward to date would manage effects from TMJ to these at-risk
17 species. The EAO recommends a KMM under CEAA 2012 for Fish Mitigations to Reduce Harm
18 and Mortality, including conducting in-water works during reduced-risk work windows
19 identified by DFO, unless authorized by DFO, conducting monitoring for fish presence prior to
20 pile driving and dredging at any time of the year, and seasonal restrictions during operations on
21 hydraulic suction and clamshell dredging to avoid entrainment of juveniles. Criteria and triggers
22 to modify or stop in water works in response to fish presence or fish kill would be developed by
23 a QP. The mitigations would be developed in consultation with DFO (through the application for
24 *Fisheries Act* authorization process), Indigenous Groups and FLNRORD and would require
25 incorporation of Indigenous knowledge. Further discussion of species-specific concerns for
26 sturgeon, eulachon and salmon are discussed below.

27 **HABITAT OFFSETTING**

28 The Application proposed a habitat offset for the direct habitat loss associated with the TMJ
29 footprint (i.e., the piles of the jetty). Tsleil-Waututh Nation, Tsawwassen First Nation,
30 Musqueam Indian Band, FLNRORD and DFO provided comments on the proposal, which
31 included the following requests: additional details on selection and function; broader scope of
32 conceptual plan to include the whole dredge area; consultation with Indigenous Groups and
33 inclusion of Indigenous Knowledge; that the offset area exceed the amount and quality of
34 habitat loss and create a net gain in fish and invertebrate productivity; reflect lessons learned
35 from other offset plans in the region; and that the proposed offset plan not be considered in
36 the EAO's residual effects conclusions due to uncertainty in effectiveness of the offset and
37 potential temporal delay in functioning.

1 TJLP committed to take into consideration the design and success of similar fish habitat
2 offsetting conducted in the area and to design the offset to achieve an overall net gain
3 of useable habitat. TJLP explained that follow-up environmental monitoring programs
4 would be implemented to evaluate and confirm the effectiveness of the offset, including
5 a multi-year monitoring program to measure diversity and abundance of fish and
6 benthic invertebrates compared to similar habitats not affected by TMJ activities.

7 DFO has clarified that dredging and scour protection may result in a harmful alteration,
8 disruption or destruction (“HADD”) of fish habitat and would likely require authorization under
9 the *Fisheries Act*. The scope of works that would require the authorization and habitat
10 offsetting requirements would be determined during DFO’s regulatory review process. DFO has
11 noted that annual maintenance dredging may be able to follow DFO’s code of practice for
12 routine maintenance dredging (i.e., such that there would not need to be an authorization
13 granted for each annual dredge)⁶³. DFO has noted that based on the extent and nature of TMJ
14 effects to fish and fish habitat, that it would be feasible for TJLP to develop a plan that is
15 consistent with DFO’s policy.

16 The EAO is recommending a KMM under CEAA 2012 for a Fish Habitat Offset Plan, to be
17 developed in consultation with Indigenous Groups and FLNRORD, for offsetting effects to fish
18 habitat from TMJ, to ensure offsetting habitat would provide a higher value than the fish
19 habitat it is replacing. It would also include a monitoring program to assess the effectiveness of
20 offsetting measures and describe contingency measures and associated monitoring measures
21 that would be put into place if the offsetting measures are not successful. Contingency
22 measures would be developed and implemented in consultation with Indigenous Groups,
23 including roles for Indigenous participation in monitoring.

24 **UNDERWATER NOISE**

25 Musqueam Indian Band, Tsawwassen First Nation, Tsleil-Waututh Nation and Cowichan Nation
26 Alliance noted concern for the potential effects on fish from underwater noise, such as from
27 construction and marine shipping. Tsawwassen First Nation, Tsleil-Waututh Nation and
28 Cowichan Nation Alliance requested that bubble curtains be used as a precautionary measure
29 during all pile driving activities to reduce noise related injury and disturbance to fish and
30 invertebrates. Tsawwassen First Nation has stated a precautionary approach needs to include
31 consistent noise monitoring and the use of bubble curtains (and any other valid sound

⁶³ DFO’s Interim code of practice for routine maintenance dredging, dated October 2020 ([https://www.dfo-mpo.gc.ca/pnw-
ppe/codes/dredge-drageur-eng.html](https://www.dfo-mpo.gc.ca/pnw-
ppe/codes/dredge-drageur-eng.html)). This code does not remove or replace the obligation for projects to comply with all
applicable statutory and regulatory requirements of the *Fisheries Act*, or other federal, provincial, or municipal legislation and
policies.

1 attenuation devices) during all pile driving activities, including during vibratory pile driving given
2 noise exceedances have recently been experienced on other vibratory pile driving projects in
3 the lower Fraser River. Tsawwassen First Nation deems a reactionary approach of adding sound
4 attenuation devices only once an exceedance has occurred as unacceptable.

5 Tsawwassen First Nation noted that the lack of scientific data to support conclusions on effects
6 of underwater noise on fish presented a notable concern and requested that TJLP conduct
7 continuous monitoring via side scan sonar for large fish for all construction activities that cause
8 underwater noise to reduce effects to species like sturgeon.

9 In terms of marine shipping, Musqueam Indian Band noted uncertainty about the potential
10 effects of underwater noise and the disturbance thresholds upon which the MSA based its
11 conclusions. Musqueam Indian Band recommended a precautionary approach be taken, as well
12 as additional studies. Tsawwassen First Nation requested further information about research on
13 vessel noise and acoustic thresholds, and effects on marine fish and invertebrates from
14 repeated long-term exposure and on different life stages.

15 During the review of TJLP's BVSA Report, Tsawwassen First Nation identified uncertainty
16 associated with TJLP's assumptions related to avoidance/displacement of fish in and around the
17 smaller bunkering vessels, and Tsleil-Waututh Nation expressed that the effects from
18 underwater noise to fish resulting in behavioural disturbances would be significant.

19 TJLP responded that the literature suggests that fish would move away from mobile
20 vessels due to noise and that there were no quantitative criteria for fish behaviour
21 responses to sound. TJLP stated that there was limited research available that evaluated
22 long term behavioural effects to fish from underwater noise or at different life stages.
23 TJLP summarized information from studies that looked at long term noise effects on
24 developing rainbow trout, crabs and invertebrate larvae at cumulative noise levels at or
25 higher than those predicted in the MSA that concluded with no long-term negative
26 effects on the health of the fish.

27 With respect to the request for continuous side scan sonar, TJLP noted that once
28 construction starts, noise would discourage fish from the area, and that continuous
29 monitoring would not therefore be required. Additionally, TJLP explained that
30 monitoring for fish presence during works is likely not feasible as vessels would need to
31 operate proximal to the pile driving/ dredge vessels raising safety concerns. TJLP
32 committed to monitoring prior to pile driving and dredging and to using sound
33 attenuation devices during impact pile driving at all times and during vibratory pile
34 driving if noise levels exceeded thresholds. TJLP noted that noise thresholds are typically
35 set below the injury level so that mitigation is put in place before the critical level is
36 exceeded.

1 The EAO notes that Tsawwassen First Nation and the Indigenous Groups noted above have
2 ongoing concerns regarding potential effects to fish from underwater noise for the Application
3 scenario and BVS. The EAO acknowledges that uncertainties exist regarding the nature and
4 extent of behavioural effects of underwater noise on fish and there are no standard
5 behavioural criteria or thresholds for this pathway of effect. Under the BVS, underwater noise
6 levels are predicted to be consistent with levels already experienced in this section of the Fraser
7 River from existing shipping traffic. While the BVS would result in an overall increase in the
8 frequency of TMJ-related vessels in the LAA and RAA, and increased frequency of underwater
9 noise disturbances, this increase would be temporary for vessels in transit and smaller bunker
10 vessels are expected to produce lower underwater noise levels relative to LNG carriers. The
11 EAO finds that, despite a lack of consensus on this point, for the purposes of the EA, the
12 information on acoustic effects at the TMJ site, from the TMJ site to Sand Heads, and in the
13 MSA has been sufficient to enable the EAO to conclude that underwater noise from vessel
14 traffic associated with TMJ (for both the Application scenario and BVS) is within normal ranges
15 of other marine activities, and effects to fish and fish habitat from TMJ-related vessel noise
16 would not be measurable.

17 The EAO has heard from Indigenous Groups that, given the lack of data and knowledge
18 regarding repeated, cumulative effects from vessel noise on all life stages of fish, they have low
19 confidence in the EAO's conclusion of non-measurable effects to fish from TMJ-related vessel
20 noise.

21 To mitigate underwater noise effects to fish from in-water works in the marine terminal area,
22 the EAO is proposing KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm and
23 Mortality. The KMMs recommend underwater noise management mitigations, including use of
24 vibratory pile driving as the primary driving method, use of impact pile driving only when
25 vibratory pile driving is not technically feasible, and the use of sound attenuation devices (e.g.,
26 bubble curtains) or techniques (e.g., ramp up to build up noise slowly) during impact pile
27 driving. The EAO notes Tsawwassen First Nation requested the use of sound attenuation
28 devices during all pile driving activities, including vibratory pile driving. The KMMs recommend
29 underwater noise management mitigations included underwater monitoring of sound levels to
30 ensure that injury thresholds are not exceeded, and TJLP would be required to provide
31 alternate mitigations in consultation with Indigenous Groups and DFO to ensure that the
32 thresholds are not exceeded. Mitigations also include monitoring for fish presence prior to pile
33 driving and dredging and requirements for criteria and triggers to modify or stop in water works
34 in response to fish presence or fish kill during pile driving and dredging as determined by a QP.
35 The EAO recognizes that the efficacy of mitigation measures such as bubble curtains depends
36 on factors such as current speed (e.g., the performance of bubble curtains is inversely
37 proportional to current speed) and equipment capabilities and performance.

1 *STURGEON*

2 Indigenous Groups and FLNRORD raised concerns about the vulnerability of sturgeon and
3 potential effects of TMJ on sturgeon⁶⁴. Kwantlen First Nation, Cowichan Nation Alliance,
4 Ts'uubaa-asatx Nation, Tsawwassen First Nation and Musqueam Indian Band noted the cultural
5 importance of sturgeon to their communities, and both Musqueam Indian Band and
6 Tsawwassen First Nation have self-imposed moratoriums on sturgeon fishing. FLNRORD,
7 Tsawwassen First Nation and Musqueam Indian Band raised concerns about sturgeon being
8 attracted into the dredge pocket, as they have a preference for deeper habitats, and that this
9 could expose them to a higher risk of harm or mortality from interactions with TMJ-related
10 machinery or vessels. Tsawwassen First Nation requested that TJLP limit dredging activities to
11 the least risk window for sturgeon (December to February), and that TJLP review and consider
12 additional literature available on juvenile and adult sturgeon and additional data on sturgeon
13 usage and strikes in the area. While acknowledging a lack of proven monitoring and mitigation
14 measures relating to their concerns, Tsawwassen First Nation also requested a commitment to
15 using side scan sonar to determine sturgeon presence prior to construction and annual
16 dredging (regardless of dredging timing) and assess how sturgeon use might be affected by
17 increased vessel traffic within the dredge pocket. Tsawwassen First Nation posits that the
18 monitoring results could confirm that the actual situation concerning risks to sturgeon is vastly
19 different from the one concluded on in the EAO's assessment.

20 During the EA additional information and reports were submitted regarding sturgeon, including
21 two supplemental reports⁶⁵ from TJLP that included tracking and vessel strike data from
22 FLNRORD, and a literature review⁶⁶ from Tsawwassen First Nation that provided evidence that
23 vessel movements and dredging can injure and kill sturgeon in riverine environments, such as
24 the Fraser River. Tsawwassen First Nation emphasized that the cumulative effects of threats to
25 sturgeon (including but not limited to habitat loss and degradation, dredging, gravel mining,

⁶⁴ White sturgeon are threatened under COSEWIC and green sturgeon are listed as special concern under SARA. Both are provincially red-listed. This section uses the term "sturgeon" generally because concerns about sturgeon included both species. Although the data, information and reports described in this section were focused on white sturgeon, white sturgeon are considered a suitable surrogate for green sturgeon at the TMJ site. This is because white sturgeon spend more of their life in the river (green sturgeon spend more time in the marine environment) and are considered more sensitive to project-related changes than green sturgeon. For this reason, mitigation measures proposed for white sturgeon are also likely protective of green sturgeon at the TMJ site. The EAO's analysis and conclusions in Section 5.7.4 also relate to both species.

⁶⁵ TJLP's Fish and Fish Habitat Supplemental Memos dated July 8, 2019 (https://www.projects.eao.gov.bc.ca/api/public/document/60a4856c148b4a0023306033/download/20190708_CNA_TFN_FLNRORD_Fish%20and%20Fish%20Habitat_Rev1.pdf) and May 28, 2020 (https://www.projects.eao.gov.bc.ca/api/public/document/60a4a0e9148b4a0023306183/download/20200528_Sturgeon%20Memo.pdf).

⁶⁶ Impacts of vessels on lower Fraser River White Sturgeon, dated November 2020, prepared for Tsawwassen First Nation by LGL Limited.

1 fisheries bycatch, and vessel strikes) are at best hindering population recovery and at worst
2 causing a population decline and that this may preclude the ability of white sturgeon to provide
3 a sustainable annual harvest by Tsawwassen First Nation fishers in the lower Fraser River.
4 Currently, Tsawwassen First Nation members cannot exercise their treaty right to harvest
5 sturgeon because of conservation concerns for the population. See Section 14.8 in Part C for
6 more details on the effects of TMJ on Tsawwassen First Nation's Treaty rights.

7 During the BVS review, the EAO heard concerns from Indigenous Groups, including Tsleil-
8 Waututh Nation and Tsawwassen First Nation, about the increase in vessels from 137 annual
9 calls at the jetty to up to 365 annual vessel calls and the increase in risk of vessel strikes.
10 Tsawwassen First Nation noted uncertainty about the mechanism of strikes (e.g., whether
11 related to depth of draft and/or hydraulic forces of the propeller "sucking in" sturgeon) and the
12 interaction with fish size (e.g., juveniles are smaller and weaker swimmers and may be more
13 prone to be drawn into contact with rotating propellers). FLNRORD also noted that sturgeon
14 tend to be more active in the mid-water column during the summer and fall when sturgeon are
15 known to feed near the surface. The EAO acknowledges there is some uncertainty the potential
16 risk of harm or mortality due to vessels strikes, including the interaction with vessel class and
17 fish size, and have captured uncertainty in the confidence rating in the conclusions below. TJLP
18 acknowledged that under the BVS there would be an increase in the number of TMJ-related
19 vessel transits, which may increase the risk for vessel strikes on sturgeon compared to the
20 scenario presented in the Application. TJLP acknowledges that there is a lack of empirical
21 evidence relating to the impacts of vessel strikes on sturgeon, including sub-lethal impacts on
22 reproductive success of sturgeon. TJLP considers sturgeon use within the TMJ area to be either
23 temporary or transient in nature during migration, and staging habitat for adults or juveniles
24 has not previously been identified. Although TJLP anticipates a temporary nature of sturgeon
25 presence within the TMJ area, TJLP recognizes that habitat value within the dredge area may
26 change as a result of TMJ-related dredging and, as a result, has committed to TMJ-specific
27 mitigation designed to reduce the potential for physical disturbance and vessel strikes.

28 On arrival (i.e., nearly empty cargo tanks), the draft of the LNG carrier and depth of propeller
29 are expected to be further from the bottom (i.e., where sturgeon are understood to dwell), the
30 engine would run at minimum speed, and once secured at the jetty, the engine would be
31 turned off and no propeller would be turning. In terms of propellers in the dredge pocket, TJLP
32 explained that tugs are much shallower draft (4 to 5 m) and their propellers are shrouded. For
33 the Application scenario, TJLP estimates that loaded LNG carriers would have propellers turning
34 near the bottom of the dredge pocket approximately 51 hours a year (less than 0.6%) with tug
35 and vessel noise in advance (e.g., slow start) that would likely cause sturgeon to leave if they
36 are present. Once mooring lines are released, the tugs would maneuver the LNG carrier out of
37 the dredge pocket and the main engines turned on in slow speed. Under the BVS, self-propelled
38 bunker vessels are anticipated to have propellers above the bottom of the vessel and ATBs are

1 anticipated to have shrouded propellers. Compared to LNG carriers, bunker vessels reduce the
2 amount of time propellers would spend rotating near the bottom of the dredge pocket or near
3 the riverbed within navigation channels.

4 TJLP committed to using side scan sonar prior to dredging at any time of the year, in addition to
5 monitoring the dredge pocket for sturgeon occupancy. TJLP explained that their construction
6 activities could not be conducted solely within the FLNRORD least risk window as they will take
7 longer than that. TJLP will aim to conduct annual dredging within the window but cannot
8 commit to it for a number of operational reasons (e.g., variability in timing of sediment build
9 up, availability of companies to conduct the dredging).

10 FLNRORD noted vessel strikes were not considered a main threat to sturgeon and that although
11 population-level effects are unlikely, they agreed with Indigenous Groups that the loss of a
12 large, sexually mature female would have a greater effect on the population than the loss of a
13 juvenile, and there is limited information with respect to the interaction of sturgeon with
14 vessels and dredge equipment.

15 In consideration of all the information provided and the concerns raised, the EAO recommends
16 KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm and Mortality. The EAO is
17 recommending that side scan sonar surveys of the dredge footprint be conducted immediately
18 prior to dredging and pile driving to determine sturgeon presence and acoustic and vibratory
19 fish deterrent measures (e.g., ramp up – gradual starting of machinery) to reduce risk or
20 entrainment and harm. Additionally, the EAO is recommending that side scan sonar be required
21 once the dredge pocket has been established to inform sturgeon occupancy mitigations. TJLP
22 would also be required to record and report of any observations of sturgeon mortality or injury
23 in the marine terminal area to Indigenous Groups. In the event of an observed sturgeon strike,
24 TJLP would report the strike to DFO and Indigenous Groups, determine whether the operation
25 of the TMJ played any role and if so, report to DFO and Indigenous Groups on whether further
26 mitigation is appropriate. The EAO also recommends a follow-up program for effectiveness of
27 fish and fish habitat mitigations as a KMM under CEAA 2012. The EAO is satisfied that it has
28 sufficient information to conclude on the risks to sturgeon from TMJ (see [Section 5.6.4](#)). The
29 EAO notes that Indigenous Nations have expressed that they do not agree that monitoring
30 would generate sufficient information to conclude on risks to sturgeon from TMJ.

31 ***EULACHON***

32 Tsawwassen First Nation, Musqueam Indian Band and Ts'ubaa-asatx Nation (formerly Lake
33 Cowichan First Nation) raised concerns that eulachon may spawn in the lower Fraser River and
34 around the TMJ site and noted the high cultural importance of eulachon to their communities.
35 Musqueam Indian Band identified eulachon as an integral part of Musqueam life, language and
36 culture. Tsawwassen First Nation has informed the EAO that eulachon are a cultural keystone

1 species supporting Tsawwassen First Nation with food, social, ceremonial, and ecological
2 values. Tsawwassen First Nation noted that Indigenous knowledge should have been used to
3 inform an understanding of baseline conditions and requested a eulachon egg mat study be
4 conducted to determine if the TMJ site provides spawning habitat. DFO and
5 Tsawwassen First Nation noted that egg incubation is not confined to a spawning site.
6 Musqueam Indian Band's noted the importance of protecting not only preferred eulachon
7 spawning habitat but also secondary habitat that could become more viable with greater
8 eulachon abundance and noted concerns with effects on juvenile and larval eulachon.
9 Tsawwassen First Nation was of the view that the full effects of TMJ on eulachon were not
10 assessed through various pathways (e.g., prop-wash and noise). Tsawwassen First Nation noted
11 that that there is uncertainty of the potential effects of TMJ on eulachon, which could be
12 addressed with further studies. Tsawwassen First Nation stated that, similar to sturgeon
13 monitoring, monitoring would generate results that could confirm that the actual situation
14 concerning risks to eulachon is vastly different from the one concluded in the EAO's
15 assessment. During the BVS review, the EAO heard from Indigenous Groups that they are
16 concerned that additional bunker vessel traffic would affect eulachon recruitment.

17 In response to the concerns raised, TJLP completed additional eulachon spawning
18 habitat characterization and spawning assessment studies to address uncertainty in the
19 potential for eulachon spawning habitat within the proposed dredge area. TJLP provided
20 a memo⁶⁷ summarizing the available literature and presenting data from additional
21 habitat characterization work conducted in the spring 2020, and a report⁶⁸ summarizing
22 the results of an in-river eulachon spawning assessment conducted during the 2021
23 spawning season (egg mat study). The assessment was conducted in collaboration with
24 Tsawwassen First Nation and Musqueam Indian Band to assess for the presence of
25 eulachon spawning in the dredge area and documented a total of 16 eggs during the 45-
26 day monitoring period. TJLP explained that given eulachon are broadcast spawners, the
27 low number of eggs collected during the 2021 spawning assessment suggested that
28 eulachon are not likely spawning in the proposed dredge area. Also, the eggs captured
29 were not found adhered to the mat, suggesting that the eggs likely drifted into the
30 dredge area, originating from spawning events that occurred outside of the assessment
31 area. Based on the physical and biological information collected, TJLP concluded that

⁶⁷ TJLP Eulachon Spawning Habitat Characterization, dated June 11, 2020
(https://www.projects.eao.gov.bc.ca/api/public/document/60a556a1148b4a0023306fd2/download/20200611_Eulachon_Spawning_Habitat_Characterization.pdf).

⁶⁸ TJLP's 2021 Eulachon Spawning Assessment Report, dated June 23, 2021 ([20210623_2021_Eulachon_Spawning_Assessment_Report.pdf](#)).

1 habitat within the dredge area is low suitability spawning habitat due to the
2 combination of the tidal salt wedge, lack of suitable spawning substrate, elevated flow
3 velocities that can occur during the spawning period, and lack of direct evidence of
4 spawning. Further, TJLP concluded that current usage of the dredge area by adult
5 eulachon is temporary and largely limited to the period of migration movements to
6 upstream spawning locations. TJLP considered current TMJ site usage by eulachon to be
7 temporary during the larval stage. After eggs have hatched, TJLP acknowledge that
8 planktonic larvae may spend a portion of their time travelling through the TMJ area on
9 their way downstream to the ocean with river currents.

10 Tsawwassen First Nation's disagreed with TJLP's conclusions that the site is unlikely to support
11 eulachon spawning due to unsuitable bottom substrate, water velocities and salinity given the
12 lack of empirical data and available information. Tsawwassen First Nation expressed their
13 methodological concerns with the habitat characterization work from Spring 2020 and believe
14 that uncertainty still remains and that additional field work (i.e., a total of four years of baseline
15 data on eulachon spawning) is necessary to know if the site could support eulachon spawning
16 and/ or early rearing. Tsawwassen First Nation has also identified a need to understand the
17 importance of the area for migrating adult eulachon and the potential implications of dredging
18 impacts on them.

19 DFO commented that it does not appear that habitat loss is a limiting factor causing widespread
20 population declines for eulachon at this time⁶⁹. They also noted that there is no evidence that
21 available spawning habitat within the Fraser River has been reduced to the extent that it would
22 limit population increases from the present low levels, although noted that as eulachon
23 populations recovered there may be instances where habitat loss could inhibit or slow further
24 recovery.

25 The EAO understands that TJLP is collaborating with Tsawwassen First Nation on a eulachon
26 spawning assessment in 2022-23 which would aim to identify more suitable spawning habitat in
27 the lower Fraser River. The scope of the study area is expected to be upstream of the Project
28 area desk and field methodology.

29 The EAO has considered the existing uncertainty and proposed mitigations described in the
30 above sections, most of which would also benefit eulachon, in its conclusions below. The EAO is
31 satisfied that it has sufficient information to conclude on the potential effects to eulachon from
32 TMJ. The EAO is aware that TJLP has proposed to contribute up to \$2 million to the First Nations

⁶⁹ Fisheries and Oceans Canada Recovery Potential Assessment of Eulachon (*Thaleichthys pacificus*) in Canada, dated 2012
(<https://waves-vagues.dfo-mpo.gc.ca/Library/347894.pdf>).

1 Fisheries Legacy Fund⁷⁰, which is an Indigenous-led program that support recovery programs
2 for chinook salmon, eulachon and sturgeon in the Fraser River and Salish Sea. The EAO
3 understands the proposal is currently under discussion between TJLP and Indigenous Groups.

4 **SALMON**

5 Tsleil-Waututh Nation, Malahat First Nation, Musqueam Indian Band and
6 Tsawwassen First Nation raised concerns about the effects of TMJ on salmon, including the
7 potential for TMJ to adversely affect habitat for juvenile and migrating salmon via increased
8 vessel traffic in the TMJ site area and TSS. DFO noted that the TMJ area is in an estuary
9 environment used by salmon for rearing and to adapt to saltwater and that TMJ might change
10 the function of the habitat to some degree. Musqueam Indian Band noted that they are actively
11 working to protect and restore salmon habitat in an effort to begin to restore salmon
12 populations to their traditional levels from the historic lows of recent years. In this context,
13 Musqueam Indian Band is concerned about the effects TMJ would have on both current salmon
14 abundance, but also efforts to increase populations.

15 TJLP noted that the primary risks to salmonids are understood to be factors such as
16 over-fishing, loss of spawning habitat and climatic factors, none of which would be
17 exacerbated by the TMJ. TJLP predicted that the incremental changes to habitat quality
18 and function at the TMJ site resulting from two or three additional vessels per week
19 associated with TMJ would be undetectable. TJLP noted that Fraser River out-migrating
20 salmon fry tend to remain close to the shoreline and typically inhabit the shallow waters
21 of the Fraser River's tidal marshes. To offset habitat loss, TJLP proposed that the
22 shoreline within the LAA would be restored and enhanced from its currently altered
23 state and would be designed to address the existing level of vessel activity, and as such,
24 is not expected to be adversely affected by incremental vessel activity associated with
25 TMJ. TJLP also noted that TSS levels predicted from TMJ are an order of magnitude
26 lower than those reported to be lethal to fish and also lower than those resulting during
27 naturally occurring high-flow conditions.

28 The EAO notes that Tsawwassen First Nation and the Indigenous Groups noted above have
29 ongoing concerns about salmon conservation in the lower Fraser River and Salish Sea. The EAO
30 notes the importance of salmon and the conservation status, however, the EAO is of the view
31 that, considering the extent of potential effects and with the implementation of the proposed
32 mitigation measures, potential effects on salmon from TMJ can be adequately addressed.

⁷⁰ TJLP's proposal for Unconventional Offsetting Accommodation for Residual Project and Cumulative Effects, dated July 5, 2021 (https://www.projects.eao.gov.bc.ca/api/document/61099898cd98620022b0832b/fetch/20210707_TilburyJettyLimitedPartnership_UnconventionalOffsetProposal.pdf).

1 Please see the various proposed KMMs under CEAA 2012 described in [Section 5.6.3](#), many of
2 which would also benefit salmon. Potential effects on salmon are considered as part of the
3 analysis of residual effects on habitat and noise below.

4 **EFFECTS OF SHADING**

5 During the review of TJLP's BVSA Report, Tsawwassen First Nation identified there was a lack of
6 evidence to conclude no changes to fish habitat from shading. Tsawwassen First Nation pointed
7 to the increased bunker vessel traffic with the BVS, and that the increased amount of time that
8 the jetty area would be shaded could affect aquatic vegetation and, as a result, fish habitat.

9 TJLP assessed the potential for TMJ-related shading effects on fish and fish habitat for
10 the Application scenario and concluded that there were no predicted changes in TMJ
11 shading due to the increase in bunker vessels under the BVS. This determination is
12 predominantly due to the lack of vegetation within dredge pocket.

13 The EAO agrees with TJLP, that there are no predicted changes in TMJ shading due to increase
14 in bunker vessels, primarily because there is a lack of vegetation within dredge pocket, and the
15 effectiveness of the proposed Project design measures, such as using grating in the trestle
16 structure to allow for light penetration.

17 **5.6.4 THE EAO'S ANALYSIS AND CONCLUSIONS ON EFFECTS TO FISH AND** 18 **FISH HABITAT**

19 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
20 on:

- 21 • The Fish and Fish Habitat VC;
- 22 • CEAA 2012 5(1)(a)(i): fish and fish habitat as defined in subsection 2(1) of the
23 *Fisheries Act*; and
- 24 • Fish species subject to SARA 79(2).

25 The EAO evaluated the potential effects to the above by considering construction, operations
26 and decommissioning activities that could affect fish habitat quality and quantity, fish
27 distribution, fish abundance, and which could cause harm to fish.

28 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

29 Based on mitigations proposed in the Application and issues raised during Application review,
30 the EAO proposes the following provincial conditions and federal KMMs under CEAA 2012
31 (Appendix 1):

- 32 • Condition 10: Construction Environmental Management Plan (provincial condition);

- 1 • Fish Mitigations to Reduce Harm and Mortality (KMM);
- 2 • Fish Habitat Offset Plan (KMM); and
- 3 • Provincial conditions and KMMs outlined in the River Processes ([Section 5.3](#)) and Water
- 4 Quality ([Section 5.5](#)) sections of this Report.

5 **Residual Effects:** After considering the proposed mitigation measures, the EAO predicts that
 6 TMJ would result in the following residual adverse effects on the Fish and Fish Habitat VC from
 7 the Application scenario and BVS:

- 8 • Habitat loss and alteration from the marine facility (i.e., piles), dredging,
 9 vibrodensification and scour protection (note the latter would be within the dredge
 10 pocket); and
- 11 • Potential harm to fish, including change in fish behaviour due to underwater noise
 12 during in-water works and injury or mortality due to machinery and vessels.

13 The EAO is not predicting any residual effects from marine shipping in the MSA on marine fish.

14 The EAO's characterization of the expected residual effects of TMJ on Fish and Fish Habitat VC is
 15 summarized below, as well as the EAO's level of confidence in the effects determination
 16 (including their likelihood and significance).

17 **Table 15: Summary of Residual Effects: Habitat Loss and Alteration**

Criteria	Assessment Rating	Rationale
Context	Low to moderate resilience	The habitat in the TMJ area has been previously disturbed from past industrial activity, which has decreased its resiliency. The habitat at the site is not known to contain critical habitat features such as spawning habitat for anadromous or resident fish species. For salmon and eulachon, the site is primarily regarded as a migration corridor, but may also serve as a nearshore rearing habitat for salmon. The EAO acknowledges that there is some uncertainty around use of the TMJ site by eulachon; therefore, the EAO has conservatively assumed the TMJ site is used by eulachon and could potentially support spawning for the purpose of the assessment. The benthic habitat has low productivity and is moderately resistant to change as benthic invertebrates are expected to re-colonize the site relatively quickly following dredging (less than four months).
Magnitude	Low Eulachon: Low	The habitat loss from the installation of piles (0.017 ha), scour protection, vibrodensification and dredging (~22.1 ha) and shading (~0.11 ha during construction and 0.66 ha during operations) would be low magnitude in terms of the effect to fish and fish habitat in general because the bottom substrate, salinity and water velocity are all predicted to be unchanged or within the range of baseline variation as a result of TMJ. Maintenance dredging would result in a depth change and may result in habitat alteration or degradation over time. The EAO anticipates that a <i>Fisheries Act</i> authorization would be required for TMJ; however, the scope of offset

Criteria	Assessment Rating	Rationale
		has not yet been determined. TJLP has proposed a conceptual offset to mitigate direct fish habitat loss from the jetty. The EAO has concluded low magnitude for eulachon as the habitat that may be altered by TMJ is considered to be low quality, non-essential habitat.
Extent	Site Specific	Habitat loss and alteration from installation of the marine facility and dredging would be limited to the TMJ site.
Duration	Long term	The loss of habitat due to the installation of the marine facility would be long term. TJLP's current offset proposal is designed to compensate for the direct habitat loss (piles) and TJLP predicts it would be functional in three years. The alteration effect to habitat due to repeated dredging may result in effects that extend to the longer term (i.e., life of project) as the dredge pocket may not have sufficient time between dredge events to recover.
Frequency	Single and Frequent	Habitat loss from installation of the marine facility, scour protection and vibrodensification: Single Habitat loss and alteration from dredging: Frequent (annually)
Reversibility	Reversible	The effects on habitat loss and alteration would be reversible after decommissioning.
Likelihood	There is a high likelihood that fish habitat would be affected.	
Significance Determination	Given the low to low-to-moderate magnitude of predicted effects, the limited geographic extent and the recommended KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset Plan, and a follow up program for effectiveness of fish and fish habitat mitigations, the EAO concludes that the residual effects of the expected effects to fish habitat due to TMJ would not be significant.	
Confidence	The significance determination and likelihood rating for residual effects are determined with a moderate level of confidence, based on the proposed mitigation and offsetting measures, particularly existing federal regulatory requirements, well-developed industry best management practices and compliance with the proposed key mitigations. Uncertainty exists in the degree to which dredging would alter habitat over the long-term, the importance of the area as sturgeon and eulachon habitat, and predictions about the rate of re-colonization of benthic communities. Recommended KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset Plan as well as a follow up program for effectiveness of fish and fish habitat mitigations, would be expected to reduce this uncertainty and would include an adaptive management component to mitigate effects.	

1 **Note: Magnitude definitions – Negligible: Project would likely have no measurable effect on fish populations or the function of*
 2 *fish habitat; Low: Residual effect would result in small measurable changes in abundance of fish, or result in the loss of low*
 3 *quality, non-essential fish habitat; Moderate: Residual effect would likely result in fish mortality with measurable changes in*
 4 *abundance of fish populations, or permanent loss of moderate or high-quality fish habitat. High: Residual effect would likely*
 5 *result in large effects on fish abundance occurring at a population level, or measurable effects, including mortality, on*
 6 *provincially listed or SARA-listed fish species, or loss of limiting or critical habitat for provincially-listed or SARA-listed fish*
 7 *species. Other criteria and assessment ratings are defined in [Appendix 5: Residual Effects Characterization Definitions](#).*

1 **Table 16: Summary of Residual Effects: Potential Harm and Mortality to Fish**

Criteria	Assessment Rating	Rationale
Context	Underwater Noise: Low to High Resilience Vessel Strikes on Sturgeon: Moderate Resilience	Underwater Noise: There are a large number of different fish populations that pass through the Fraser River LAA and RAA to complete their life cycle and some populations are less resilient than others to underwater noise. Vessel Strikes on Sturgeon: White sturgeon are provincially red-listed and assessed as threatened by COSEWIC. Green sturgeon are provincially red-listed and listed as special concern under SARA. Recent surveys suggest the overall abundance of sturgeon is declining. Vessel strikes are considered to be a threat to sturgeon; however, they are not a primary threat or understood to be inhibiting population recovery.
Magnitude	Underwater Noise: Low Vessel Strikes on Sturgeon: Low	Underwater Noise: The magnitude of the effect is expected to be low. The mitigations are expected to limit noise to levels below the mortality/ potential mortality injury thresholds for pile driving; however, pile driving would exceed the behavioural effect threshold for pile driving. There are also still a variety of in-water works (during construction and dredging activities) that would exceed the disturbance thresholds for fish. This could cause fish to generally avoid the TMJ site area during those activities. Vessel Strikes on Sturgeon: Potential injury or mortality from TMJ on sturgeon could possibly cause a very small change on sturgeon abundance. High population-level effects from TMJ are unlikely in the Application scenario or BVS; however, the EAO acknowledges that the loss of a large, mature female could have a greater effect than the loss of a juvenile.
Extent	Underwater Noise: Site Specific Vessel Strikes on Sturgeon: Regional	Underwater Noise: The potential effects of behavioural change to fish due to underwater noise would be limited to the TMJ site. Vessel Strikes on Sturgeon: The effect would occur at the regional scale, within the RAA (downstream to Sand Heads); however, they are more likely in the marine terminal area as sturgeon may be attracted to the dredge pocket.
Duration	Underwater Noise: Short-term Vessel Strikes on Sturgeon: Short-term to Permanent	Underwater Noise: For most fish populations the duration of the effect is expected to be short-term. Vessel Strikes on Sturgeon: The potential for vessel strikes would exist for the life of TMJ. Depending on the nature and severity of the injury, the effect would range from short- to medium-term for injury. It would be permanent for an individual death, but the population would be expected to recover.
Frequency	Underwater Noise: Infrequent Vessel Strikes on Sturgeon:	Underwater Noise: Underwater noise is expected to be generated regularly during construction during pile-driving and other in-water activities. It would be infrequent (nine working days a year) during operations due to annual dredging.

Criteria	Assessment Rating	Rationale
	Infrequent to Continuous	Vessel Strikes on Sturgeon: There is a low probability for vessel strikes due to TMJ as the increase in vessel traffic over current conditions is small (~4% under the BVS), which is an average of one vessel call per day. There would be a very limited time period during which deep draft vessels (LNG carriers) would have propellers turning near the bottom of the dredge pocket. The majority of TMJ-related vessels would be bunker vessels, which are smaller than LNG carriers and could interact with sturgeon in the mid-water column and at the surface. There remains uncertainty in the frequency of vessel strikes, given the limited data on vessel strikes in the lower Fraser River and the linkage between vessel strikes and vessel class size.
Reversibility	Underwater Noise: Reversible Vessel Strikes on Sturgeon: Reversible	Underwater Noise: With mitigations in place, the exposure to recoverable behavioral changes (due to sub-injury underwater noise exposure) is expected to be reversible. Vessel Strikes on Sturgeon: Depending on the nature of the injury, the effect could be reversible for minor injuries. An interaction with TMJ-related machinery or vessels may lead to irreversible consequences at the individual sturgeon level; however, it is expected that the population could recover from the scale of potential effects from TMJ.
Likelihood		Underwater Noise: The likelihood of this residual effect is moderate. The proposed mitigations have been proven in a variety of aquatic environments; the results can be found in published peer reviewed literature and are commonly used in noise sensitive environments. Vessel Strikes on Sturgeon: It is likely that, during operations of a minimum of 30 years, vessel strikes would occur at some point. The increase in vessel traffic over current conditions due to TMJ-related vessels is small (~4% under the BVSA). Although population level residual effects are unlikely from TMJ, there remains uncertainty in the likelihood of population level effects given the limited data on vessel strikes in the lower Fraser River and the linkage between vessel strikes and vessel class size and fish size.
Significance Determination		Underwater Noise: In consideration of the above assessment, the recommended federal KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm and Mortality, which would include mitigations for underwater noise and timing of activities, and a follow up program for effectiveness of fish and fish habitat mitigations, the EAO concludes that underwater noise would not have a significant adverse effect on Fish and Fish Habitat. Vessel Strikes on Sturgeon: Considering the above analysis and the recommended KMMs under CEAA 2012 in the marine terminal area, the EAO is satisfied that TMJ would not have significant adverse residual effects on sturgeon through vessel strikes.
Confidence		Underwater Noise: The EAO's confidence in the effects assessment is moderate. There is some uncertainty with regards to when different populations of fish could pass through the Fraser River LAA and how they might behave in response to the sounds. There is high confidence in the underwater noise modelling as it has been proven through use and the thresholds used for effects on fish are the results of long-term peer-reviewed studies. The effectiveness of the mitigation measures would also be monitored during construction activities. The further reduction of this residual effect could occur through the

Criteria	Assessment Rating	Rationale
		<p>implementation of additional mitigation measures that would be defined during detailed design and construction planning.</p> <p>Vessel Strikes on Sturgeon: The EAO's confidence in the effects assessment is moderate. There is uncertainty in the effect, frequency and likelihood of vessel strikes on sturgeon and whether sturgeon would be attracted to the deeper water created at TMJ by dredging. However, the EAO's confidence is high in the increase in vessel traffic from TMJ and the potential for interactions with sturgeon. There remains uncertainty in the likelihood of population level effects given the limited data on vessel strikes in the lower Fraser River and the linkage between vessel strikes and vessel class size and fish size.</p>

1 *Note: Criteria and assessment ratings are defined in Appendix 5: Residual Effects Characterization Definitions.*

2 The EAO assesses that the residual effects on fish and fish habitat from habitat loss and
3 alteration and underwater noise would be of low to low-moderate magnitude, limited to the
4 TMJ site, short- to long- term, reversible/ irreversible and moderate to high likelihood. The EAO
5 assesses the risk on sturgeon injury and mortality from vessel strikes to be low magnitude,
6 regional in extent, reversible and low likelihood. During the course of the EA, the EAO learned
7 that while harm and mortality due to vessel strikes to sturgeon has not been recognized as a
8 key threat to the species, information was shared during the EA that sturgeon may be
9 vulnerable to vessel strikes due to their response behaviour and preference for dredge pockets.
10 Compared to salmon, there is limited baseline information on population trends for white
11 sturgeon in the Fraser River, so the EAO has applied the precautionary approach when
12 determining the potential magnitude of effect from TMJ-related activities on sturgeon. The EAO
13 has also considered potential effects from water quality (increases to TSS) but predicting that
14 these would not adversely affect fish and fish habitat. With the proposed monitoring and
15 mitigation measures, predicted increases to TSS would be within the range of existing variation.
16 The EAO proposes Condition 12: Water Quality Management Plan and recommended KMMs
17 under CEAA 2012 for water quality to manage potential effects to water quality during
18 dredging, including a water quality monitoring program for turbidity, in accordance with the BC
19 Ambient Water Quality Guidelines, with decision criteria and management actions.

20 The EAO considered the magnitude, extent and reversible nature of potential effects from
21 habitat loss and alteration and noise, as well as the recommended KMMs under CEAA 2012 for
22 a Fish Habitat Offset Plan and Fish Mitigation to Reduce Harm and Mortality. The EAO
23 acknowledges the conservation status of the fish species and that there are no legislated or
24 regulated thresholds for fish and fish habitat to define significance. Residual effects on Fish and
25 Fish Habitat were determined to be significant if an ecological threshold is exceeded such that a
26 fish population within the RAA is expected to no longer be self-sustaining or ecologically
27 effective. Based on the consideration of all of the above factors, and DFO's rigorous review
28 process that would be undertaken as part of the *Fisheries Act* authorization process, the EAO
29 concludes that effects to Fish and Fish Habitat from TMJ would not be significant.

1 The EAO heard from several Indigenous Groups, including Tsleil-Waututh Nation, Tsawwassen
2 First Nation, and Musqueam Indian Band, that they do not agree with the EAO's conclusions
3 and significance determination for residual effects. The EAO understands the disagreement to
4 be primarily related to differences in definitions for significance determination, views on the
5 use of pre-contact baseline conditions for the assessment, the adequacy of baseline data and
6 information to inform a structured assessment, and views on fish habitat offsetting success.
7 Please refer to the Section 5.6.5 below for discussion about cumulative effects, including the
8 perspective of Indigenous Groups on the EAO's cumulative effects conclusions, and Part C for
9 more details on Indigenous Groups' views on residual and cumulative effects to fish and fish
10 habitat.

11 **5.6.5 CUMULATIVE EFFECTS ASSESSMENT**

12 TJLP submitted a supplemental memo during the EA that included a cumulative effects
13 assessment of the combined residual effects that TMJ, existing projects and reasonably
14 foreseeable future projects could have on Fish and Fish Habitat through habitat loss,
15 disturbance to fish from underwater noise, and direct mortality. TJLP predicted an increase in
16 vessel traffic as a result of TMJ (over 2018 forecasted conditions) of ~1.5% (from approximately
17 18,278 to 18,552 one-way transits) for the Application scenario and ~4% (from ~18,278 to
18 ~19,008) for the BVS. The increase in large vessel traffic (LNG carriers), is predicted to be ~4.1%
19 for the Application scenario and ~3.5% for the BVS. LNG carriers would be similar in size to
20 vessels that currently use the Fraser River (e.g., car carriers of similar length, width and draft
21 call at Annacis Island along with container ships and bulk carriers that also call at the Port docks
22 upstream of TMJ). The supplemental memo determined that the VFPA annual navigation
23 dredging program, which is adjacent to TMJ, could interact cumulatively with TMJ to affect fish
24 and fish habitat. However, the supplemental memo concluded that there would be no residual
25 cumulative effects as TJLP stated there was no evidence of sturgeon mortality from the VFPA
26 annual dredge program based on anecdotal information, and that the habitat in the area was
27 not used for spawning by sturgeon.

28 The EAO heard from many Indigenous Groups on the Fraser River that participated in the EA,
29 including Musqueam Indian Band, Tsleil-Waututh Nation, Tsawwassen First Nation, Maa-nulth
30 Treaty Society, Quw'utsun Nation⁷¹, Kwantlen and the People of the Rivers Office, on behalf of
31 the S'ólh Témexw Stewardship Alliance, that Indigenous Groups disagreed with TJLP's
32 assessment. Those Indigenous Groups concluded that TMJ was likely to contribute to existing

⁷¹ Quw'utsun Nation member Indigenous Groups include Cowichan Tribes, Halalt First Nation, Lyackson First Nation, Penelakut Tribe, and Stz'uminus First Nation. See Quw'utsun Nation's Part C Section 14.1.

1 significant cumulative effects on fish and fish habitat in the Fraser River. Based on concerns
2 raised about TJLP's cumulative effects assessment, the EAO has conducted its own cumulative
3 effects assessment based on its own conclusions of predicted residual effects to habitat loss
4 and alteration, behavioral disturbances from underwater noise and vessel strikes to sturgeon.
5 Potential effects from underwater noise are predicted to be limited to the TMJ site.

6 The EAO acknowledges that the lower Fraser River has been, and continues to be, affected by
7 industrial developments and urbanization. Most of the shorelines of the lower Fraser River have
8 been diked; off-channels filled-in, diverted, or otherwise altered; and much of the riverbed is
9 subject to regular dredging. The EAO has heard from Indigenous Groups that there is currently
10 a high level of marine vessel traffic. These factors have affected the quality and suitability of
11 fish habitat over time at the local and regional scales. Causal linkages between these impacts
12 and the reasons for the current conservation status of species like eulachon and white sturgeon
13 are known or suspected.

14 The EAO notes that the lower Fraser River White Sturgeon Designated Unit has been assessed
15 by COSEWIC as Threatened. This listing has triggered a Recovery Potential Assessment⁷² That
16 document identifies three complementary candidate recovery thresholds: (i) 20,000 adults [age
17 22-55, 160-279 cm fork length], (ii) total abundance of 60,000 [age 7-55, 60-279 cm fork
18 length], and (iii) a positive trend in juvenile abundance over a 50-year time window. These
19 thresholds are not currently in effect, but it is expected they would comprise a key part of any
20 Recovery Plan that might be developed for the species. The RAP concluded that "Although the
21 population is expected to be above the survival threshold into the foreseeable future; if juvenile
22 recruitment declines further (i.e., to half of the 2010-2019 levels), adult abundance could drop
23 below the survival threshold within 50 years."

24 The EAO considers that the effects of past projects and activities are reflected in existing
25 conditions. The EAO considered the following reasonably foreseeable future projects and
26 activities that could potentially interact cumulatively with TMJ to affect fish and fish habitat
27 (through effects to habitat in the RAA):

- 28 • VAFFC;
- 29 • Vancouver Fraser Port Authority Fraser River Annual Dredging Program;
- 30 • Seaspan Ferries Tilbury Terminal Expansion;
- 31 • FortisBC Tilbury LNG Plant Expansion Project;
- 32 • Fraser River Tunnel Project; and
- 33 • PBRP; and

⁷² https://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2021/2021_011-eng.pdf

- 1 • Delta Grinding Facility.

2 TMJ construction is not expected to overlap with any of the above noted projects. However,
3 underwater noise from TMJ operations (that is, dredging) could potentially interact
4 cumulatively with effects from other projects.

5 Construction and/ or operational noise from Seaspan, Fortis and Delta Grinding Facility
6 (depending on if, and when, these projects proceed) which could result in fish avoiding the
7 Tilbury island nearshore area. The EAO conducted an EA of the VAFFC in 2012 and concluded
8 that there would be residual effects to fish and fish habitat through the periodic removal of the
9 benthic layer from dredging. Both the Delta Grinding Facility and the VFPA dredging program
10 would also involve future dredging, and the Seaspan Ferries Tilbury Terminal Expansion may
11 include dredging, which would remove the benthic layer and potentially cause residual effects
12 to fish habitat and the fish that depend on it. The EAO considers the residual effect to fish
13 habitat loss and alteration to be long-term (see Table 16 above). The EAO does not know the
14 future dredge schedules for the reasonably foreseeable projects that include dredge
15 components. However, it is reasonable to consider that there could be a temporal overlap
16 between two or more projects in the fish RAA during the TMJ lifespan (that is, a temporal
17 overlap when the effects to fish habitat alteration would interact cumulatively). In terms of
18 habitat loss, the Delta Grinding Facility's March 2019 project description proposes the
19 installation of piles, which could potentially cause habitat loss similar to TMJ's for the life of the
20 project. The EAO has assumed that any future projects, such as those listed above, that would
21 cause harmful effects to fish habitat would need to obtain authorization under the federal
22 *Fisheries Act* and potentially offset the habitat elsewhere.

23 The EAO also considered the potential for cumulative effects from TMJ with past, present and
24 reasonably foreseeable future projects and activities on sturgeon strikes. The EAO identified
25 existing vessel traffic (such as from the Fraser Surrey docks and tug traffic for various purposes),
26 and the VAFFC (1.3 km downstream) and PBRP (9 km upstream) as having vessel activity with
27 the potential to result in a cumulative effect with TMJ on sturgeon strikes. Although details are
28 not available for the Seaspan Ferries Tilbury Terminal Expansion, Fraser River Tunnel Project,
29 and Deas Island BC Hydro Transmission Line, there may be potential cumulative interaction
30 with vessels strikes due to additional vessels; however, it is unlikely that the potential
31 cumulative interactions of sturgeon with vessel strikes would result in population level effects.

32 The EAO understands that fish species in the lower Fraser River are experiencing cumulative
33 effects; however, there are no established thresholds, neither DFO nor FLNRORD have
34 conducted regional cumulative assessments on the species evaluated in this EA and there are

1 no recovery strategies⁷³ or action plans in place for the species assessed. The EAO is
2 recommending KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm and Mortality and
3 a Fish Habitat Offset Plan. The EAO concludes that with mitigations and offsetting measures for
4 TMJ, there would be non-significant residual cumulative effects on Fish and Fish Habitat from
5 the interaction of TMJ (both Application scenario and BVS) with other reasonably foreseeable
6 projects. The EAO acknowledges there is some uncertainty in the significance conclusion
7 related to the absence of established threshold and recovery strategies or action plans in place
8 for the species assessed, and uncertainties around proposed mitigation measures for
9 foreseeable projects that are capable of contributing to future cumulative adverse effects.

10 The EAO is aware that TJLP has proposed to contribute up to \$2 million to the First Nations
11 Fisheries Legacy Fund⁷⁴, which is an Indigenous-led program that support recovery programs
12 for chinook salmon, eulachon and sturgeon in the Fraser River and Salish Sea. For more
13 information about the EAO's consideration of TJLP's contribution proposal, refer to [Section 13.1](#)
14 on Current Context and Cumulative Effects in Part C.

15 The EAO heard from Indigenous Groups that there are significant cumulative effects at baseline,
16 with or without TMJ, and that TMJ contributes to existing significant cumulative effects.
17 Indigenous Groups have informed the EAO that they are unable to catch fish species in either
18 the amount or preferred areas in the RAA to meet cultural practices needs. The Indigenous
19 Groups' perspective on the state of fish at baseline is integrated into the cumulative effects
20 conclusions Current Use of Lands for Traditional Purposes ([Section 11.4](#) of this Report)
21 assessment. For the assessment of effects to Aboriginal Interests and treaty rights, please refer
22 to the Part C assessment.

23 **5.6.6 CONCLUSIONS**

24 Considering the above analysis and the EAO's recommended KMMs under CEAA 2012
25 (Appendix 1) for Fish Mitigations to Reduce Harm and Mortality, and a Fish Habitat Offset Plan,
26 and follow up program for effectiveness of fish and fish habitat mitigations, and provincial
27 conditions and KMMs outlined in the River Processes ([Section 5.3](#)) and Water Quality

⁷³ Under SARA, critical habitat would be defined in the recovery plan. Critical habitat is defined as "the habitat that is necessary for the survival or recovery of a listed wildlife species that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species" and is legally protected from destruction.

⁷⁴TJLP's proposal for Unconventional Offsetting Accommodation for Residual Project and Cumulative Effects, dated July 5, 2021 (https://www.projects.eao.gov.bc.ca/api/document/61099898cd98620022b0832b/fetch/20210707_TilburyJettyLimitedPartnership_UnconventionalOffsetProposal.pdf).

- 1 ([Section 5.5](#)) sections of this Report, the EAO is satisfied that TMJ would not have significant
2 adverse residual effects or significant cumulative effects on Fish and Fish Habitat.

3 **5.7 MARINE MAMMALS**

4 **5.7.1 BACKGROUND**

5 Marine Mammals was selected as a VC because of the potential for adverse effects from the
6 TMJ due to dredging, pile driving and vessel operations. Marine mammals are top predators in
7 the food chain and are key indicators for marine ecosystem health. In addition to having
8 importance to Indigenous Groups and the public, marine mammals are subject to federal
9 legislation such as CEAA 2012, the *Fisheries Act* and SARA.

10 The subcomponents selected for the Marine Mammals VC assessment included:

- 11 • Harbour seal – Pacific subspecies;
- 12 • California sea lion;
- 13 • Steller sea lion⁷⁵;
- 14 • Harbour porpoise – Pacific Ocean population;
- 15 • Killer whale - Northeast Pacific southern resident population (SRKW)⁷⁶;
- 16 • Killer whale - Northeast Pacific transient population;
- 17 • Humpback whale - North Pacific population⁷⁷; and
- 18 • Grey whale - Eastern North Pacific population.

19 The indicators selected for the Marine Mammals VC assessment were:

- 20 • Habitat quality and quantity: area of habitat permanently removed/ altered; and
- 21 • Abundance and distribution: change in species presence and relative abundance.

22 Tilbury Marine Jetty Limited Partnership's effects assessment of the Marine Mammals VC was
23 influenced by the Noise ([Section 6.2](#)), the River Processes ([Section 5.3](#)), Water Quality
24 ([Section 5.5](#)) and Fish and Fish Habitat ([Section 5.6](#)) assessments in this Report. The results of
25 the Marine Mammals assessment are incorporated into the Current Use chapter ([Section 11.4](#))
26 in this Report. Potential effects on marine mammals from accidents and malfunctions, including

⁷⁵ Marine mammal species also selected as a subcomponent for the MSA.

⁷⁶ Ibid.

⁷⁷ Ibid.

1 spills of toxic or hazardous materials, during construction, operations, and decommissioning are
2 assessed in the Accidents and Malfunctions chapter ([Section 9](#)) in this Report.

3 For the EAO's assessment of potential effects of dredge disposal to marine mammals, refer to
4 the Alternative Means of Undertaking the Project ([Section 2.2.5](#)) of this Report.

5 **MARINE SHIPPING ASSESSMENT**

6 The assessment of potential effects on marine mammals in the MSA used subcomponent
7 species that were selected as representative of other species groups, based on their
8 conservation status and their importance to regulatory agencies, Indigenous Groups and the
9 public. SRKW was chosen to represent toothed whales, the humpback whale to represent
10 baleen whales, and the Steller sea lion to represent pinnipeds.

11 Indicators selected for the Marine Mammals VC in the MSA were:

- 12 • Population abundance (health) and distribution: avoidance of habitat areas or acoustic
13 disturbance/ injury as well as potential for vessel strikes.

14 **5.7.1.1 REGULATORY CONTEXT**

15 Marine mammals and their habitats are protected under federal legislation, including the
16 federal *Fisheries Act* (amended August 28, 2019) through the Marine Mammal Regulations,
17 and SARA. The *Fisheries Act*, administered by DFO, is the main statute related to the
18 conservation and protection of marine fish and marine mammals. The Marine Mammal
19 Regulations under the *Fisheries Act* prohibits the disturbance of marine mammals by any
20 person except when fishing for marine mammals under the authority of the Regulations or
21 when carrying on a work, undertaking or activity that is authorized, otherwise permitted or
22 required under the *Fisheries Act*. The Marine Mammal Regulations for vessel approach
23 distances do not apply to vessels in transit (that is, any vessel travelling directly from one
24 point in the water to another, such as TMJ LNG carriers).

25 CEAA 2012 requires an assessment of environmental effects on fish and fish habitat as defined
26 in subsection 2(1) of the *Fisheries Act*. CEAA 2012 Section 5 (a) (i and ii) are relevant for
27 assessing effects on marine mammals as they are defined as fish in the *Fisheries Act*.

28 SARA prohibits killing, harming, capturing or harassing species listed on Schedule 1 as
29 endangered, threatened or extirpated and protects critical habitat⁷⁸ that supports these
30 species. SARA requires that EAs identify adverse effects of projects on the SARA-listed species

⁷⁸ Under SARA, critical habitat is defined as “the habitat that is necessary for the survival or recovery of a listed wildlife species that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species” and is legally protected from destruction.

1 and their critical habitat and requires that measures be taken to avoid or lessen those effects
2 and to monitor them.

3 There are a number of SARA-listed marine mammal species in the TMJ RAA. The following
4 recovery planning documents under SARA are relevant to the conservation of marine mammals
5 in the area:

- 6 • SARA Management Plans for Steller sea lion (DFO, 2011a), harbour porpoise (DFO,
7 2009), and grey whale (DFO, 2011b);
- 8 • SARA Recovery Strategies for SRKW (DFO, 2011c; DFO, 2018), west coast transient
9 (Bigg's) killer whale (DFO, 2007) and humpback whale (DFO, 2013);
- 10 • Action Plan for the Northern and SRKW (*Orcinus orca*) in Canada (DFO, 2017); and
- 11 • SRKW Imminent Threat Assessment (Government of Canada, 2018).

12 DFO is responsible for administering SARA for aquatic species at risk. Since 2009, critical habitat
13 for the SRKW has been protected against destruction under a SARA 58(4) Protection Order. The
14 original Application RAA and MSAA (as described in [Section 5.7.1.2](#)) overlap a portion of the
15 critical habitat for SRKW. TMJ-related shipping is the only proposed TMJ-related activity in the
16 critical habitat for SRKW.

17 To protect SRKW, the federal government has taken recent regulatory actions to address
18 imminent threats, improve prey availability and reduce disturbances in critical habitat. To
19 reduce acoustic and physical vessel-related disturbances, three interim sanctuary zones in
20 critical SRKW habitat at Swiftsure Bank and North Pender and Saturna Islands were enacted and
21 extended under the *Canada Shipping Act, 2001* in 2019, 2020, and 2021, respectively (Figures 5
22 and 6). To address vessel-related disturbance to whales, on June 1, 2020, the mandatory
23 approach distances for killer whales in all southern B.C. coastal waters between Campbell River
24 and just north of Ucluelet was increased to 200 and 400 m for pre-authorized whale-watching
25 vessels and all other vessels, respectively. To further reduce acoustic and physical vessel-
26 related disturbances in B.C. coastal waterways, the Marine Mammal Regulations (under the
27 *Fisheries Act*) were amended to increase the mandatory approach distances to 200 and 100 m
28 for killer whales and most other whales, dolphins and porpoises in all other coastal waters of
29 B.C., respectively. To improve prey availability and further reduce disturbances to SRKW in their
30 critical habitat, interim seasonal closures for recreational and commercial salmon fishing in key
31 foraging areas for SRKW in the Strait of Juan de Fuca and Gulf Islands were established in 2019,
32 2020, and 2021. In 2021, DFO piloted a fishing closure protocol for the southern Gulf Islands
33 recreational and commercial salmon fisheries, where fishery closures are triggered by the first
34 confirmed presence of SRKW in the area.

1 5.7.1.2 BOUNDARIES

2 The LAA for the Marine Mammals VC included marine waters within 1.5 km of the TMJ site (the
3 onshore and offshore components of TMJ) and a 50 m buffer on either side of the shipping
4 route extending out to Sand Heads. The RAA included the South Arm of the Fraser River
5 downstream of the TMJ site to Sand Heads and included a 1.5 km buffer upstream of the site
6 (see Figure 5).

7 *MARINE SHIPPING ASSESSMENT*

8 The spatial boundaries for the MSA considered potential effects from TMJ-related shipping. The
9 boundaries for the MSA were not an extension of the spatial boundaries described in the
10 Application, but rather a separate, additional study area.

11 The MSAA included the marine areas between Sand Heads and the 12-nautical mile limit of
12 Canada's territorial sea, within the inbound and outbound shipping channels in the Strait of
13 Georgia, Boundary Pass, Haro Strait and Juan de Fuca Strait. The MSAA boundaries were
14 selected in consideration of the extent of potential direct physical effects (for example, injury or
15 mortality from vessel strikes and underwater sound) and potential indirect effects (for example,
16 changes in marine mammal behaviour and masking effects from vessel underwater sound).

17 The MSAA also encompassed the area within which direct and indirect effects have the
18 potential to occur and within which cumulative effects were assessed. To facilitate the analysis
19 of potential TMJ-related effects and cumulative effects from marine shipping, the MSAA was
20 divided into Segments A through G. A map of the MSA spatial boundaries is shown in Figure 6.

21 5.7.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE 22 APPLICATION

23 5.7.2.1 BASELINE INFORMATION

24 Existing marine mammal conditions in the LAA, RAA and MSAA were determined through a
25 combination of a literature review of existing data sources, traditional use and traditional
26 ecological knowledge (TEK), underwater acoustic modelling and a marine mammal
27 reconnaissance survey (see the Application Sections 3.3.3 and 4.3.2.1 for all sources).

28 Marine mammal species at risk listed on Schedule 1 of SARA potentially occurring in the
29 Application LAA and/ or RAA are: killer whale [populations: Northeast Pacific SRKW, west coast
30 transient (Bigg's) killer whale, and northeast pacific offshore killer whale], harbour porpoise,
31 humpback whale, grey whale and Steller sea lion. There have been no reported sightings of
32 grey whale in the LAA. TJLP noted that the only marine mammal species with the potential to
33 occur in the LAA near the TMJ site (based on baseline surveys and historical sightings records)

1 are harbour porpoise and harbour seal. Critical habitat under SARA has been designated for
2 SRKW in the Salish Sea, which overlaps with the MSAA (see Figure 6).

3 In the MSAA, there are 25 species of cetacean (whales, dolphins, and porpoises), five species of
4 pinnipeds (seals and sea lions), and one species of sea otter known to occur in B.C. seasonally
5 or year-round depending on their life history. Several species of marine mammals are known to
6 occur in the MSAA. Six of these species are listed as at risk under Schedule 1 of SARA, including
7 SRKW (endangered), northeast pacific transient (Bigg's) killer whale (threatened), harbour
8 porpoise (special concern), north pacific humpback whale (special concern), Steller sea lion
9 (special concern), and grey whale (eastern north pacific population) (special concern).

10 **5.7.2.2 POTENTIAL PROJECT EFFECTS**

11 This section provides an overview of potential effects to marine mammals identified in the
12 Application and MSA.

13 ***DIRECT LOSS OF HABITAT***

14 TJLP predicted that direct habitat loss would occur from the construction of associated offshore
15 facilities, dredging (during construction and maintenance during operations), in-river ground
16 stabilization and pile works and installation of scour protection. Work for both the temporary
17 berth and jetty would occur during the least risk fisheries window specified by DFO.

18 TJLP concluded that while construction of infrastructure and dredging would result in a
19 loss of marine mammal habitat, it would be minor relative to the overall amount
20 available in the region and, because the site is located in freshwater approximately 21
21 km from the mouth of the Fraser (measured from Sand Heads), it would not overlap
22 with any known high use, sensitive, or critical marine mammal habitat. TJLP stated that
23 there would be no expected influence on the short- or long-term viability of marine
24 mammal populations and that negligible residual effects on habitat quantity were
25 predicted.

26 ***CHANGES IN PREY DISTRIBUTION DUE TO WATER QUALITY AND SHADING***

27 The potential effects from changes in water quality (for example, increased total suspended
28 solids [TSS] due to sediment disturbance) on marine mammal prey are discussed in Water
29 Quality ([Section 5.5](#)) and Fish and Fish Habitat ([Section 5.6](#)) sections of this Report. TJLP
30 explained that increased TSS levels would be limited to areas that are non-critical or low use
31 marine mammal habitat. In-water works (for example, dredging) that would increase TSS in the
32 Fraser River would mainly occur during the least risk fisheries window, which would reduce
33 effects marine mammals.

1 The potential effects of shading are reviewed in greater detail in [Section 5.6.2.2](#) Fish and Fish
2 Habitat. TJLP predicted that there would be negligible loss of aquatic vegetation due to shading
3 from the installation and operation of offshore facilities and that this would therefore not have
4 significant effects on marine mammal prey availability.

5 ***EFFECTS FROM POTENTIAL SPILLS***

6 Accidents and malfunctions have the potential to occur during all phases of TMJ and cause an
7 unintentional release of deleterious substances into the environment that have the potential to
8 adversely affect marine mammals and their prey. The potential effects of accidents and
9 malfunctions are assessed in the Accidents and Malfunctions ([Section 9](#)) of this Report.

10 ***DISTURBANCE AND HABITAT AVOIDANCE DUE TO UNDERWATER NOISE AND VIBRATION***

11 Marine mammals use underwater sound as a means of communication, navigation and prey
12 detection. Underwater noise was predicted to affect marine mammals during all phases of TMJ.
13 The potential effects of underwater noise on marine mammals depends on a host of factors
14 including the type of marine mammal, their hearing abilities, ambient noise levels and
15 environmental sound transmission properties (for example, water column characteristics).
16 Depending on the received levels of sound, the associated effect to the marine mammal can
17 range from subtle behavioural changes (for example, movement away from the sound source,
18 change in dive patterns) to strong disturbance effects (for example, change in foraging patterns,
19 habitat avoidance, interference with communication).

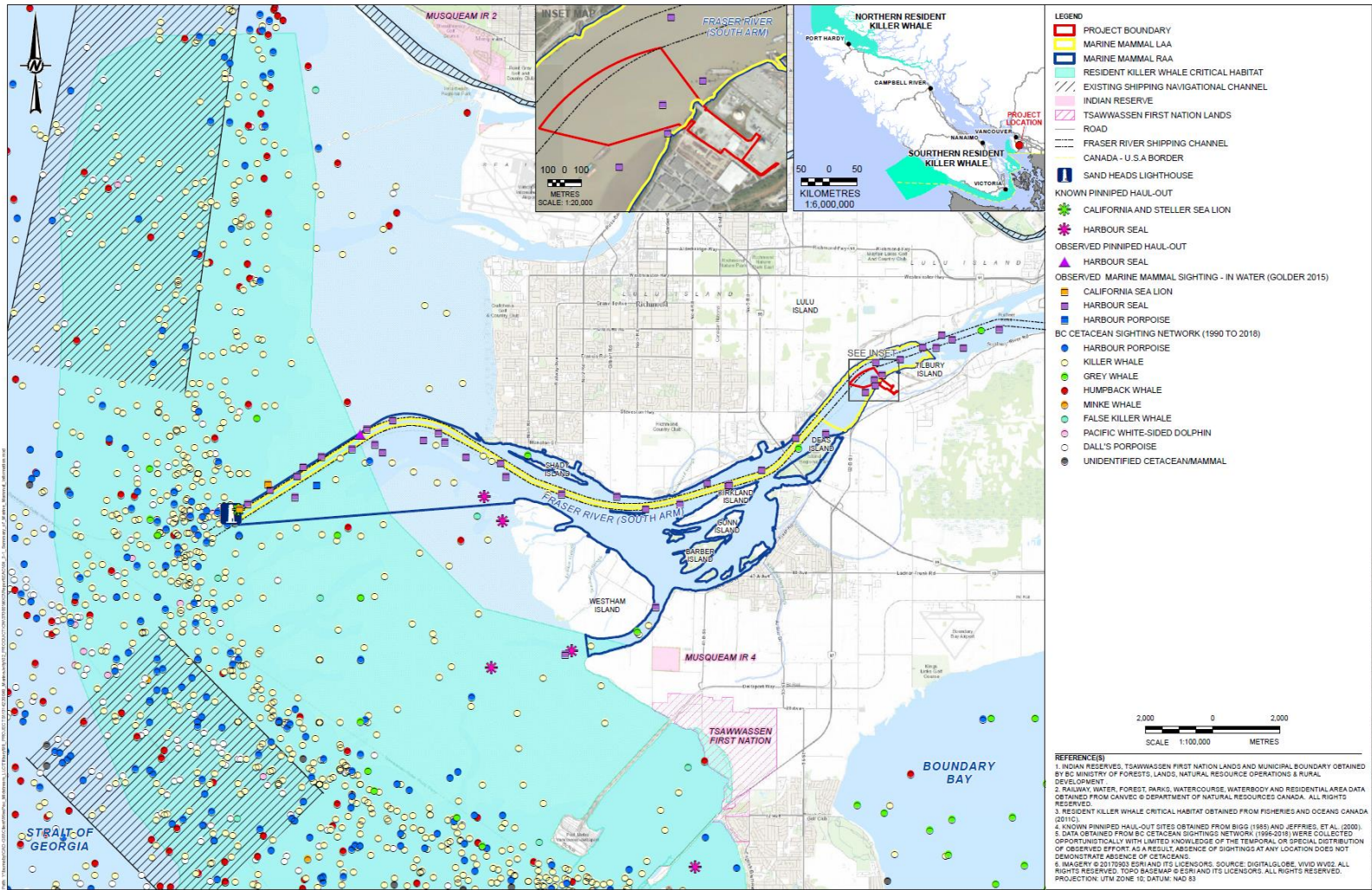
20 Underwater noise at high enough levels and duration can cause physical injury in the form of a
21 temporary or permanent loss of hearing sensitivity. These are respectively referred to as
22 temporary threshold shifts and permanent threshold shifts. TJLP explained that there are
23 currently no legislated underwater noise criteria in Canada for assessing noise effects on
24 marine mammals. For behaviour effects, TJLP referenced the US National Marine Fisheries
25 Service behaviour thresholds for all marine species as 120 dB re 1 μ Pa (SPLrms) for non-
26 impulsive (continuous; e.g., vibratory pile-driving, vessel noise) noise, and 160 dB re 1 μ Pa
27 (SPLrms) for impulsive (e.g., impact pile driving) noise levels. It should be noted that these
28 disturbance thresholds apply to all marine mammals and do not consider species-specific
29 hearing abilities, and do not account for the overall duration of the noise. TJLP noted that these
30 thresholds are considered conservative.

31

32

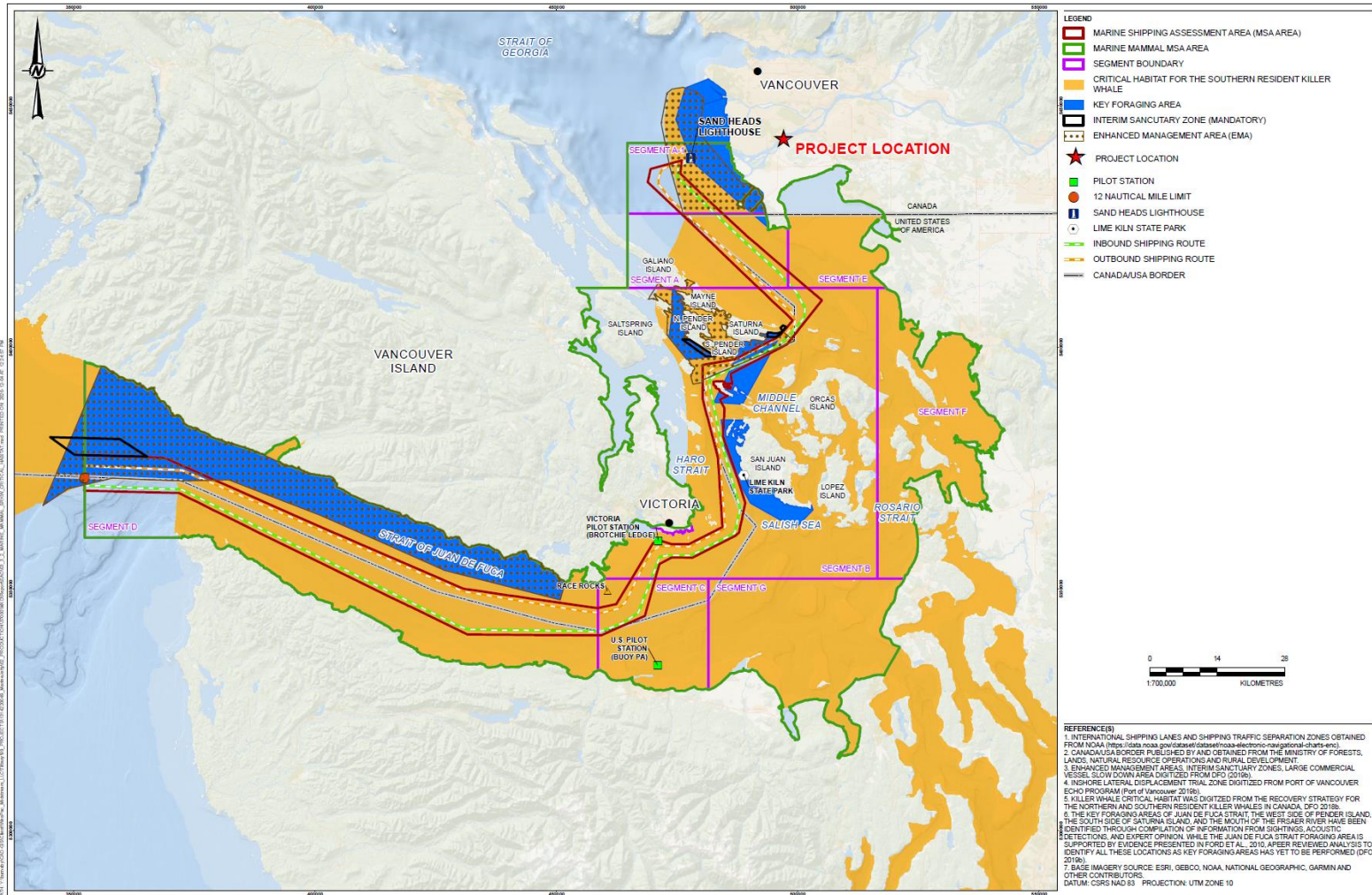
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1
2 **Figure 5: Marine Mammal LAA and RAA and Summary of Marine Mammal Information Near the LAA and RAA.**

1



2

3 Figure 6: Marine Mammal MSA Area and Southern Resident Killer Whale Critical Habitat and Sensitive Areas.

1 TJLP identified the following activities as the main sources of TMJ-generated underwater
2 noise: ground stabilization works, impact pile driving, vessel traffic and dredging. The
3 results of acoustic modelling conducted by TJLP showed that impact pile driving is the
4 one activity that, without mitigation, has the potential to exceed both injury and
5 disturbance thresholds over a considerable distance (up to 6.2 km away for highly
6 sensitive species). Underwater noise from pile driving, construction dredging and
7 ground stabilization would occur over a period of 36-90 days during Construction.
8 Annual maintenance dredging would occur over a period of nine working days.

9 TJLP noted that the prediction of effects was limited by the understanding of how
10 marine mammals respond to various environmental changes. These limitations included
11 the use of US guidelines for assessing disturbance effects on marine mammals from
12 underwater sound which may have limitations in the Canadian context, use of the
13 underwater sound model based on third-party data and models of other projects in the
14 region, a lack of consensus in the scientific community on how best to quantify masking
15 effects in marine mammals, and the limited understanding of the effectiveness of the
16 proposed environmental design features and mitigation for reducing effects.

17 Given this uncertainty, TJLP stated that mitigation measures have been proposed to
18 limit the effect of impact pile driving (as detailed in [Section 5.7.2.3](#)) and are expected to
19 considerably reduce the zone of injury and disturbance. For the other TMJ activities,
20 including ground stabilization works, vessel traffic and dredging, TJLP concluded that
21 exceedance of the injury thresholds would occur in distances relatively close to the
22 source where it would be unlikely to interact with marine mammals.

23 ***INJURY OR MORTALITY DUE TO VESSEL STRIKES***

24 There is the potential for injury or direct mortality to marine mammals due to vessel
25 movements during all phases of TMJ. A variety of factors could affect the possibility of a vessel
26 strike, including the speed and size of the vessel, the marine mammal species and the ambient
27 noise levels interfering with the sound of the vessel. TJLP explained that vessels over 80 m long
28 and travelling at speeds greater than 13-15 knots are more likely to cause ship strikes and
29 mortality. Vessel strikes are infrequent at speeds less than 14 knots and rare at speeds less than
30 10 knots. Slower vessels would give the marine mammals more time to move away and for
31 operators to detect and attempt to avoid individuals. As identified in the Application (Table 4.3-
32 18), the speed of vessels traveling in the Fraser River is expected to be 10 knots, when safe, a

1 speed at which strikes are considered unlikely⁷⁹. TMJ would use the following lengths of
2 vessels: FraserMax vessel (~250-295 m), LNG vessel (~250 m), bunker vessel (~150 m), tug
3 (28 m), and water taxi (<10 m).

4 SRKW are considered to have a low resilience to imposed stresses associated with potential
5 vessel strikes due to their continued state of decline and vulnerability from other stressors and
6 considering that the loss of any individual could have population level-effects. The population
7 of SRKW is currently estimated at 74 individuals⁸⁰. TJLP concluded that SRKW and other toothed
8 whales are considered to be at relatively low risk of vessel strikes due to their speed and agility
9 and sensitive underwater hearing abilities. Vessel collisions have recently been added as an
10 emerging threat for SRKW within their recovery plan due to evidence that J34 (an individual
11 SRKW) died as a result of blunt force trauma from a vessel strike. Although this has been the
12 only individual within the SRKW population reportedly struck by a vessel since 2008, the loss of
13 one individual could exceed the resiliency of this population.

14 Despite current levels of vessel traffic and associate vessel strikes, the population of north
15 pacific humpback whales have been growing at an annual rate of 4 to 7 percent and in 2017 the
16 species was down-listed from Threatened to Special Concern under Schedule 1 of SARA. As a
17 result, the population is considered to have a moderate resilience to effects associated with
18 marine shipping activities due to their continued state of growth in the presence of current
19 conditions.

20 TMJ is expected to increase shipping in the MSAA by 118 TMJ vessels annually (68 LNG
21 carriers and up to 50 LNG bunker vessels per year). A tug escort is required for inbound
22 and outbound transits through Boundary Pass and Haro Strait from Saturna Island to the
23 Pilot Station near Victoria, B.C. (see Figure 6). This would result in approximately one
24 TMJ vessel every three days and one vessel movement every day and a half, or
25 236 movements every year. There are currently an estimated 21,200 to 111,300 vessel
26 movements annually (including pleasure craft with automatic identification systems) in
27 Segments A through D in the MSAA. TMJ-related shipping would incrementally increase
28 current vessel movement numbers by an average of 0.6 percent annually (0.2 percent to
29 1.1 percent depending on segment).

⁷⁹ TJLP defined likelihood: low likelihood of occurrence (0 to 40%) - residual effect is possible but unlikely; moderate likelihood of occurrence (41% to 80%) - residual effect may occur but is not certain to occur; and high likelihood of occurrence (81% to 100%) - residual effect is likely to occur or is certain to occur.

⁸⁰ Based on SRKW population estimate as of August 2021.

1 **BUNKER VESSEL SCENARIO**

2 In the BVSA, TJLP concluded that increased bunker vessel traffic would not change the
3 conclusions for changes in marine mammal habitat quality resulting from changes in water
4 quality and underwater noise causing reduced prey availability in the original Application area
5 (i.e., jetty to Sand Heads). TJLP assessed the potential changes in abundance and distribution of
6 marine mammals due to underwater noise and injury and/or mortality from vessel strikes in the
7 original Application area, as a result of increased in bunker vessels traffic. Bunker vessels are
8 expected to generate noise levels similar to or lower than tugs, and the disturbance area
9 generated by bunker vessels would be smaller (approximately 9 times smaller) than the LNG
10 carriers that were assessed in the Application. TJLP concluded that the increase in the number
11 of bunkering vessels increases the potential frequency (to continuous) for disturbance effects
12 to marine mammals due to underwater noise, and that all other characterizations for the
13 residual effect remained consistent with the Application. TJLP concluded that behavioural
14 disturbance from underwater noise is considered not significant. In terms of vessel strikes, TJLP
15 concluded that the frequency of the residual effect would remain very rare (infrequent) given
16 the proposed federal conditions, and the low number of baleen whales (more susceptible to
17 vessel strikes) in the RAA. TJLP concluded that the residual effects of injury and/or mortality
18 from vessel strikes is not significant.

19 **5.7.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

20 TJLP proposed the following mitigation measures to reduce the effects of TMJ on marine
21 mammals:

- 22 • **Prioritization of vibratory pile driving methods over impact pile driving:** Piles would be
23 vibrated through the overburden using a vibratory hammer until this is no longer
24 possible, at which point impact pile driving would be used. Using a vibratory hammer
25 instead of impact pile driving during construction would reduce underwater noise and
26 the zone of injury and behavioural disturbance to marine mammals. For example, for
27 high frequency cetaceans, the zones of injury and behavioural disturbance would be
28 reduced from 6.2 km (limited by land) to 26 m and 1.2 km respectively with the use of
29 vibratory pile driving methods;
- 30 • **Installation of bubble curtain:** Bubble curtains would reduce underwater noise from
31 pile driving activities by 5 to 30 dB depending on the depth of water. TJLP estimated
32 that a reduction in 15 dB would reduce the potential injury zone from impact pile driving
33 from 6.2 km (limited by land) to 858 m for most marine mammals⁸¹;

⁸¹ Refer to Table 4.3-16, in Section 4.3 of the Application for more details.

- 1 • **Ramp-up/ soft-start procedure:** This would entail the initial activation of the equipment
2 at the quietest level possible and then gradually increasing the sound (typically within a
3 30-minute period) until the needed intensity to give acoustically sensitive marine
4 mammals time to leave the area;
- 5 • **Sequencing of in-water works:** In scenarios where several underwater noise activities
6 are planned, TJLP would sequence activities whenever possible to avoid the aggregation
7 of underwater noise;
- 8 • **Marine Mammal Management Plan:** To reduce effects of underwater noise on marine
9 mammals during pile driving and dredging activities, through the use of a marine
10 mammal safety/ detection zone;
- 11 • **Shut-down of vessel during LNG transfer:** Shut down of vessel engines and propellers
12 while moored to reduce potential injury and disturbance to marine mammals;
- 13 • **Vessel Traffic Management:** LNG carriers and bunkers would move at less than 13 knots
14 in the LAA and RAA, follow established routes, and maintain a constant course and
15 speed to the extent practical (for example, subject to human health and safety
16 considerations) and at the discretion of the pilot as part of their overall responsibility for
17 the safe navigation of a vessel;
- 18 • **Do not disturb marine mammals:** Adhere to the 2018 Marine Mammals Regulations (or
19 any future updates to the regulations) to avoid disturbing marine mammals from vessel
20 operations;
- 21 • **Accidental contact with marine mammals:** Report accidental contact between a vessel
22 and marine mammals to DFO and Indigenous Groups within 24 hours, including the
23 information specified in the Marine Mammals Regulations. This would help to provide
24 information on how to avoid accidental contact in the future;
- 25 • **Constant course and speed:** All TMJ vessels would maintain a constant course and
26 speed, to the extent practical (for example, subject to human health and safety
27 considerations), when operating in the MSAA, and at the discretion of the pilot as part
28 of their overall responsibility for the safe navigation of a vessel; and
- 29 • **Voluntary ECHO Program slowdown initiatives:** TJLP committed to incorporating
30 contractual measures to support participation of TMJ-related vessels in the VFPA-led
31 ECHO Program seasonal slowdown initiatives, to limit potential disturbance and masking
32 effects to SRKWs.

34 No additional mitigation measures were proposed by TJLP as part of the BVSA.

1 **5.7.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 2 **IDENTIFIED DURING APPLICATION REVIEW**

3 The following key issues related to the assessment of Marine Mammals for TMJ were identified
4 during Application review and based on feedback from the Working Group:

- 5 • Persistent organic pollutants; and
- 6 • Vessel strikes

7 ***PERSISTENT ORGANIC POLLUTANTS***

8 ECCC and Musqueam Indian Band questioned whether TMJ had the potential for adverse
9 effects to SRKW from persistent organic pollutants (POPs), in particular PCBs or polybrominated
10 diphenyl ethers (PBDE) exposure downstream of TMJ. Musqueam Indian Band noted that
11 dredging could bring historic contaminants to the surface and re-suspend as TSS.

12 TJLP conducted additional sediment sampling and analysis to predict whether
13 resuspended sediment would contribute to PCBs or PBDE in SRKW critical habitat.
14 Sampling showed that concentrations of total PCBs were less than CCME sediment
15 quality guidelines, Fraser River Sediment Quality Objectives, and B.C.'s marine and
16 freshwater SWQGs for sediments. TJLP concluded that dredging is not expected to
17 increase PCBs in downstream SRKW critical habitat above the baseline conditions.
18 Sediment sampling showed that concentrations of PBDE did not exceed Federal
19 Environmental Quality Guidelines (FEQGs) at the TMJ site.

20 ECCC noted that the FEQGs are not intended to be protective of PBDE exposure through food
21 chain bioaccumulation. However, ECCC is of the view that dredging is not expected to increase
22 PBDE concentrations in SRKW critical habitat above thresholds that are specific to the
23 protection of marine mammals from PBDE bioaccumulation.

24 The EAO has considered ECCC's views that, based on the additional PCB and PBDE sampling and
25 analysis, it would be reasonable to conclude that dredging of sediments is unlikely to increase
26 PCB or PBDE concentrations in SRKW critical habitat above current conditions or above
27 protective thresholds. The EAO acknowledges that there is some uncertainty with respect to
28 the level of conservatism in TJLP's assessment; however, the EAO is satisfied that there is
29 sufficient information and analysis to inform the EAO's understanding about potential residual
30 effects to SRKW through organic pollutant transport.

31 ***VESSEL STRIKES***

32 Tsawwassen First Nation, Tseil-Waututh Nation and DFO expressed concerns that the
33 mitigations for vessel traffic management were overly optimistic in terms of effectiveness.

1 Namely, they questioned the ability of large vessels to slow down and move away from animals.
2 Additionally, Tsawwassen First Nation and DFO noted that strikes at slower speeds could still
3 result in serious injury or death, and that propeller strikes could be very grave to large whales.

4 TJLP explained that the vessel traffic management mitigations would apply to all vessels
5 and agreed with DFO that the effectiveness would be greater for smaller vessels as they
6 could change speeds and maneuver more easily. However, TJLP noted that it could be
7 possible for larger LNG carriers to avoid interactions upon detection of a marine
8 mammal, depending on their distance from the individual. Additionally, TJLP pointed to
9 the proposed vessel traffic management mitigation measures, aside from just speed
10 limitations, and noted that collectively the measures were highly effective at reducing
11 vessel strikes.

12 The EAO is recommending a key mitigation under CEAA 2012 to develop a Vessel Traffic
13 Management Plan that contains vessel traffic management mitigations, including speed limits in
14 the Fraser River, participation in the VFPA-led ECHO Program seasonal slowdown initiatives in
15 the MSAA, and use of the WhaleReport Alert System to reduce the likelihood of vessel strikes
16 with marine mammals. Given the potential for mortality from a variety of types of vessel
17 strikes, the EAO has carried forward injury or mortality from vessel strikes as a residual effect in
18 the conclusions section below.

19 **5.7.4 THE EAO'S ANALYSIS AND CONCLUSIONS ON EFFECTS TO MARINE** 20 **MAMMALS**

21 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
22 on:

- 23 • The Marine Mammal VC;
- 24 • CEAA 2012 5(1)(a)(i): fish and fish habitat as defined in subsection 2(1) of the
25 *Fisheries Act*; and
- 26 • Marine mammal species subject to SARA 79(2): Steller sea lion, harbour porpoise,
27 SRKW, transient killer whale, humpback whale and grey whale.

28 The EAO evaluated the potential effects to the above by considering construction, operations
29 and decommissioning activities that could affect marine mammals through changes to habitat
30 quality, loss of habitat, changes in abundance and distribution through underwater noise, and
31 injury or mortality due to vessel strikes.

32 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

33 Based on mitigations proposed in the Application and issues raised during Application review,
34 the EAO is recommending the following KMMs under CEAA 2012:

- 1 • Marine Mammal Management Plan (KMM) to mitigate effects from activities at the TMJ
 2 site to marine mammals, also capturing mitigations listed in [Section 5.7.2.3](#) of this
 3 Report; and
 4 • Vessel Traffic Management Plan (KMM) to reduce the likelihood of vessel strikes and
 5 reduce underwater noise from shipping, also capturing mitigations listed in [Section](#)
 6 [5.7.2.3](#) of this Report.

7 **Residual effects:** After considering all relevant proposed mitigation measures, the EAO
 8 concludes that TMJ would result in the following residual adverse effects to Marine Mammals
 9 for the Application scenario and BVS:

- 10 • Physical injury from underwater noise of impact pile driving during construction;
 11 • Behavioral changes from underwater noise due to ground stabilization works, impact
 12 pile driving, vessel operations, and dredging during construction and operations; and
 13 • Physical injury or mortality due to vessel strikes.

14 The EAO's characterization of the expected residual effects of TMJ on Marine Mammals (Table
 15 17) is summarized below, as well as the EAO's level of confidence in the effects determination
 16 (including their likelihood and significance).

17 **Table 17: Summary of Residual Effects to Marine Mammals Due to Underwater Noise**

Criteria	Assessment Rating	Rationale
Context	Low to Moderate Resilience	<p>SRKW - Low: Species at risk in the RAA and MSAA, such as SRKW, would have low resilience to underwater noise due to their vulnerability. SRKW are within the zone of potential behavioural change from vessel movement. SRKW are SARA-listed, and the populations is considered at risk due to their low reproductive rate, small population size, and susceptibility to anthropogenic threats.</p> <p>Other Marine Mammals - Low-Moderate: Marine mammals in the LAA, RAA and MSAA are expected to have low to moderate resiliency to underwater noise. There is no sensitive marine mammal habitat in the most conservative zone of potential injury for underwater noise (within 6.2 km from the site, based on unmitigated impact pile driving).</p>
Magnitude	Low to Moderate	<p>Low to Moderate - behavioural disturbance: Noise from vessel operations, ground stabilization and dredging would exceed the behaviour threshold from 367 m- 3.6 km away from the source for both the Application scenario and BVS. There is the potential for disruption of marine mammal activities in SRKW critical habitat from vessel operations.</p> <p>Moderate – injury: With the implementation of sound attenuation devices, underwater noise from impact pile driving would exceed the temporary threshold shifts injury threshold for most hearing groups of marine mammals up to 858 m from the source.</p>

Criteria	Assessment Rating	Rationale
Extent	Local and Beyond regional	<p>Local – injury: Underwater noise disturbance in excess of the injury thresholds from pile driving would be local in extent, as the potential injury zone would be approximately 858 m for most marine mammals.</p> <p>Beyond regional – behavioural disturbance: Underwater noise in excess of behaviour thresholds would be beyond regional as it includes underwater noise from TMJ vessels in transit that may result in behavioural effects beyond the RAA/ MSAA.</p>
Duration	Short-term	<p>Short-term: During construction, underwater noise from pile driving, dredging and ground stabilization would be 36-90 days. Annual maintenance dredging would occur over a period of nine working days.</p> <p>Underwater noise from TMJ-related vessels would only be during the passing of the vessel in transit relative to the receptor, and during berthing/departing at the jetty. The anticipated transit time for an LNG carrier from the 12-nautical mile limit to Sand Heads is approximately 10 to 12 hours. A vessel traveling at 9 knots is estimated to require 1 to 2 hours to transit between the Sand Heads and the TMJ site; however, the transit time would vary depending on vessel type and speed.</p>
Frequency	Infrequent, Frequent	<p>Infrequent – pile driving, dredging, ground stabilization: Noise from these activities would occur infrequently during construction, and during operations for maintenance dredging.</p> <p>Frequent – vessel operations: There would be noise that exceeds behaviour effect thresholds for vessel operations (approximately one vessel call at the jetty every 2-3 days for the Application scenario to, on average, one vessel call to the jetty per day for the BVS), including vessels moving in the shipping lanes and berthing/departing at the jetty.</p>
Reversibility	Irreversible and reversible	<p>Irreversible or reversible – injury: Injury to marine mammals may be irreversible or fully reversible depending on the level of trauma incurred (that is, if a permanent threshold shift or temporary threshold shift was exceeded)</p> <p>Reversible – behavioural disturbance: Any behavioural changes are expected to be temporary in nature with individuals returning to habitat areas once the activities have ceased or becoming habituated to the noise.</p>
Likelihood	High	There is a high level of likelihood of low residual effects to marine mammals from underwater noise due to TMJ.
Significance Determination	Not significant	Considering the above analysis and the EAO's recommended KMMs under CEAA 2012 for a Marine Mammal Management Plan and Vessel Traffic Management Plan, the EAO is satisfied that TMJ would not have significant adverse residual effects on marine mammals through underwater noise.
Confidence	Moderate to high	There is a moderate to high level of confidence in the likelihood and significance determinations based on the effectiveness of mitigation and compliance with the recommended KMMs under CEAA 2012. There is some uncertainty regarding the effectiveness in the use of bubble curtains due to uncertainty in the specific environmental conditions that would exist

Criteria	Assessment Rating	Rationale
		following the dredging. The ~1 km marine mammal safety zone is expected to be highly effective; however, it would be rendered less effective if the bubble curtains are not effective, as the mammal safety zone would then need to be larger and would be more difficult to monitor. There is also some uncertainty on the long-term behavioural effects of underwater noise on marine mammals (for example, effects on foraging).

1 Note: Criteria and assessment ratings are defined in *Appendix 5: Residual Effects Characterization Definitions*.

2 **Table 18: Summary of Residual Effects on Marine Mammals Due to Vessel Strikes**

Criteria	Assessment Rating	Rationale
Context	Low to Moderate Resilience	Species at risk in the RAA and MSAA, such as SRKW and harbour porpoise, would be more vulnerable at the population level and would have low resilience to any adverse effects. There are also species such as grey whales and humpback whales that have a higher susceptibility to vessel-strikes compared to other marine mammals due to their large size, slower travel and manoeuvring speeds, lower avoidance capability, and increased proportion of time they spend near the surface.
Magnitude	High	The LAA, RAA and MSAA contain federally-listed species, whose populations are vulnerable to the injury or loss of any individuals.
Extent	Regional	The effect would occur at the regional scale, within the RAA and MSAA.
Duration	Short-term to Permanent	Depending on the nature and severity of the injury, the effect would range from short- to medium-term for injury. It would be permanent for an individual death. Given the vulnerability of federally-listed species, in particular for SRKW, an injury or loss of any individual may lead to long-term consequences for populations.
Frequency	Infrequent	The residual effect of a vessel strike due to TMJ would be infrequent because it is expected to occur rarely (if ever) over the lifespan of the TMJ, the increase in vessel traffic over current conditions is small (0.2 percent to 1.1 percent depending on the segment in the MSAA; and ~1.5 % and ~4% in the original Application area for the Application scenario and BVS, respectively), and vessel strikes at the speeds proposed are rare.
Reversibility	Reversible and Irreversible	Depending on the nature of the injury, the effect could be reversible for minor injuries. It would be irreversible for major injury or death. Given the vulnerability of federally-listed species, in particular for SRKW, an injury or loss of any individual may lead to irreversible consequences for populations.
Likelihood	Low	There is a low likelihood that a vessel strike would occur, given the small increase in vessel traffic associated with TMJ, and mitigation measures, such as to slow vessels down (to a maximum speed of 10 knots in the Fraser River, when safe; and participating in the VFPA-led ECHO Program seasonal slowdown initiatives in the MSAA) and maintain minimum distances from marine mammals. The EAO notes that there may be increased likelihood of

Criteria	Assessment Rating	Rationale
		vessel strikes in areas of higher relative SRKW and vessel density; however, the overall likelihood is expected to remain low.
Significance Determination	Not significant	Considering the above analysis and the KMMs that the EAO is recommending under CEAA 2012 for a Vessel Traffic Management Plan, the EAO is satisfied that TMJ would not have significant adverse residual effects on marine mammals through vessel strikes.
Confidence	Moderate	There is moderate confidence in the likelihood and significance determinations based on the effectiveness of mitigation and compliance with the recommended KMMs under CEAA 2012, as there is scientific literature ⁸² demonstrating the effectiveness of vessel speed restrictions in reducing the likelihood of vessel-marine mammal collisions.

1 Note: Criteria and assessment ratings are defined in [Appendix 5: Residual Effects Characterization Definitions](#).

2 The EAO considered the effect of TMJ on marine mammals from all potential effects including
3 habitat loss, effects to prey, underwater noise and vessel strikes. The effect of a direct loss of
4 habitat is predicted to be negligible, based on the location of the TMJ site (21 km from the
5 mouth of the Fraser) and the overall amount of habitat potentially affected. Effects on marine
6 mammals from changes in prey abundance and distribution were also considered negligible
7 because overall effects of TMJ on fish and fish habitat were not significant. Considering the
8 characterization of residual effects due to underwater noise and vessel strikes on marine
9 mammals in combination with the above effects and having regard to the KMMs that the EAO is
10 recommending under CEAA 2012 for a Marine Mammal Management Plan and Vessel Traffic
11 Management Plan, the EAO predicts that there would still be residual effects from TMJ on
12 marine mammals after the implementation of mitigations, however, the EAO is satisfied that
13 these effects would not be significant from TMJ alone.

14 5.7.5 CUMULATIVE EFFECTS ASSESSMENT

15 The Application included a cumulative effects assessment of the combined residual effects that
16 TMJ, existing projects and reasonably foreseeable future projects could have on marine

⁸² Dolman, S., Williams-Grey, V., Asmutis-Silva, R., & Isaac, S. (2006). Vessel collisions and cetaceans: What happens when they don't miss the boat. Whale and Dolphin Conservation Society.

Jensen, A. S., & Silber, G. K. (2003). *Large Whale Ship Strike Database*. U. S. Department of Commerce (p. 37). NOAA Technical Memorandum. NMFS-ORP.

Kite-Powell, H. L., Knowlton, A., & Brown, M. (2007). *Modeling the effect of vessel speed on Right Whale ship strike risk* (p. 8). NA04NMF47202394. National Oceanic and Atmospheric Administration and National Marine Fisheries Service.

Vanderlaan, A. S. M., & Taggart, C. T. (2007). Vessel Collisions with Whales: The Probability of Lethal Injury Based on Vessel Speed. *Marine Mammal Science*, 23(1), 144–156.

1 mammals. Cumulative effects on marine mammals could occur if there is a spatial and/ or
2 temporal overlap of past, present and reasonably foreseeable projects.

3 TJLP determined that the following reasonably foreseeable future projects and activities in the
4 RAA (Jetty to Sand Heads) could interact cumulatively with TMJ to affect marine mammals:

- 5 • PBRP (9 km upstream) – potential spatial and temporal overlap of marine shipping
6 activities in the marine mammal RAA; and
- 7 • VAFFC (1.3km downstream) – overlaps with the TMJ marine mammal RAA, and marine
8 shipping activities during construction and operations of this project spatially and
9 temporally overlap with the TMJ marine mammal RAA.

10 TJLP noted the following other projects in the RAA that could potentially interact with TMJ due
11 to additional vessels but stated that there was insufficient information about the project or
12 certainty that the project would proceed to include it in a cumulative effects assessment for
13 marine mammals: Seaspan Ferries Tilbury Terminal Expansion, Fraser River Tunnel Project,
14 Deas Island BC Hydro Transmission Line. The EAO notes that the Delta Grinding Facility and
15 FortisBC Tilbury Phase 2 LNG Plant Expansion could potentially interact with TMJ due to
16 additional vessels; however, there is uncertainty about the potential temporal overlap. As
17 proposed, the Delta Grinding Facility would include approximately 30 Panamax class vessel
18 movements a year and the FortisBC Tilbury Phase 2 LNG Plant Expansion is expected to increase
19 marine shipping traffic during construction (up to 3 years) as part of the temporary
20 construction jetty and delivery of project equipment modules.

21 For the MSAA, a complete list of existing and reasonably foreseeable projects considered is
22 provided in the MSA (Table 2.0-6). All projects and activities with a marine shipping or vessel
23 activity component were considered to interact with residual effects with marine mammals.
24 TMJ is expected to increase shipping in the MSAA by 118 TMJ vessels annually (236 vessel
25 movements annually with required tug escorts). TJLP predicted total future cumulative vessel
26 movements in the MSAA by considering TMJ, the projects in the MSA (Table 2.0-6) and a
27 projected vessel traffic growth rate.

28 ***INJURY FROM UNDERWATER NOISE***

29 In the Fraser River, impact pile driving from both the PBRP and VAFFC have the potential to
30 interact cumulatively with TMJ. TJLP noted that construction for VAFFC was already underway
31 at the time the Application was written and should be completed prior to construction of TMJ.
32 Therefore, there would be no temporal overlap between underwater noise from pile driving.
33 Construction for the PBRP could overlap temporally with TMJ. However, it is located 9 km
34 upstream from TMJ, and therefore is farther than the most conservative estimate for the
35 distance of injury threshold attenuation from pile driving (6.2 km) from TMJ. Despite the

1 unlikely interaction between the bridge replacement and TMJ, the Application still noted that
2 there was a chance they could interact cumulatively.

3 ***BEHAVIOURAL DISTURBANCE FROM UNDERWATER NOISE***

4 In the RAA, TJLP predicted a potential residual cumulative effect to behavioural disturbance
5 from underwater noise from the interaction between TMJ, VAFFC and the PBRP vessels during
6 construction and operations. Once operational, VAFFC would receive one barge of fuel every
7 two weeks and one Panamax class vessel per month. PBRP would require three vessels per
8 week in the area during construction and a higher number of barges and tugboats over a 15-
9 day period to decommission the existing Pattullo Bridge. TJLP explained that almost all ocean-
10 going vessels generate underwater noise that exceeds the disturbance thresholds for marine
11 mammals at close range. TJLP assumed that the potential disturbance zone radii associated
12 with vessels from these projects would be similar to those modelled for TMJ. Therefore, when
13 any vessels occur close together in space and time there would be an overlapping of the
14 “behavioural disturbance zone” radii from each vessel and a cumulative behavioural
15 disturbance effect could occur. This could increase the duration of noise exposure for an
16 individual animal, in addition to increasing the number of individuals potentially affected. TJLP
17 noted that predicted acoustic frequencies emitted by TMJ, VAFFC and PBRP vessels would be
18 more likely to overlap with the hearing range of baleen whales and pinnipeds than with
19 toothed whales.

20 In the MSAA, TJLP predicted that cumulative underwater sound activities are expected to
21 exceed established underwater sound behavioral disturbance criteria and cause masking of
22 important marine mammal and echolocation. Behavioral responses have the potential to be
23 significant to the population due to the almost continuous nature of cumulative vessel activity
24 in the MSAA, especially in critical habitat areas for SRKW. Reductions in foraging opportunities
25 due to masking of echolocation signals is likely to act synergistically with other threats to the
26 SRKW population identified in the Recovery Strategy for SRKW (for example, reduced prey
27 availability due to low abundance of chinook salmon, contaminant levels, vessel disturbance
28 and underwater noise pollution). TJLP noted it is likely that large vessels are causing the
29 majority of behavioral responses in SRKW while smaller vessels contribute more significantly to
30 the masking of echolocation clicks. The likelihood of these effects occurring from cumulative
31 underwater sound sources is considered high. TJLP concluded that the existing baseline
32 conditions and other reasonably foreseeable projects and vessel activity are currently
33 significantly affecting behavioral disturbance and masking of important vocalizations to SRKW.

34 TJLP concluded it is considered unlikely that behavioral responses from humpback whales
35 would be significant to the population due to their low densities in the MSAA and preference
36 for areas along the continental shelf. Masking effects could occur, however, the effects of
37 masking of humpback whale vocalizations in the MSAA are not well understood. TJLP concluded

1 that due to their continued recovery and population growth, the cumulative effects of
2 behavioral disturbance and masking in North Pacific humpback whales are not expected to be
3 significant.

4 TJLP concluded that cumulative underwater sound activities are expected to exceed established
5 underwater sound behavioral disturbance criteria for Steller sea lions. There is a high likelihood
6 for underwater sound generated from cumulative sources to result in some level of behavioral
7 disturbances. Due to the transient nature of underwater sound associated with vessel
8 movements, high severity or significant behavioral responses are not anticipated. TJLP
9 concluded that due to their continued recovery and population growth, the cumulative effects
10 of behavioral disturbance to Steller sea lions are not expected to exceed the resilience and
11 adaptability limits of the population, and therefore the residual cumulative effect is considered
12 negligible and not significant.

13 *INJURY/ MORTALITY FROM VESSEL STRIKES*

14 In the RAA, TJLP stated that vessel movements from the VAFFC and PBRP could cause a
15 cumulative effect with TMJ on vessel-marine mammal interactions (injury and/ or mortality).
16 TJLP noted that this risk was highest for baleen whales, such as grey and humpback whales, due
17 to their larger size, slower speeds and preferred foraging behaviour in surface waters. In the
18 MSAA, the western Strait of Juan de Fuca is considered a high-risk area for vessel collisions with
19 humpback whales. As most of the vessels transiting in this area would be large vessels (>80 m)
20 and are likely operating at speeds of ≥ 16 knots, beyond both the critical thresholds for a
21 collision probability (>13 knots) and lethality (>9 knots), the effect of vessel strikes on
22 humpback whales due to cumulative vessel activity was carried forward in the cumulative
23 effects assessment.

24 The potential effect of a vessel strike on north pacific humpback whales was considered
25 moderate in magnitude as a strike could lead to the death or injury from a population listed as
26 Special Concern under SARA. TMJ vessels would continue beyond the MSAA and therefore
27 potential effects associated with vessel strikes would continue beyond the 12-nautical mile limit
28 through the western Juan de Fuca Strait, an area considered high risk for collisions with
29 humpback whales. The likelihood of the effect is considered high due to the estimated vessel
30 speeds (≥ 16 knots) and overlap of the shipping route with a high-risk collision area. DFO
31 considered the relative risk of vessel strikes to the humpback whale population to be moderate
32 for an individual but low for the overall population. Due to the continued state of growth of this
33 population (4 percent to 7 percent), TJLP concluded that the cumulative residual effect would
34 be not significant to baleen whales because the effects of cumulative vessel strikes are not
35 expected to exceed the resilience and adaptability limits of the population.

1 Toothed whales, such as SRKW, could also be affected. SRKW have a particularly low resilience
2 due to the small population. TJLP consider SRKW and other toothed whales to be at relatively
3 low risk of vessel strikes due their speed and agility and sensitive underwater hearing abilities.
4 To effectively avoid vessel strikes on SRKW, TJLP committed to incorporating contractual
5 measures to support participation of TMJ-related vessels in the VFPA-led ECHO Program
6 seasonal slowdown initiatives. The seasonal slowdown initiatives currently take place in key
7 SRKW foraging areas such as Haro Strait, Boundary Pass and Swiftsure Banks. In these
8 slowdown areas, the ECHO's requests bulk carriers, tankers and general cargo vessels to slow
9 down to 11 knots speed through water and requests containers, car carriers and cruise vessels
10 to slow down to 14.5 knots speed through water. Based on the limited number of SRKWs
11 reportedly struck by vessel traffic despite their continued presence in high-traffic areas within
12 the MSAA, their physiological attributes (echolocation to detect ships at a distance), and the
13 implementation of mitigation measures, TJLP concluded the cumulative residual effect is
14 considered not significant.

15 TJLP concluded that the BVS did not change TJLP's conclusions on cumulative residual effects.

16 **5.7.5.1 ISSUES IDENTIFIED DURING APPLICATION REVIEW**

17 Maa-nulth First Nations, Esquimalt First Nation, Sc'ianew (Beecher Bay) First Nation,
18 Pauquachin First Nation, Esquimalt First Nation, Tsawwassen First Nation and Tseil-Waututh
19 Nation raised concerns regarding cumulative effects to marine mammals from marine shipping
20 activities.

21 Maa-nulth First Nations noted in their submissions in the TMX and RBT2 EAs, and for TMJ, that
22 Maa-nulth First Nations are very concerned regarding the cumulative effects of development
23 on the health of the ocean and that the collapsing steelhead, chinook and SRKW populations
24 are signs of an imbalance in the marine environment.

25 Tsawwassen First Nation requested TJLP acknowledge the DFO conclusion concerning the
26 cumulative threats that significant adverse effects pose, not only to individual SRKWs, but the
27 future viability of the entire population and its possible status as endangered, or worse, extinct
28 in the event that current efforts to mitigate adverse effects are unsuccessful.

29 Tseil-Waututh Nation expressed concerns that cumulative missed feeding opportunities and
30 potential hearing impairment for SRKW could result in the mortality of an individual, which
31 could have cascading population-level effects. Tseil-Waututh Nation recommended that TJLP
32 partner with TC and DFO to establish thresholds and management objectives for SRKW; assess
33 TMJ's environmental effects against the thresholds and management objectives; and establish
34 adaptive management strategies to ensure TMJ-related environmental effects are compliant
35 with management objectives that promote SRKW survival and recovery.

1 TJLP outlined their acoustic modelling which concluded that TMJ would not exceed thresholds
2 for pain/ injury to marine mammals in the MSAA. TJLP noted that TMJ-related shipping could
3 result in SRKW behavioral responses that are likely to range from no reaction to minor
4 alterations in swimming speed and/ or minor or moderate individual or group avoidance of the
5 sound source. With consideration for voluntary vessel slowdowns, TJLP anticipates that TMJ-
6 related effects of behavioural disturbance and masking on SRKWs to be minor relative to
7 existing conditions, and therefore, are not expected to contribute to the decline of the
8 population.

9 Maa-nulth First Nations, Tsawwassen First Nation and Tsleil-Waututh Nation raised concerns
10 about the high uncertainty in the cumulative effects assessment and the effectiveness of the
11 mitigation measures.

12 DFO agreed with TJLP's cumulative assessment in general but noted there remains considerable
13 uncertainty about how the cumulative effects of these residual effects would affect the
14 recovery or resilience of marine mammal populations.

15 The EAO acknowledges there is some uncertainty in the behavioural response of SRKW to
16 underwater noise; however, conservative thresholds and the best available science have been
17 considered in the assessment. During the EA, the EAO sought input from the Working Group
18 and Indigenous Groups on the sufficiency and effectiveness of the mitigation measures
19 proposed in the Application. The EAO has recommended a number of mitigation measures
20 proposed in the Application and during the EA as KMMs under CEAA 2012 as part of the Vessel
21 Traffic Management Plan. The plans and mitigations would also be required to be developed in
22 consultation with a number of agencies and Indigenous Groups. To support the effectiveness of
23 these measures, these plans would include a number of specific mitigation measures,
24 monitoring requirements.

25 **5.7.5.2 REGIONAL INITIATIVES FOR ADDRESSING CUMULATIVE EFFECTS TO MARINE** 26 **MAMMALS**

27 The federal government's Oceans Protection Plan (OPP) includes initiatives aimed at protecting
28 Canada's coasts, including a state-of-the art marine safety system, preservation and restoration
29 of marine ecosystems, building Indigenous partnerships, creating a stronger evidence base and
30 increasing community participation and public awareness. The Whales Initiative (in place until
31 2023), as well as additional management measures targeted to support the protection and
32 recovery of SRKW (in place until 2024) builds on measures of the OPP and aims to address
33 imminent threats to SRKW, by improving prey availability, reducing disturbances from
34 underwater vessel noise, enhancing monitoring under the water and in the air, encouraging
35 compliance, strengthening enforcement and building partnerships for additional action to
36 protect SRKW. A variety of regulatory, research, monitoring and mitigation activities associated

1 with the protection of SRKW are either planned or ongoing. Recent regulatory measures
2 implemented by the federal Government of Canada to help support the recovery of SRKW by
3 abating threats include: seasonal area-based salmon fishing closures in key foraging areas for
4 SRKW, establishing three Interim Sanctuary Zones, updating the *Marine Mammal Regulations*
5 with larger approach distances (200 m), and further increasing the vessel approach distances in
6 the SRKW's range on an interim basis (400 m). The federal government has also increased
7 monitoring of contaminants, supported international technical workshops, provided funding to
8 promote measures to protect SRKW, and increased the number of fishery officers to verify
9 compliance with fisheries management measures and the Marine Mammal Regulations.

10 TC is also undertaking a study to assess the feasibility of modifying the Traffic Separation
11 Scheme in SRKW critical habitat to reduce the proximity of the shipping lanes to important
12 areas for SRKW. Should modifications be determined to be feasible and safe, and a benefit for
13 SRKW overall without increasing effects on other species and Indigenous rights, any potential
14 changes would require binational cooperation with the U.S. and an eventual submission to the
15 IMO. The study is focusing on key areas of importance located in the Strait of Juan de Fuca and
16 at Swiftsure Bank, Haro Strait/ Boundary Pass and the Strait of Georgia near the mouth of the
17 Fraser River.

18 The federal government has also worked with and supported the Vancouver Fraser Port
19 Authority-led ECHO Program to implement voluntary measures to reduce threats to SRKW from
20 large commercial vessels. The VFPA's ECHO Program aims to better understand and reduce
21 cumulative effects of shipping activities on at-risk whales throughout the southern coast of B.C.
22 Since 2014, the ECHO Program has worked to better understand and reduce acoustic effects of
23 large commercial vessels in key foraging areas in SRKW critical habitat through a range of
24 projects, educational initiatives, incentive programs and voluntary research trials, including
25 implementing and evaluating the effectiveness of the voluntary vessel slow down initiatives in
26 Haro Strait, Boundary Pass and Swiftsure Bank and the voluntary inshore lateral displacement
27 initiative for tugboat operators in the Strait of Juan de Fuca. The Canadian Coast Guard (CCG)
28 through its Marine Communications and Traffic Services (MCTS) centres, will continue to
29 support the ECHO Program by informing mariners of voluntary slowdown areas and lateral
30 displacement initiatives. Through the Whales Initiative, an additional position within MCTS has
31 been created to support maritime domain awareness with an additional focus on the
32 communication of marine mammals presence to mariners.

33 The EAO's analysis and conclusions on cumulative effects and their significance have considered
34 the proposed mitigation measures identified in the Application and the MSA and over the
35 course of the EA, as well as Government of Canada initiatives as important context for
36 understanding regional cumulative effects.

1 5.7.5.3 THE EAO'S CONCLUSIONS ON CUMULATIVE EFFECTS

2 The EAO notes that several federal regional initiatives are underway whose goals are to collect
3 habitat and monitoring information, implement management measures to address cumulative
4 effects in the Salish Sea, including (as described in [Section 5.7.5.2](#)) the OPP initiatives, the
5 Whales Initiative, and the ECHO Program. TMX Accommodation Initiatives, such as the Salish
6 Sea Initiative and Quiet Vessel Initiative are working towards a better understanding of
7 cumulative effects in the Salish Sea as well as taking actions to address cumulative effects, and
8 are therefore considered relevant by the EAO as important context for understanding regional
9 cumulative effects.

10 The EAO considered the interaction between injury-causing noise sources that could temporally
11 or spatially overlap with TMJ residual effects for the Application scenario and BVS. The EAO
12 concludes that with the implementation of proposed mitigation measures, including sound
13 attenuation devices at the TMJ site and marine mammal monitoring in the zone of potential
14 injury, there would be a low likelihood of temporal or spatial overlap between TMJ and the
15 above two projects (PBRP and VAFFC) in the Fraser River in terms of injury to marine mammals
16 from underwater noise. The EAO has a high level of confidence that any potential residual
17 cumulative effects to marine mammals from injury due to underwater noise from pile driving
18 would not be significant.

19 The EAO concludes there is an existing significant adverse cumulative effect on SRKW due to
20 their endangered status under SARA and significant risks to the recovery of this population, and
21 cumulative underwater sound activities from marine shipping that are expected to exceed
22 established underwater sound behavioural disturbance criteria. Although the EAO concludes
23 that the residual effects from TMJ alone would not be significant (for either the Application
24 scenario or BVS), considering the residual effects from TMJ in combination with other past,
25 present and reasonably foreseeable projects, the cumulative effects on SRKW due to
26 underwater noise would be significant. This cumulative effect would be non-significant for the
27 other marine mammal species.

28 The EAO is recommending KMMs under CEAA 2012 to develop a Marine Mammal Management
29 Plan with mitigation measures to reduce underwater noise effects at the TMJ site and a Vessel
30 Traffic Management Plan with vessel speed provisions to reduce underwater noise from TMJ
31 vessels in transit. The EAO is recommending a KMM under CEAA 2012 that would require TMJ
32 to identify their participation, where possible, in the identification and implementation of
33 regional environmental/ vessel management measures to protect SRKW, such as the federal
34 Oceans Protection Plan and the federal Whales Initiative, and to report on this annually.

35 The EAO concludes that there would be residual, non-significant, cumulative effects (for both
36 the Application scenario and BVS) with respect to injury and/ or mortality as a result of effects

1 of TMJ interacting with effects of other past, present and reasonably foreseeable future
2 projects and activities. The likelihood of vessel strike is higher in areas of higher relative SRKW
3 and vessel density when cumulative increase of ship traffic due to other planned projects are
4 considered. This effect would be high magnitude due to the risk of mortality to individuals of
5 species at risk, but unlikely to occur given the proposed mitigation measures, as presented in
6 [Section 5.7.2.3](#) and regional initiatives described in [Section 5.7.5.2](#).

7 The EAO is aware that TJLP has proposed to contribute up to \$2 million to the First Nations
8 Fisheries Legacy Fund⁸³, which is an Indigenous-led program that support recovery programs
9 for chinook salmon, eulachon and sturgeon in the Fraser River and Salish Sea. In the proposal,
10 TJLP noted that an important factor underlying the current state of SRKW is the state of
11 chinook salmon, upon which SRKW rely for a substantial portion of their diet. For more
12 information about the EAO's consideration of TJLP's contribution proposal, refer to [Section 13.1](#)
13 on Current Context and Cumulative Effects in Part C.

14 **5.7.6 CONCLUSIONS**

15 Considering the above analysis and having regard to the mitigation measures identified in the
16 Application including the EAO's recommendations for KMMs under CEAA 2012 (Appendix 1),
17 including Marine Mammal Management Plan and Vessel Traffic Management Plan, the EAO is
18 satisfied that TMJ would not have significant adverse residual effects on marine mammals from
19 underwater noise or vessel strikes.

20 The EAO concludes that the predicted residual effects from TMJ interacting with existing
21 baseline conditions (which include existing threats to the SRKW population), existing projects
22 and other reasonably foreseeable future projects would contribute to significant adverse
23 cumulative effects on SRKW due to underwater noise.

24 **5.8 VEGETATION**

25 **5.8.1 BACKGROUND**

26 Vegetation was selected as a VC for TMJ because there are plant species of particular
27 importance to provincial and federal regulators, Indigenous Groups, and the public, and TMJ

⁸³ TJLP's proposal for Unconventional Offsetting Accommodation for Residual Project and Cumulative Effects, dated July 5, 2021 (https://www.projects.eao.gov.bc.ca/api/document/61099898cd98620022b0832b/fetch/20210707_TilburyJettyLimitedPartnerShip_UnconventionalOffsetProposal.pdf).

1 has the potential to adversely affect the availability and/ or quality of those plant species due to
2 activities associated with TMJ construction, operations, and decommissioning.

3 The Vegetation VC is linked to the following VCs: River Processes ([Section 5.3](#)), Vessel Wake
4 ([Section 5.4](#)), Water Quality ([Section 5.5](#)), Fish and Fish Habitat ([Section 5.6](#)), and Wildlife and
5 Wildlife Habitat ([Section 5.9](#)). The Vegetation assessment supports the assessment of TMJ's
6 effects on the Land and Marine Resource Use VC, Current Use VC, and Wildlife and Wildlife
7 Habitat VC, as well as Part C of this Report.

8 The Vegetation assessment was based on three sub-components and indicators:

- 9 • Plant species of management concern – plant species at-risk distribution, traditional use
10 plant distribution, and invasive plant distribution;
- 11 • Terrestrial ecosystems – terrestrial ecosystem presence and distribution; and
- 12 • Wetland and riparian ecosystems – wetland and riparian ecosystem presence and
13 distribution.

14 For the EAO's assessment of potential effects of dredgeate disposal to the Vegetation VC, refer
15 to [Section 2.2.5](#) (Alternative Means of Undertaking the Project) in Part A of this Report. TJLP did
16 not include the Vegetation VC in the MSA because vegetation is not expected to occur within
17 the spatial boundaries of the MSA (inbound and outbound shipping lanes that occur between
18 Sand Heads and the 12 nm limit) or be adversely affected by TMJ shipping. TMJ-related vessel
19 wake is expected to be within the natural variation of the wave heights at the shoreline (see
20 [Section 5.4](#), Vessel Wake) and therefore is not expected to affect vegetation along the
21 shoreline.

22 **5.8.1.1 REGULATORY CONTEXT**

23 Some plant species are protected under the federal SARA and others indirectly under the
24 *Migratory Birds Convention Act*. Changes potentially affecting vegetation are linked to sections
25 5(1)(a), 5(1)(b)(i), 5(1)(c)(iii), and 5(2)(a) of the CEAA 2012. Changes potentially affecting
26 riparian ecosystems or wetlands are also linked to fish and fish habitat under the *Fisheries Act*.
27 *The Federal Policy on Wetland Conservation* (1991) (Policy) commits "all federal departments to
28 the goal of no net loss of wetland functions (i) on federal lands and waters, (ii) in areas affected
29 by the implementation of federal programs where the continuing loss or degradation of
30 wetlands has reached critical levels, and (iii) where federal activities affect wetlands designated
31 as ecologically or socio-economically important to a region. Due to local circumstances where
32 wetland losses have been severe, in some areas no further loss of any remaining wetland area
33 may be deemed essential."

34 Under the B.C. *Weed Control Act*, noxious weeds growing or located on land and project
35 premises must be controlled. The provincial *Water Sustainability Act* also provides protection of

1 riparian ecosystems and wetlands. The Environmental Protection and Management Regulation
2 may apply to portions of the foreshore administered by the Province. B.C.'s Environmental
3 Mitigation Policy applies to provincial lands and includes a mitigation hierarchy approach that
4 prioritizes preventing or avoiding harm over managing its consequences. The preferred order of
5 addressing potential adverse effects to values and associated components is 1) Avoid effects; 2)
6 Minimize adverse effects; 3) Restoration where effects have occurred; and 4) Offset residual
7 adverse effects.

8 **5.8.1.2 BOUNDARIES**

9 Five spatial boundaries were used in the assessment (Figure 7):

- 10 • Project Disturbance Footprint: all terrestrial and submerged lands subject to direct
11 disturbance (except the Dredge Area), as well as a 1 m buffer surrounding the
12 disturbance;
- 13 • TMJ Site includes the onshore and offshore portions of TMJ;
- 14 • LAA: the Project Disturbance Footprint plus a 100 m buffer area;
- 15 • RAA: the LAA, and South Arm of the Fraser River from the TMJ Site boundary
16 downstream to Sand Heads, including a 50 m buffer from the high-water mark on either
17 side; and
- 18 • Technical Study Area: encompasses terrestrial portions of the TMJ site and the LAA
19 located on Tilbury Island. It also extends southwest in the RAA along the north side of
20 Tilbury Island, and encompasses vegetated habitat outside of the RAA, along the south
21 side of Tilbury Island.

22 **5.8.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATION MEASURES** 23 **IN THE APPLICATION**

24 **5.8.2.1 BASELINE INFORMATION**

25 The Fraser River shoreline in the LAA consists of mud flat with several small surface channels
26 that drain marsh and riparian areas, all of which have been heavily modified and fragmented by
27 historical activities. Tilbury Island and the LAA are currently dominated by industrial activities,
28 and historical activities have altered the upland environment. The LAA is comprised of 4.3 ha
29 (5.4 percent) of various wetland types. TJLP conducted a wetland functional assessment in the
30 LAA and determined that wetlands in the Project Disturbance Footprint provided low functional
31 performance due to historical anthropogenic disturbances⁸⁴. The Project Disturbance Footprint
32 overlaps a single marsh area, comprised of three Sensitive Ecosystem Inventory (SEI) wetland

⁸⁴ Assessment of the ecological, hydrological, biochemical, and habitat function.

1 types⁸⁵ Please refer to [Section 5.5](#), Water Quality, for further details about water and sediment
2 quality. Terrestrial ecosystems in the LAA consist of anthropogenic land cover types such as
3 barren fields and horticultural plantings. The terrestrial portions of the LAA are maintained as
4 lawn or covered with asphalt, compacted gravel, and infrastructure, and no longer have natural
5 site characteristics. Terrestrial ecosystems were not considered further in the assessment.

6 ***PLANT SPECIES OF MANAGEMENT CONCERN***

7 Based on the B.C. CDC Species and Ecosystem Explorer website, eight red-listed and
8 16 blue-listed plant species at risk have the potential to occur in the LAA. B.C. CDC data
9 indicated occurrences of streambank lupine (provincially red-listed and federally listed as
10 Endangered), Vancouver Island beggarticks (provincially blue-listed and federally listed as
11 Special Concern), and provincially blue-listed three-flowered waterwort were recorded on
12 Tilbury Island outside of the LAA (in the RAA). During 2015 plant species at risk field surveys
13 conducted for TMJ, no species at risk were identified in the LAA. No marine plants, as defined in
14 the SARA, were identified during TMJ's baseline studies.

15 In terms of traditional use plants, of the 50 plant taxa encountered during field surveys in the
16 LAA, 20 species were identified as potential traditional use plants, mainly deciduous shrubs or
17 forbs (herbs) and some trees, ferns and grasses. These plants were unevenly distributed and
18 were more common in the less disturbed portions of the LAA. Although traditional use plant
19 collecting areas were not identified on Tilbury Island in Traditional Use Studies (TUS) provided
20 by Indigenous Groups, potential traditional use plants are present on Tilbury Island. No
21 traditional use plants were observed in the Project Disturbance Footprint.

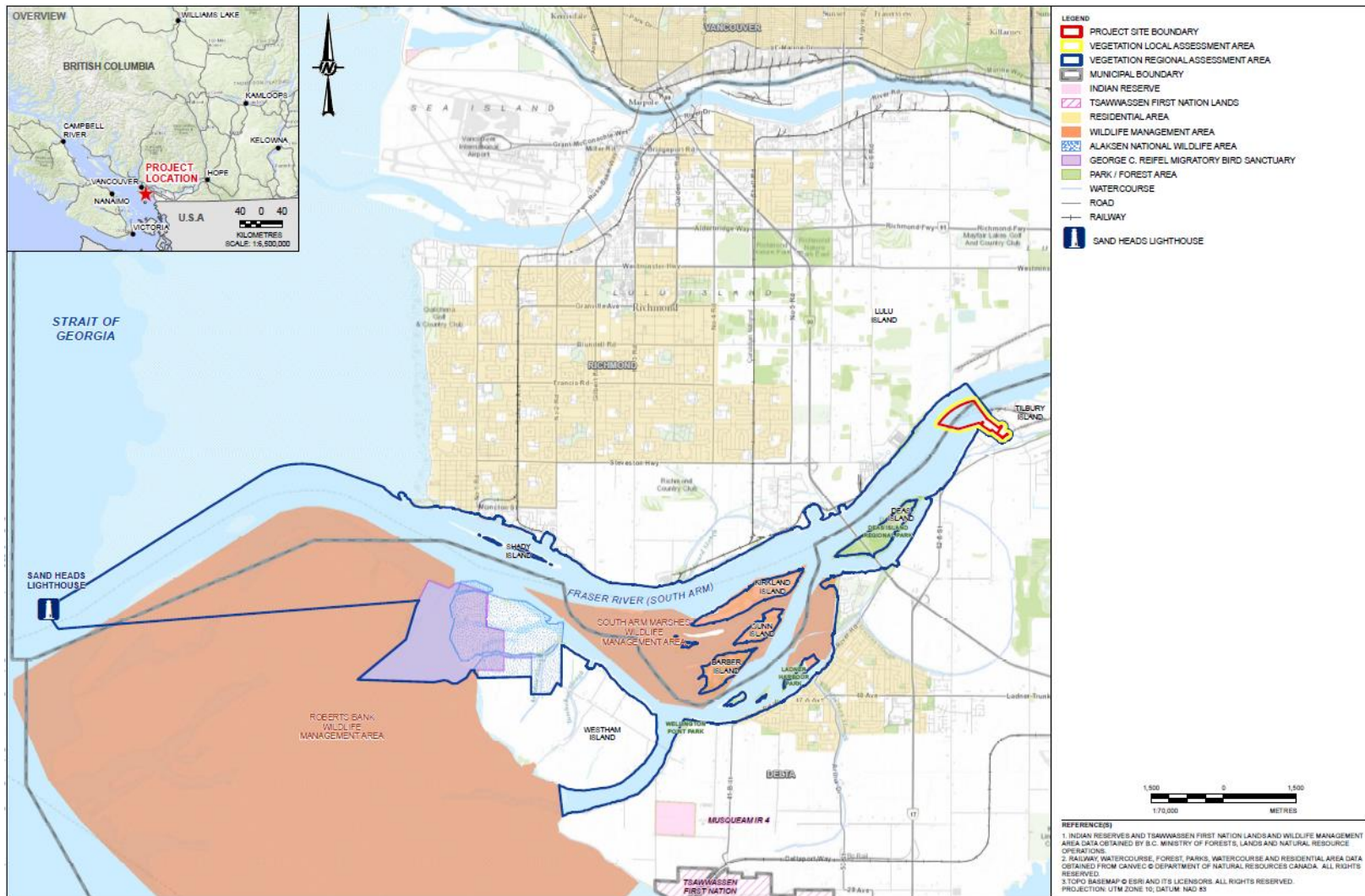
22 In the LAA, habitats are highly disturbed, invasive plant species⁸⁶ are prevalent, and noxious
23 species⁸⁷ are present. During 2015 field surveys conducted for TMJ, seven invasive, five
24 noxious, and six exotic species were observed in the Technical Study Area. Himalayan
25 blackberry was the only invasive plant and Japanese knotweed was the only noxious plant
26 observed in the TMJ site.

⁸⁵ Wetland classes in the Sensitive Ecosystem Inventory which encompasses ecosystems at risk as well as rare and ecologically fragile ecosystems that are ecologically important because of the diversity of species they support.

⁸⁶ As listed under the B.C. Weed Control Regulation under the *Weed Control Act* (1996) and B.C.'s Proposed Prohibited Noxious Weeds list.

⁸⁷ Ibid.

1



2

3 **Figure 7: Vegetation Local and Regional Assessment Area.**

1 5.8.2.2 POTENTIAL PROJECT EFFECTS

2 *LOSS OF SPECIES OF MANAGEMENT CONCERN*

3 During construction, site preparation and ground stabilization could result in direct loss of plant
4 species at risk and traditional use plants. Although plant species at risk and traditional use
5 plants were not observed within the Project Disturbance Area, baseline field surveys cannot
6 determine their complete absence. In the Application, TJLP stated that a pre-construction
7 survey of the Project Disturbance Footprint would be conducted to identify plant species at risk
8 and traditional use plants prior to the initiation of construction. Methods to protect, salvage
9 and transplant those plants would be outlined in the Vegetation Management Plan and
10 Wetland Mitigation Plan. TJLP expected the wetland and riparian enhancement and creation, to
11 be conducted during construction, to expand the available habitat for these species. Wetland
12 and riparian enhancement is planned to occur primarily within the TMJ Site, but it would
13 extend into the LAA. Given the implementation of mitigation measures, TJLP concluded that the
14 magnitude of the predicted residual effect would be negligible.

15 *INTRODUCTION AND EXTENT EXPANSION OF INVASIVE SPECIES*

16 TMJ activities during construction and decommissioning, such as transportation of equipment
17 and material to the TMJ site from off site, and activities that disturb soil and vegetation, may
18 result in the introduction and proliferation of invasive plant species. In the Application, TJLP
19 noted that natural ecosystems in the LAA currently exist with the imposed stress of invasive
20 plant species. TJLP expects to reduce the distribution of invasive plants through invasive plant
21 species management planning and habitat restoration. With the application of standard
22 construction mitigation practices, applicable BMPs, and an Invasive Plant Species Management
23 Plan, TJLP concluded that the magnitude of the predicted residual effect would be negligible.

24 *DIRECT LOSS OF WETLAND AND RIPARIAN ECOSYSTEMS*

25 During construction, site clearing, ground disturbance, other site preparation activities, and
26 onshore and offshore construction are expected to result in the direct loss of 0.23 ha of
27 wetland and riparian ecosystems (Table 19). TJLP predicted negligible habitat loss due to
28 decommissioning because areas affected by the removal of piles would be restored to the state
29 of surrounding habitat. The methods of pile removal and restoration during decommissioning
30 would be detailed in a decommissioning plan. This plan would be a requirement for BC OGC
31 Commission permitting and would be drafted closer to decommissioning to capture current
32 technologies and best practices.

33

1 **Table 19: Direct Loss of Wetland and Riparian Ecosystems in the Project Disturbance Footprint during**
 2 **Construction**

SEI Wetland Class and Subclass	Areas of ecosystems loss in Project Disturbance Footprint (ha)	Proportion of total area of the ecosystem type in the LAA (%)	Proportion of the total area of the ecosystem type in the RAA (%)
Estuarine marsh	0.08	11.6	0.01
Riparian mudflat	0.1	24.5	0.76
Riparian fringe	0.05	14.8	0.08
<i>Total potential loss</i>	<i>0.23</i>	<i>15.3</i>	<i>0.03</i>

3
 4 TJLP stated that TMJ design has integrated features that would minimize loss of these
 5 ecosystem types, and that offsetting⁸⁸ through wetland enhancement and creation during
 6 construction would result in an overall gain of 0.95 ha of wetland ecosystems in the LAA (Table
 7 20). This wetland enhancement and creation is the same area proposed for the offsetting for
 8 the federal *Fisheries Act* authorization.

9 **Table 20: Wetland Offsetting – Enhancement and Creation during TMJ Construction**

Project Phase	Offsetting	Wetland Type	Area (ha)	Study Area
Construction (Year 2)	Enhancement	Riparian fringe	0.23	LAA foreshore
Construction (Year 2)	Enhancement	Estuarine marsh	0.32	LAA foreshore
Construction (Year 3)	Enhancement	Riparian mudflat	0.31	LAA foreshore
Construction (Year 2)	Creation	Estuarine marsh	0.32	LAA foreshore
<i>Total</i>			<i>1.18</i>	<i>LAA foreshore</i>

10 TJLP would salvage plants from wetlands affected by construction and translocate them to
 11 wetland offsetting sites. TJLP considers that wetland offsetting sites would be partially
 12 functional immediately. TJLP expects the wetland enhancement and creation to provide
 13 increased hydrological, biochemical, ecological, and habitat functions to wetlands currently in
 14 the LAA, and increased ecological function is expected within three years, based on similar
 15 wetland restoration projects in the south Fraser Arm. To determine the success of wetland
 16 offsetting, TJLP proposed a monitoring program be initiated after enhancement and creation of
 17 the wetlands to assess biological, hydrological, and structural characteristics of the wetlands.
 18 After performance standards have been achieved, TJLP proposed long-term monitoring and

⁸⁸ Note: TJLP's proposed offsetting through wetland enhancement and creation is for both fish and wetlands.

- 1 adaptive management would be implemented to ensure the success of the wetland offsetting.
- 2 With the proposed wetland enhancement and creation, TJLP concluded that residual effects
- 3 related to the loss of wetland and riparian ecosystems would be negligible.

4 **INDIRECT LOSS OF WETLAND AND RIPARIAN ECOSYSTEMS**

5 Construction and decommissioning activities, such as site preparation, land-based ground
6 stabilization, and piling works, for onshore facilities may have indirect effects on wetland and
7 riparian ecosystems through surface runoff and deposition of fugitive dust. Surface runoff from
8 disturbed areas (such as, exposed soil) can contain suspended solids that may affect soil quality
9 and vegetation and localized dust can coat vegetation leading to reduced growth and vigour.
10 Standard mitigation practices outlined in the Construction Environmental Management Plan
11 (CEMP) and Operational Environmental Management Plan (OEMP), along with an Erosion and
12 Sediment Control Plan (ESCP) and a Decommissioning and Final Rehabilitation Plan, would be
13 applied during construction and decommissioning to prevent or minimize indirect loss of
14 wetland and riparian ecosystems. Based on the wetland enhancement and creation proposed,
15 TJLP concluded that residual effects related to the indirect loss of wetland and riparian
16 ecosystems would be negligible.

17 Ground stabilization for offshore and onshore facilities during construction may indirectly affect
18 wetland and riparian ecosystems by altering localized hydrology and river processes. TJLP
19 stated that stabilization activities would take place at or below the sediment surface; therefore,
20 surface flows would be maintained and minor impediments to hydrological input from
21 groundwater sources are not expected to affect wetland and riparian ecosystems outside of the
22 Project Disturbance Footprint. In addition, TJLP does not expect in-river structures to alter river
23 processes (such as sedimentation and scour) beyond the natural range of variation for existing
24 river characteristics (Refer to [Section 5.3](#), River Processes). Given that loss of ecosystems in the
25 Project Disturbance Footprint has been accounted for as direct loss, TJLP does not expect
26 additional indirect effects from hydrological changes.

27 **BUNKER VESSEL SCENARIO**

28 For the BVSA, TJLP considered the effects on scour (as described in River Processes, Section
29 5.3.3) on Vegetation. TJLP concluded that the proposed increased annual bunker activity would
30 not result in changes in the effects or characterization of effects to River Processes, as such no
31 change to Vegetation is predicted. The increase in annual bunker vessels is predicted to have a
32 negligible effect on Vegetation, and the residual effect conclusions in the Application for
33 Vegetation are expected to remain unchanged.

1 5.8.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION

2 The Application proposed the following mitigation measures to reduce the effects of TMJ on
3 the Vegetation VC:

- 4 • Limit vegetation clearing using measures to preserve native trees and vegetation;
- 5 • Conduct pre-construction surveys for plant species of management concern (including
6 species at risk and traditional use plants);
- 7 • *Construction Environmental Management Plan (CEMP)*: Identify sensitive areas to be
8 flagged and vegetation and soils to be retained or salvaged with required methods and
9 monitoring;
- 10 • *Vegetation Management Plan*: Guidance for the protection and salvage of vegetation
11 including terrestrial ecosystems, wetland ecosystems, and plant species of management
12 concern (species at risk and traditional use plants). It will also provide site-specific
13 information on mitigation measures, monitoring activities and adaptive management.
14 Under the provincial *Weed Control Act*, TJLP is required to control noxious weed
15 populations at the TMJ site. The plan would also include invasive plant control
16 procedure to mitigate the introduction, transportation and proliferation of invasive
17 plants species;
- 18 • *Erosion and Sediment Control Plan*: Identify where erosion and sediment control
19 measures should be implemented during construction, operational constraints (for
20 example, stop sensitive works in heavy rains), and effectiveness monitoring;
- 21 • *Wetland Mitigation Plan*: To offset unavoidable loss of vegetation and ecosystems in the
22 Project Disturbance footprint through enhancement and creation of wetland and
23 riparian ecosystem. It would also describe salvaging and transplanting techniques for
24 any plant species at risk and traditional use species identified during pre-construction
25 surveys;
- 26 • *Operational Environmental Management Plan*: Identify methods to be used during
27 operation to avoid or reduce effects to vegetation during operations, including erosion
28 and sediment control, and vegetation management;
- 29 • *Decommissioning Environmental Management Plan*: Identify methods to be used during
30 decommissioning to reduce potential effects on the environment, including invasive
31 species management; and
- 32 • *Decommissioning and Final Rehabilitation Plan*: Following the most current BMPs,
33 regulations, and standards at the time of decommissioning and developed in
34 consultation with applicable regulatory authorities and local Indigenous Groups prior to
35 TMJ no longer being operational.

36 No additional mitigation measures were proposed by TJLP as part of the BVSA.

1 5.8.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS 2 IDENTIFIED DURING APPLICATION REVIEW

3 The following key issues related to the assessment of Vegetation for TMJ were identified
4 during Application review and based on feedback from the Working Group:

- 5 • Wetland and riparian ecosystems loss and offsetting; and
- 6 • Indirect effects to wetland and riparian ecosystems.

7 **WETLAND AND RIPARIAN ECOSYSTEMS LOSS AND OFFSETTING**

8 ECCC, DFO, Musqueam Indian Band, Tsleil-Waututh Nation and Tsawwassen First Nation
9 expressed concerns about: loss of plants species of management concern; uncertainty when
10 developing and implementing offsetting measures, including design or implementation failure;
11 longer time lags than predicted before created offsetting measures become functional; and
12 monitoring and follow-up plans.

13 In response, TJLP stated that the Vegetation Management Plan would include
14 pre-construction surveys to be conducted for plant species of management concern,
15 including species at risk and traditional use plants. The surveys would incorporate
16 Traditional Environmental Knowledge (TEK) and Traditional Use (TU) and salvage
17 protocols for traditional use plants. Indigenous Groups would be invited to participate in
18 the pre-construction surveys and in developing the salvage protocols.

19 TJLP confirmed that the Wetland Mitigation Plan would include the monitoring
20 protocols and the performance standards that would be used to determine a successful
21 trajectory for wetland enhancement and creation, long-term monitoring and adaptive
22 management. The performance standards would be used for early detection if wetland
23 enhancement or creation areas are not on track to meet objectives. Early detection
24 would enable the implementation of adaptive management to meet the performance
25 standards for wetland enhancement and creation areas. The Wetland Mitigation Plan
26 would provide details on methods for plant salvage and sod transplanting, including
27 translocation areas that contain suitable attributes to promote plant survival. Methods
28 for monitoring translocated plants and “control” plants would be included in the
29 monitoring plan that would be described in the Wetland Mitigation Plan. Indigenous
30 Groups would be invited to participate in the monitoring of wetland enhancement and
31 creation areas.

32 The EAO is proposing Condition 18: Vegetation and Wetland Management and Wetland
33 Offsetting Plan. The condition would include vegetation and wetlands management measures
34 such as pre-construction surveys for rare, culturally significant plants, and those protected
35 under the SARA. The plan would include protocols for native and SARA-listed plant salvage and

1 relocation, and measures to establish plant species of cultural significance to Indigenous
2 Groups. Wetland creation and enhancement measures, a schedule and timeline for
3 implementation, monitoring and performance standards, and adaptive management would be
4 part of the Wetland Offsetting Plan. The plan would require consultation with Indigenous
5 Groups and regulatory agencies, and require that the compensatory wetland sites performance
6 standards exceed the level of function of the habitat being compensated, and provide higher
7 value and larger area than the wetland habitat it is replacing. The EAO is also recommending a
8 KMM under CEAA 2012 for a Wetland Compensation Plan to offset the direct loss of wetland
9 and riparian vegetation and ecosystems through enhancement and creation of wetland and
10 riparian ecosystem and to monitor the functioning of the wetland area.

11 **INDIRECT EFFECTS TO WETLAND AND RIPARIAN ECOSYSTEMS**

12 Musqueam Indian Band and ECCC raised concerns about indirect effects to wetlands and
13 vegetation due to erosion, sediment build-up, and degradation of wetland and shoreline
14 habitat due to vessel wake, invasive species, and fugitive dust.

15 In response, TJLP noted that the Dredge Management Plan would outline methods for
16 sediment control during dredging, the In-Water Works Management Plan would be
17 developed to reduce sediment disturbance during construction and prevent release of
18 deleterious substances into the aquatic environment and the Erosion and Sediment
19 Control Plan would also provide mitigation to avoid or minimize the potential for
20 erosion and sediment input into watercourses during construction. TJLP's vessel wake
21 assessment did not predict effects to shorelines from TMJ-associated vessel wake.

22 Under the provincial *Weed Control Act*, TJLP would be required to control noxious weed
23 populations at the TMJ site. Information on how to prevent, mitigate, control, dispose
24 and report on invasive plants would be outlined in the Invasive Plant Species
25 Management Plan (as part of the Vegetation Management Plan). This would include
26 preventing and managing the potential spread of invasive plants after revegetation
27 activities on disturbed soils from the TMJ site to surrounding areas. Transportation can
28 facilitate the movement of exotic organisms particularly due to ballast water exchange.
29 TJLP proposes a Ballast Waste Management Plan that would comply with legislated
30 shipping requirements.

31 Fugitive dust deposition may result in reduced growth and vigor of plant species,
32 including traditional use plants. TJLP acknowledged that dust production may occur and
33 would be managed with BMPs (refer to [Section 5.1](#), Air Quality) for wetland and riparian
34 ecosystems and plant species of management concern.

35 The EAO is proposing Condition 12: Water Quality Management Plan and recommending KMMs
36 under CEAA 2012 that would include mitigations measures to minimize effects to water quality,

1 including sediment dispersion during in-water works and dredging. The EAO is also proposing
2 erosion and sediment control measures as part of Condition 10: Construction Environmental
3 Management Plan, Condition 11: Operations Environmental Management Plan and
4 recommending as KMMs under CEAA 2012. The plan includes measures to prevent and manage
5 the potential spread of invasive plants. The EAO acknowledges that, to prevent further spread
6 onsite and beyond, Japanese knotweed should be controlled prior to construction. Conditions
7 would require consultation with Indigenous Groups and regulatory agencies.

8 **5.8.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

9 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
10 on the Vegetation VC. The EAO considered construction and operations activities that could
11 affect Vegetation through loss of species of management concern, introduction and extent
12 expansion of invasive species, and direct and indirect loss of wetland and riparian ecosystems.

13 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

14 Based on mitigations proposed in the Application and issues raised during Application review,
15 the EAO proposes these provincial conditions and recommends KMMs under CEAA 2012:

- 16 • Condition 10: Construction Environmental Management Plan (provincial condition);
- 17 • Condition 11: Operations Environmental Management Plan (provincial condition);
- 18 • Condition 18: Vegetation and Wetland Management and Wetland Offsetting Plan
19 (provincial condition); and
- 20 • Mitigation measures to reduce effects to migratory birds, including a Wetland
21 Compensation Plan (KMM).

22 The EAO also proposes Condition 12: Water Quality Management Plan and KMMs under CEAA
23 2012 for water quality (see the Water Quality assessment in [Section 5.5](#)) which is relevant to
24 the Vegetation VC.

25 **Residual effects:** After considering the proposed mitigation measures, the EAO concludes that
26 TMJ would result in the following residual adverse effect to the Vegetation VC for the
27 Application scenario and BVS:

- 28 • Loss or alteration of wetland and riparian ecosystems due to site clearing, ground
29 disturbance, other site preparation activities, and onshore and offshore works during
30 construction and machinery access and maneuvering for removal of onshore and
31 offshore facilities during decommissioning.

32 The EAO found that TMJ would have negligible effects on plant species of management concern
33 and no marine plants, as defined in subsection 2(1) of the SARA, were identified during TMJ's
34 baseline studies. As described above, the EAO proposes Condition 18: Vegetation and Wetland

- 1 Management and Wetland Offsetting Plan, including measures to minimize effects of ground
 2 disturbance, including clearing and grubbing, soil compaction and excavation on vegetation and
 3 wetlands. The plan would also require pre-construction surveys for rare, culturally significant
 4 plants and those listed under SARA in the Project Disturbance Footprint to ensure these plants
 5 can be salvaged and relocated, and noxious and invasive species management. The plan would
 6 require consultation with Indigenous Groups and regulatory agencies.
- 7 The EAO's characterization of the expected residual effects of TMJ on the Vegetation VC is
 8 summarized below, as well as the EAO's level of confidence in the effects determination
 9 (including likelihood and significance).

10 **Table 21: Summary of Residual Effects for Loss of Wetland and Riparian Ecosystems**

Criteria	Assessment Rating	Rationale
Context	Low resilience	There are no known at-risk (as defined by the B.C. CDC) wetland or riparian plant species in the LAA, and the wetlands in the Project Disturbance Footprint provide low levels of function due to historical disturbance and modifications. The Tilbury Island area is heavily industrialized, and the Fraser River Delta is an area of historic wetland loss. Due to effects of industrialization on wetland and riparian ecosystems, they are expected to have low resilience to changes and be sensitive to disturbance.
Magnitude	Low	TMJ would result in a direct loss of 0.23 ha (15 percent) of wetland and riparian ecosystems in the LAA (0.03 percent in RAA) during construction. TJLP would offset for losses, by creating or enhancing approximately 1.18 ha of estuarine marsh and riparian habitat. TJLP would be required to construct offsets or conduct enhancements promptly to minimize time lag effects between the removal and offsetting and would monitor them on an ongoing basis. During decommissioning, machinery access and maneuvering for removal of onshore and offshore facilities could result in the direct loss of wetland and riparian ecosystems. Areas affected by decommissioning activities would be restored to the state of surrounding habitat. In consideration of the requirement for offsetting, residual effects are predicted to be low in magnitude.
Extent	LAA	The effects of direct loss of wetlands and riparian area would occur primarily in the Project Disturbance Footprint.
Duration	Long-term	Wetland and riparian loss would be expected to persist for the duration of construction and into operations, as wetland enhancement and creation may take several years (approximately three years) to achieve full functionality. After decommissioning, areas affected by the removal of piles would be restored to the state of surrounding habitat which may also take several years.

Criteria	Assessment Rating	Rationale
Frequency	Continuous	The effects of wetland and riparian loss would occur continuously for at least several years following construction and decommissioning until the ecological functions lost are created or enhanced through offsetting.
Reversibility	Reversible	The effects of wetland and riparian habitat loss are considered reversible in the long term because the jetty and other structures would be removed during decommissioning and habitat would be restored. The wetland enhancement and creation may take several years to achieve full functionality. Because wetland and riparian ecosystem loss would be replaced through wetland enhancement and creation, the effect is considered reversible.
Likelihood	There is a high likelihood of residual effects due to unavoidable wetland and riparian habitat loss. It is expected that riparian and estuarine marsh enhancements and creation would offset the direct loss of habitat following construction and decommissioning. With successful implementation of habitat offsetting, there is low likelihood for long-term residual effects.	
Confidence	The EAO's confidence in the effect assessment is moderate. There is a high degree of certainty that habitat would be lost and some uncertainty in the wetland enhancement and creation related to the success of the offsetting and the lag time to become effective. Offsetting must be fully implemented to ensure that no less than 0.95 ha of fully functional wetland ecosystems is created to mitigate adverse effects. There is also some uncertainty whether TJLP would use dredge material for wetland creation and enhancement. If TJLP used dredge material, it would be tested prior to use and any contaminated material would be disposed of appropriately. As such, potential adverse effects from using dredge materials for wetland creation and enhancement are not predicted. Wetland monitoring to assess biological, hydrological, and structural characteristics would occur over a number of years to confirm that offsetting achieves full wetland functionality.	
Significance	Considering the analysis above and the conditions identified in the TOC and Certified Project Description (CPD) (which would become legally binding if an EAC is issued), and recommended KMMs under CEAA 2012 (Appendix 1) the EAO is satisfied that TMJ is not likely to have significant adverse residual effects on the Vegetation VC.	

1 *Note: Criteria and assessment ratings are defined in Appendix 5: Residual Effects Characterization Definitions.*

2 5.8.5 CUMULATIVE EFFECTS ASSESSMENT

- 3 The EAO concluded that TMJ would result in a residual adverse effect to the Vegetation VC due
4 to loss or alteration of wetland and riparian ecosystems. Wetland enhancement and creation to
5 offset wetland loss may take several years to achieve full functionality. Until the time at which
6 full functionality is achieved, residual effects from TMJ may cumulatively interact with past,
7 present and reasonably foreseeable future projects and activities in the Vegetation RAA.
- 8 The Fraser River Delta is both an area of historic wetland loss and an area of regional
9 importance to waterfowl, including migratory birds. Approximately 70 percent of the
10 Fraser River Estuary's wetlands have been diked, drained, and filled to reclaim land for

1 development. The Lower Mainland/ Fraser Valley region has been identified as one of the
2 geographic areas in B.C. where the documented continuing loss or degradation of wetlands has
3 reached critical levels. Past, present and reasonably foreseeable future projects and activities in
4 the Vegetation RAA that were considered in the cumulative effects assessment include:

- 5 • Coast 2000 Terminals;
- 6 • Vancouver Fraser Port Authority Fraser River Annual Dredging Program;
- 7 • FortisBC Tilbury LNG Plant Expansion (Phase 2) project;
- 8 • Delta Grinding Facility;
- 9 • Marine shipping;
- 10 • SeaSpan;
- 11 • Urban infrastructure development;
- 12 • VAFFC;
- 13 • Vancouver Fraser Port Authority Habitat Enhancement Program; and
- 14 • Varsteel.

15 Cumulative effects from the past and present projects and activities on the Vegetation VC in the
16 RAA were considered under current baseline conditions.

17 Future projects and activities in the RAA that are on federal lands, in areas affected by the
18 implementation of federal programs where the continuing loss or degradation of wetlands has
19 reached critical levels, and where federal activities affect wetlands designated as ecologically or
20 socio-economically important to a region would be required to adhere to the goals and
21 objectives set out by The Federal Policy on Wetland Conservation (Government of Canada,
22 1991). Future projects and activities in the RAA on provincial lands would be required to apply
23 the Environmental Mitigation Policy, which would include offsetting any wetland losses that
24 cannot be adequately addressed through other mitigation measures in the mitigation hierarchy
25 (that is, avoid, minimize, restore) and conduct monitoring over a number of years to confirm
26 that offsetting achieves full wetland functionality.

27 Monitoring conducted as part of the EAO's proposed Condition 18: Vegetation and Wetland
28 Management and Wetland Offsetting Plan, recommended KMMs under CEAA 2012 for a
29 Wetland Compensation Plan, and TJLP's Decommissioning and Final Rehabilitation Plan is
30 intended to detect unanticipated cumulative effects and address such effects through adaptive
31 management.

32 Based on the information available at the time of this assessment, the enhancement or creation
33 of approximately 1.18 ha of wetland habitat (0.95 ha greater than the amount of wetland loss
34 due to TMJ) and the predicted success of wetland enhancement and creation following
35 construction and decommissioning, the EAO concludes that significant cumulative effects on
36 wetland and riparian ecosystems, thus the Vegetation VC, are not expected as a result of the

- 1 effects of TMJ (for both the Application scenario and BVS) interacting with the effects of other
2 past, present and reasonably foreseeable future projects and activities.

3 5.8.6 CONCLUSIONS

4 Considering the above analysis and conditions identified in the CPD and TOC conditions,
5 including Condition 10: Construction Environmental Management Plan, Condition 11:
6 Operations Environmental Management Plan, and Condition 18: Vegetation and Wetland
7 Management and Wetland Offsetting Plan (which would become legally binding if an EAC is
8 issued), and recommended KMMs under CEAA 2012 for a Wetland Compensation Plan
9 (Appendix 1), the EAO is satisfied that TMJ would not have significant adverse effects on the
10 Vegetation VC.

11 5.9 WILDLIFE AND WILDLIFE HABITAT AND MARINE BIRDS

12 5.9.1 BACKGROUND

13 Wildlife and Wildlife Habitat and Marine Birds (MSA area) were selected as a VCs because TMJ
14 and TMJ-related vessels have the potential to cause adverse effects to these VCs, they are
15 important to Indigenous Groups and to members of the public.

16 The subcomponents (group of species) , focal species and indicators selected for the
17 assessment are listed in Table 22⁸⁹:

18 **Table 22: Key assessed wildlife and marine bird subcomponents, focal species and indicators**

Wildlife	Marine Birds
Subcomponents and focal species	
<ul style="list-style-type: none"> • Amphibians: Pacific chorus frog; • Waterbirds: Double-crested cormorant and Great blue heron (<i>fannini</i> Subspecies); • Migratory birds: Song sparrow⁹⁰; 	<ul style="list-style-type: none"> • Sea duck: Surf scoter; • Piscivorous diving bird/ pelagic bird: Cassin's auklet, Fork-tailed storm-petrel, Marbled murrelet; • Waterfowl: Brant and Canada goose; • Gulls and terns: Glaucous-winged gull; and • Shorebirds: Black oystercatcher and Red knot.

⁸⁹ Further rationale for the species at risk considered in the assessment is provided in Appendix 6.

⁹⁰ TJLP selected song sparrow as the focal species to represent the potential effects of TMJ on migratory birds and other upland birds that could use the riparian vegetation in the LAA. Potential effects to migratory birds resulting from changes in habitat are captured in the assessment of the song sparrow. Regionally, song sparrow is not a migratory species. As a result, TJLP conducted additional assessments specific to potential effects on migratory birds due to artificial light sources that have been summarized and considered in this Report.

<ul style="list-style-type: none"> • Barn owl⁹¹; and • Little brown myotis⁹². 	
Indicators	
<ul style="list-style-type: none"> • Habitat quality and quantity: area and suitability of wildlife habitat; • Wildlife mortality: sources of mortality and intensity of effect; and • Wildlife movement: barriers to wildlife movement. 	<ul style="list-style-type: none"> • Marine bird habitat quality and quantity⁹³; • Disturbance/ behavioural change; and • Marine bird mortality.

1

2 The effects assessment of Wildlife and Wildlife Habitat is linked to the Air Quality ([Section 5.1](#)),
3 Water Quality ([Section 5.5](#)), Fish and Fish Habitat ([Section 5.6](#)), Vegetation ([Section 5.8](#)), Land
4 and Marine Resource Use ([Section 8.2](#)), Visual Quality ([Section 8.3](#)), Noise ([Section 6.2](#)), River
5 Processes ([Section 5.3](#)), Vessel Wake ([Section 5.4](#)), and Accidents and Malfunctions ([Section 9](#))
6 VCs. The effects assessment of Marine Birds VC is linked to the Marine Resource Use ([Section](#)
7 [8.2](#)), Vessel Wake ([Section 5.4](#)) and Marine Fish ([Section 5.6](#)), and Accidents and Malfunctions
8 ([Section 9](#)) VCs. The results of the Wildlife and Wildlife Habitat and Marine Birds assessment are
9 incorporated into the Current Use VC ([Section 11.4](#)). For the EAO's assessment of the potential
10 effects of dredge disposal to the Wildlife and Wildlife Habitat VC, refer to [Section 2.2.5](#)
11 (Alternative Means of Undertaking the Project) of this Report.

12 5.9.1.1 REGULATORY CONTEXT

13 The following statutes, policies and guidelines were identified in the Application as being of
14 relevant context for the assessment of the Wildlife and Wildlife Habitat VC:

- 15 • Federal *Species at Risk Act* (SARA);
- 16 • Federal *Migratory Bird Convention Act*;
- 17 • Provincial *Forest and Range Practices Act*;
- 18 • B.C. *Wildlife Act*;
- 19 • Section 5(1)(a)(iii) of CEAA 2012 requiring the assessment of adverse effects on migratory
20 birds; and
- 21 • The Federal Policy on Wetland Conservation (1991) committing all federal departments to a
22 goal of no net loss of wetland functions under specific conditions (see [Section 5.8](#),
23 Vegetation).

⁹¹ Barn owl and little brown myotis were not identified in the AIR or Application as a subcomponent for review. During Application review, ECCC recommended that potential effects of TMJ on barn owl and little brown myotis be considered in the assessment and TJLP submitted technical memorandums which have been captured in this Report.

⁹² Ibid.

⁹³ This indicator applies only to the following subcomponents: Gulls and terns, Waterfowl and Shorebirds.

1 Multiple provincial strategies, plans, guidelines, and BMPs also provide guidance relevant for
2 the Wildlife and Wildlife Habitat VC.

3 **5.9.1.2 BOUNDARIES**

4 ***WILDLIFE AND WILDLIFE HABITAT***

5 The LAA for the assessment of the Wildlife and Wildlife Habitat VC is the TMJ Site with a 100 m
6 buffer area. The RAA includes the LAA and the South Arm of the Fraser River downstream of
7 the TMJ Site boundary to Sand Heads with a 50 m buffer from the high-water mark on either
8 side (Figure 8).

9 ***MARINE BIRDS (MSA AREA)***

10 The spatial boundary for the Marine Bird VC (Marine Bird MSA Area) extends from the shipping
11 channel to the high-water mark between Sand Heads and the 12 nm limit.

12 **5.9.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 13 **APPLICATION**

14 In response to Working Group comments, during Application review, TJLP provided
15 supplementary wildlife information and conducted additional assessment on the potential
16 effects on migratory birds, barn owl and little brown myotis. In addition to the Application, TJLP
17 submitted a separate MSA including an assessment of potential effects on the Marine Bird VC.
18 These materials are summarized below and were considered in the EAO's assessment of
19 effects.

20 **5.9.2.1 BASELINE INFORMATION**

21 The LAA, including the TMJ site, is situated in the Boundary Bay – Roberts Bank – Sturgeon Bank
22 Important Bird Area (IBA) which consists of a complex of marine, estuarine, freshwater and
23 agricultural areas. The habitat in the LAA has been altered by previous development and
24 industrial activities and lacks high-quality foraging or nesting habitat for most terrestrial
25 passerine species and migratory bird species (for example, migratory passerines, shorebirds,
26 and waterfowl). Terrestrial portions of the LAA are maintained as lawn or covered with asphalt,
27 compacted gravel, and infrastructure and no longer maintain natural ecosystem characteristics.

28 In the LAA, amphibian habitat may be present in the riparian area between the estuarine marsh
29 habitat and paved area, including anthropogenically-modified vegetated areas. Potential
30 breeding habitat is located in nearby swamp, ditch, and foreshore areas, though TJLP concluded
31 that none of these habitats were high quality. No amphibians were observed during field
32 studies. Habitat exists for the double-crested cormorant and great blue heron within the LAA.

1 The Application concluded that the LAA does not contain suitable foraging or nesting habitat for
2 barn owl. Riparian areas and marshes within the LAA may be used as foraging habitat for little
3 brown myotis.

4 The Marine Bird MSA Area includes Important bird areas (IBAs), migratory bird sanctuaries,
5 provincial parks, ecological reserves, wildlife management areas, and the Gulf Island and Pacific
6 Rim national park reserves. These productive ecosystems support marine bird breeding
7 colonies and large, seasonally abundant gatherings of over-wintering birds, providing birds with
8 foraging, resting and nesting opportunities. The Marine Bird MSA Area overlaps the Pacific
9 Flyway bird migration route which is one of four major bird migratory routes that connect the
10 Arctic to South America through North America.

11 **5.9.2.2. WILDLIFE AND WILDLIFE HABITAT - POTENTIAL PROJECT EFFECTS**

12 This section provides an overview of potential effects and proposed mitigations identified in the
13 Application.

14 **HABITAT LOSS AND BARRIERS TO MOVEMENT**

15 Clearing of the TMJ site during construction to accommodate the jetty and trestle would result
16 in the loss of 0.21 ha (<0.2 percent of similar habitat in the RAA) of potential amphibian
17 breeding and upland habitat. Construction of the jetty would result in the direct loss of 0.18 ha
18 (0.1 percent of similar habitat in the RAA) of great blue heron foraging habitat. Clearing of
19 riparian habitat to accommodate the trestle would result in the loss of 0.13 ha of upland
20 habitat that could provide roosting or nesting site for great blue heron and potentially suitable
21 nesting and foraging habitat for migratory birds. During construction, approximately 0.23 ha of
22 marsh and riparian habitat (approximately 0.2 percent of similar habitat in the RAA) that may
23 be used for foraging by bats would be lost. TJLP noted that estuarine marsh creation and
24 restoration is expected to increase the amount and suitability of foraging habitat in the LAA,
25 offsetting the amount of habitat disturbed.

26 The new jetty would extend 230 m into the aquatic habitat and be approximately 10 m above
27 the water level at high tide. TJLP noted that wildlife would be expected to move under or over
28 the facilities and that local wildlife was likely already adopted to the presence of these types of
29 structures.

30 **DISTURBANCE – NOISE AND LIGHT**

31 TMJ would be situated in an industrial area with multiple sources of daytime and nighttime
32 noise and light. The Application described the existing noise levels in the LAA as above 50 A-
33 weighted decibels (dBA). During construction, dredging and pile driving would be the loudest
34 activities.

1 During construction, TJLP predicted noise levels to be between 40 dBA to 70 dB at the
2 warehouse, where there is suitable barn owl nesting and roosting habitat, and up to 90 dB at
3 potential bat foraging areas. In-water works are generally expected to occur during the day (not
4 during bat foraging periods) and would predominantly avoid the maternity period for little
5 brown myotis. Noise was predicted to attenuate to between 48 to 56 dB by the maternity roost
6 on Deas Island. During operations, noise is not predicted to exceed 40 dBA at the warehouse
7 and to remain below 65 dB in bat foraging habitat and at the maternity roost (up to 37 dB).

8 TJLP predicted that up to 0.3 ha (0.33 percent of similar habitat in the RAA) of amphibian
9 habitat would be affected by both noise and light during all TMJ phases.

10 Migrating birds are known to be attracted to artificial lights at night or in poor visibility
11 conditions during the day, which can result in disorientation leading to fatigue and collisions.
12 TJLP concluded that as substantial lighting already exists in the LAA from adjacent facilities,
13 TMJ's contributions to effects to migratory birds would be negligible.

14 Access to foraging habitat under the trestle is expected to be maintained, and TJLP do not
15 expect that TMJ would reduce fish habitat or fish abundance, and in turn, prey availability for
16 piscivorous wildlife is expected to remain unchanged.

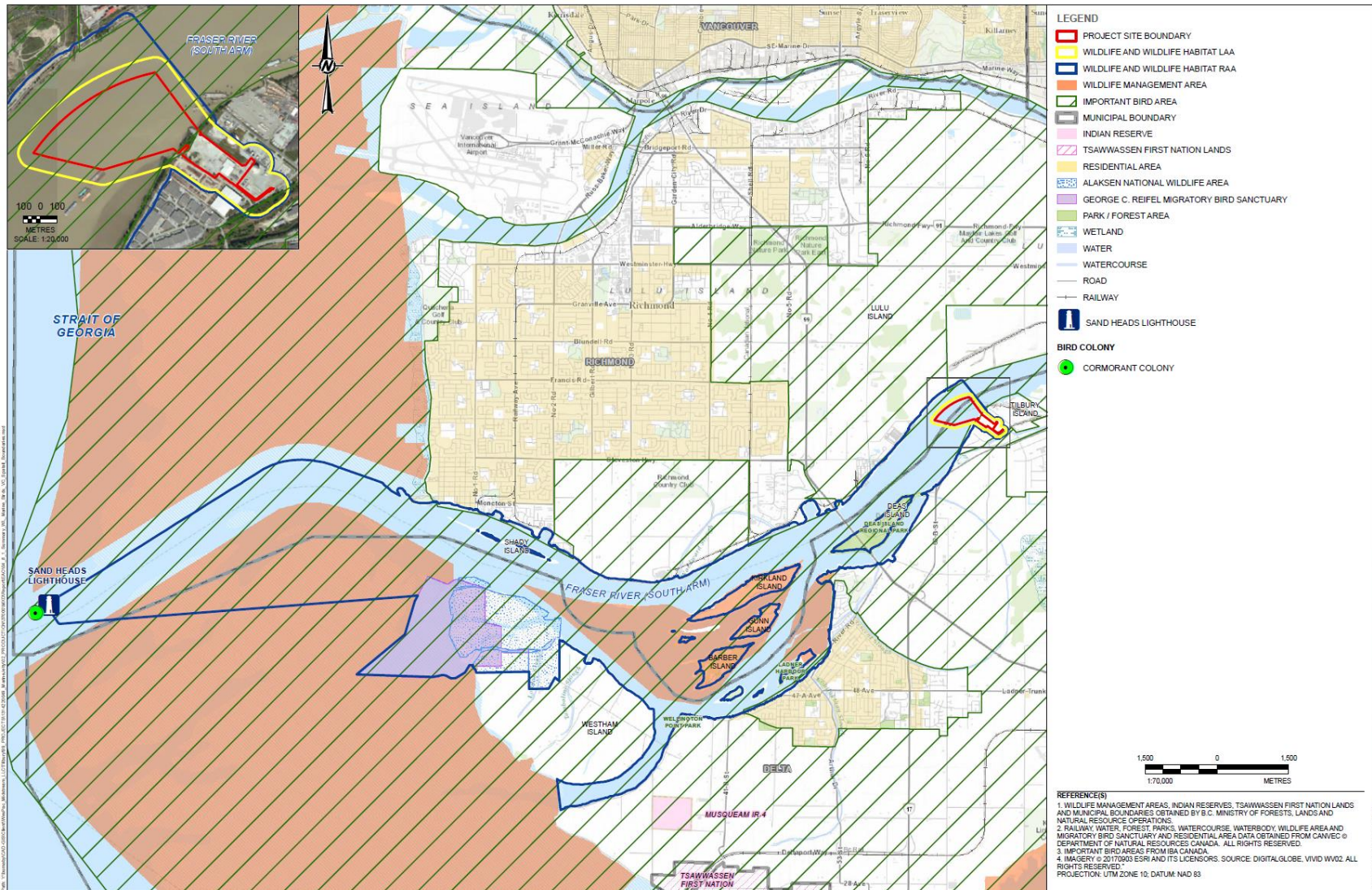
17 **MORTALITY**

18 Wildlife mortality could occur due to vegetation clearing or vehicle/ wildlife collisions or strikes
19 with jetty infrastructure. Bright lights used at night during construction and operations may
20 further increase the likelihood of collision with infrastructure. Potential effects of wildlife
21 mortality are expected to be similar through all TMJ phases.

22 TJLP predicted that residual effects on amphibians due to mortality during habitat clearing
23 during construction can predominantly be avoided through pre-construction surveys and
24 salvages. TJLP concluded that resident birds that forage in the LAA and RAA are expected to be
25 adapted to noise, light, and other infrastructure features associated with an industrial setting
26 and are not expected to interact with jetty features. Additional vehicle traffic due to
27 construction is estimated to be an increase of 100 vehicles a day, a <1 percent volume increase
28 in weekday traffic volume in the LAA. TJLP predicted that residual effects on due to mortality
29 would be negligible during all phases.

30

31



1
2 **Figure 8: Wildlife and Marine Birds features and spatial boundaries for the original Application area (jetty to Sand Heads).**

1 **BUNKER VESSEL SCENARIO**

2 In the Application, TJLP assessed potential wildlife interactions with vessel movements and
3 considered potential for vessels to disturb birds and risk of mortality from collisions (aquatic
4 birds only). In the BVSA, TJLP stated that the proposed increase in bunker vessel traffic is not
5 predicted to change the extent of the zones of influence applied to TMJ to account for potential
6 disturbance. Given that TJLP are not proposing new activities from what was assessed in the
7 Application, TJLP concluded that the characterization of effects is not predicted to change, and
8 the frequency of disturbance remains continuous. While the risk of interaction with aquatic
9 birds is increased in the BVS, TJLP does not expect that mortalities would be more frequent
10 than once a year given the infrequency of reported collision-related aquatic mortality and the
11 limited aquatic bird abundance in the LAA. TJLP concluded that aquatic birds occurring near the
12 TMJ site and in the navigational channels of the Fraser River are expected to be resilient to an
13 incremental increase in vessel traffic. As vessels would predominately be in the navigational
14 channels regularly used by marine traffic, situated in a highly industrialized system, TJLP
15 concluded that the incremental increase in annual bunker vessels transits is predicted to result
16 in negligible effects on Wildlife and Wildlife Habitat.

17 **5.9.2.3 MARINE BIRD – POTENTIAL PROJECT EFFECTS**

18 **HABITAT LOSS – WAKE**

19 Increased wave action along the shore due to TMJ vessel wake could result in erosion, reduced
20 availability of food, or disturb or displace birds near shore. Several species of shorebirds,
21 waterfowl, and gulls, including the red knot, brant, and glaucous-winged gull, use tidal
22 mudflats, eelgrass beds, and ocean beaches as foraging habitat. TJLP concluded that TMJ-
23 related vessel generated waves would be within the range of natural wave conditions and
24 would not have a measurable effect on marine birds.

25 **DISTURBANCE - VISUAL AND ATMOSPHERIC NOISE, AND UNDERWATER NOISE**

26 TJLP predicted that marine birds may alter their movement or feeding activity and demonstrate
27 avoidance behaviour within one km of TMJ-related vessels that travel through the Marine Bird
28 MSA Area. TMJ vessels would follow established shipping lanes, situated between one and 10
29 km from the shoreline, with the majority of the route located away from shorelines. Shorebirds
30 (red knot and black oystercatcher) and species occurring in the nearshore (surf scoter, grebes,
31 marbled murrelet, brant, Canada goose) are not expected to frequently occur within one km of
32 the shipping lanes for most of the route.

33 TMJ-related changes to the underwater acoustic environment from TMJ vessels could affect
34 marine birds, particularly those species that dive and forage underwater. Based on their feeding
35 ecology, piscivorous diving birds (for example, fork-tailed storm-petrels, Cassin's auklet, and

1 marbled murrelet) and sea ducks (that is, surf scoter) are predicted to be most vulnerable to
2 underwater noise disturbance. TMJ is expected to result in an incremental increase in vessel
3 movements in the Marine Birds MSAA (0.2 percent to 1.1 percent depending on segment) and
4 the effect on the populations of marine bird subcomponents from atmospheric or underwater
5 noise is expected to be negligible.

6 **MORTALITY – STRIKES, COLLISIONS AND DISORIENTATION**

7 TMJ-related vessels transiting through the Marine Bird MSAA could result in bird mortality due
8 to vessel strikes (that is, vessels hitting birds). Species that may be more susceptible to strikes
9 include species that sleep roost on the water during the night (e.g., surf scoter) and pelagic
10 species (e.g., fork-tailed storm petrel and Cassin's auklet) due to their occurrence in offshore
11 environments and diving foraging habits. Birds attracted to artificial light sources from vessels
12 may become disorientated and continuously fly around illuminated vessels resulting in fatigue
13 that can lead to mortality or collision (that is, birds hitting vessels) with vessels. Migrating birds
14 are most susceptible due to their reduced energy reserves and flight paths over open water.

15 TJLP concluded that TMJ is not expected to result in a meaningful increase in vessel traffic in
16 the Marine Bird MSAA, and TMJ-related vessels are not expected to use high-powered artificial
17 lights for navigation that are shown to have the most pronounced effect on marine birds. TJLP
18 predicted no increased risk of marine bird-vessel strikes with vessels in the Marine Bird MSAA,
19 although there could be collisions with marine birds associated with vessel lighting and
20 disorientation.

21 **5.9.2.4 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

22 The Application proposed mitigation measures to reduce the effects of TMJ on the Wildlife and
23 Wildlife Habitat VC, including:

- 24 • **Wildlife Management Plan:** Describe pre-construction surveys, mitigation in
25 consideration of applicable BMPs, ongoing wildlife monitoring, reporting and recording
26 wildlife conflicts, and methods to evaluate the effectiveness of mitigation measures;
- 27 • **Erosion and Sediment Control Plan (ESCP):** Identify design and layout of erosion control
28 measures and stormwater management;
- 29 • **Light Management Plan:** Identify wildlife-specific light management, including outdoor
30 lighting designed to reduce light trespass (i.e., light extending beyond target) and
31 skyglow (i.e., illumination of the night sky) during construction and operations;
- 32 • **Noise Management Plan:** Identify wildlife-specific noise control, including maintaining
33 acoustic barriers (for example, vegetation and trees) around the active work areas,
34 enclosing noise producing machinery, using acoustic screens, and minimizing speed on
35 roadways;
- 36 • **Transport Management Plan (Land-Based Traffic):** Identify measures to limit and
37 control speed on TMJ roadways (for example, 10 km/hr speed limit on-site);

- 1 • **Vegetation Management Plan:** Guidance for replanting temporarily disturbed habitat
- 2 with native species following the completion of construction and removal and disposal
- 3 of existing invasive plants and maintenance of subsequently restored vegetated areas;
- 4 and
- 5 • **Wetland Mitigation Plan:** Identify wetland enhancement and creation to off-set direct
- 6 loss.

7 No additional mitigation measures were proposed by TJLP as part of the BVSA.

8 TJLP has not proposed mitigation measures specific to vessels associated with TMJ. Vessel
9 lighting is mandated by international regulations and standards. These regulations describe the
10 lighting that is required for signaling and visibility. TMJ vessels transiting through the existing
11 shipping lanes would follow the federal "On the Water" guidelines⁹⁴ (e.g., maintaining sufficient
12 distance to avoid disturbing nesting birds, travelling at steady speeds, moving parallel to the
13 shore, maintaining constant engine noise levels, and not pursuing seabirds on the water
14 surface). These are not considered mitigation measures for Marine Birds.

15 **5.9.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS**

16 **IDENTIFIED DURING APPLICATION REVIEW**

17 The following key issues related to the assessment of Wildlife and Wildlife Habitat for TMJ were
18 identified during Application review and based on feedback from the Working Group:

- 19 • Barn owl;
- 20 • Migratory birds;
- 21 • Sensory disturbance
- 22 • Air quality; and
- 23 • Marine shipping.

24 **BARN OWL**

25 ECCC raised concerns regarding potential effects to barn owl and the effectiveness of proposed
26 mitigation measures to address disturbance to roosting barn owls.

⁹⁴ ECCC's guidelines to avoid disturbance to seabird and waterbird colonies in Canada, dated 2018
(<https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/avoid-disturbance-seabird-waterbird-colonies-canada.html>).

1 TJLP responded in a memo⁹⁵ that pre-construction surveys (day and night-time) for barn
2 owl would be conducted to determine presence and use. Acoustic screens or other
3 noise mitigating measures, depending on the sources of noise and receptor location,
4 would be implemented if there was evidence of barn owl use, and a database of barn
5 owl observations would be maintained. TJLP's Wildlife Management Plan would also
6 have recommended procedures for chance encounters.

7 The EAO recommends KMMs under CEAA 2012 for a Barn Owl Management Plan that would
8 require nocturnal and diurnal pre-construction surveys, mitigations related to sensory
9 disturbance, physical barriers and annual reporting to assess mitigation effectiveness and any
10 need for adaptive management measures. Noise would be managed during all TMJ phases
11 according to applicable BC OGC guidelines (including BC OGC's Noise Control Best Practice
12 Guidelines) and TC requirements. The EAO is also proposing noise management as part of
13 Condition 10: Construction Environmental Management Plan and Condition 11: Operations
14 Environmental Management Plan. Monitoring would allow for detection and adaptive
15 management in response to noise exceedances.

16 **MIGRATORY BIRDS**

17 ECCC raised concerns regarding the selection of song sparrow as the sub-component for
18 terrestrial and migratory birds because it is regionally a resident species and would not capture
19 the potential effects of TMJ on migratory bird species. ECCC asked TJLP to provide an effects
20 assessment considering potential effects of artificial light on migratory birds.

21 During Application review, TJLP acknowledged that, in the B.C. Lower Mainland, song
22 sparrow does not conduct annual migrations similar to other migratory passerine species
23 and therefore may not be representative of potential mortality due to collisions with
24 infrastructure and fatigue associated with disorientation from lights. TJLP provided
25 additional information in two memos⁹⁶ and assessed the potential effects of TMJ related to
26 artificial lighting (presented in [Section 5.9.2.2](#)) and proposed additional mitigation measures
27 for the marine terminal area:

⁹⁵ TJLP's response to ECCC and Agency information requests dated July 11, 2019
(https://www.projects.eao.gov.bc.ca/api/public/document/60a48839148b4a0023306067/download/20190711_ECCC_Wildlife.pdf).

⁹⁶ TJLP response to ECCC and Agency information requests dated July 11, 2019
(https://www.projects.eao.gov.bc.ca/api/public/document/60a48839148b4a0023306067/download/20190711_ECCC_Wildlife.pdf) and TJLP's response to ECCC comments dated May 17, 2019
(https://www.projects.eao.gov.bc.ca/api/public/document/5ce5820fc414f300241393c4/download/20190517_ECCC-barn%20owl%2C%20migratory%20birds%2C%20little%20brown%20bat.pdf).

- 1 • Navigational lights would be flashing and directed horizontally to reduce skyglow, based
- 2 on navigational safety standards;
- 3 • Night-time construction work required would be scheduled to avoid sensitive migratory
- 4 periods (particularly during fog or cloud cover) and conducted under a canopy (or
- 5 similar structure) to minimize light trespass and skyglow; and
- 6 • Surveys for bird mortality would be conducted during migratory periods and records of
- 7 dead wildlife would be maintained. The results of surveys may be used to implement
- 8 adaptive management as part of the Wildlife Management Plan.

9 The EAO is satisfied that TJLP provided sufficient information and effects assessment in
10 memoranda during Application review related to effects on migratory birds. The EAO is
11 proposing Condition 10: Construction Environmental Management Plan, that would identify
12 timing windows and mitigation to avoid human-wildlife conflict and Condition 11: Operations
13 Environmental Management Plan, that would identify mitigation measures to be implemented
14 during operations and describe wildlife monitoring, reporting requirements, and adaptive
15 management. The plans would both include wildlife-specific measures for light management
16 including potential attraction of birds. The EAO also recommends KMMs under CEAA 2012 for
17 migratory birds, including strategies to minimize glare such as direction, timing and intensity to
18 be employed, where lighting is not standardized based on navigational and safety
19 requirements.

20 ***SENSORY DISTURBANCE***

21 Musqueam Indian Band, Tsleil-Waututh Nation and Tsawwassen First Nation, and Snuneymuxw
22 First Nation raised concerns about potential harm to or displacement of wildlife due to
23 increased noise and light and questioned the assumed habituation of wildlife to current levels
24 of disturbance.

25 In response, TJLP stated that given TMJ is in an industrialized area, noise levels at
26 baseline are generally above the levels that tend to alter wildlife behaviour. Pre-project
27 noise conditions are greater than the noise thresholds, yet species continue to persist in
28 the RAA and the LAA. In terms of lighting, TMJ is expected to contribute to an existing
29 industrial lightscape to which species in the LAA are adapted. Given the limited
30 information on noise and light thresholds in urban environments, TJLP established zones
31 of influence for each subcomponent based on published best management practices
32 and/ or provincial setback recommendations to guide the assessment of indirect effects.
33 Effects of noise and light on the wildlife subcomponents were measured from the
34 Project Disturbance Footprint (that is, source of disturbance), as such, these potential
35 effects were considered in the Application through the application of zones of influence.

1 The EAO is proposing noise and light management as part of Condition 10: Construction
2 Environmental Management Plan and Condition 11: Operations Environmental Management
3 Plan. Wildlife specific mitigation to be included in the plans include the use of LED lights,
4 temporal mitigation measures (for example, reducing lighting in bird-sensitive periods such as
5 migration). Ongoing monitoring and adaptive management would also be included in the plans,
6 given the inherent uncertainty in evaluating the potential responses of wildlife to light
7 generated by TMJ. The EAO has also recommended KMM under CEAA 2012 for a follow-up
8 program in the marine terminal area to verify the predictions of the EA as it pertains to the
9 effect of artificial light on coastal birds.

10 **AIR QUALITY**

11 Tsleil-Waututh Nation and Tsawwassen First Nation raised concerns that the pathway of air
12 quality effects on vegetation, wildlife habitat, and wildlife was not adequately assessed.

13 TJLP noted that air quality was not identified as a major factor contributing to the
14 decline or affecting the resilience of vegetation or wildlife subcomponents selected for
15 TMJ. Residual effects to Vegetation and Wildlife and Wildlife Habitat VCs from air quality
16 would be anticipated to be negligible and not change the significance determination of
17 the respective chapters.

18 The EAO understands that ECCC is of the view that a risk assessment evaluating the potential
19 risks to flora and fauna through the air exposure pathway would not be typically undertaken
20 unless there are specific, key concerns (i.e., high concentrations of VOCs) that would further
21 inform an understanding of potential effects. The EAO agrees that further assessment is not
22 required. The EAO proposes Condition 19: Air Quality Management Plan, Condition 20:
23 Greenhouse Gas Reduction Plan, and recommends KMM under CEAA 2012 for an Air Quality
24 Management Plan, which would outline mitigations required to reduce adverse effects to air
25 quality during construction and operations.

26 **MARINE SHIPPING**

27 ECCC and Tsleil-Waututh Nation raised concerns about the baseline information for the Marine
28 Bird assessment, and in particular, ECCC raised concerns about the use of RBT2 and TMX
29 assessments to describe baseline conditions and encouraged TJLP to consider technical advice
30 and recommendations from ECCC submitted as part of the panel process. ECCC also raised
31 concerns about uncertainty associated with the extent to which effects on marine birds would
32 be adverse, based upon a lack of available scientific information and/ or understanding, and
33 lack of monitoring data for anticipated effects (for example, mortality arising from ship-
34 associated interactions) as well as potential cumulative effects.

1 TJLP responded that data presented in TMX and RBT2 were incorporated into the
2 description of baseline conditions in the MSA and supplemented with additional and
3 updated with information presented after the time of submission of TMX and RBT2, to
4 verify information presented in these reports, and to update spatial and temporal gaps
5 that may exist. Given the amount of data available for the Marine Bird MSA Area, the
6 existing available data was considered sufficient for the assessment of baseline
7 conditions.

8 TJLP concluded that residual effects associated with TMJ-related shipping were unlikely
9 to cause population level adverse effects. TJLP acknowledged that while there is lack of
10 information in the literature regarding the effects of shipping on marine birds,
11 conservative assumptions have been implemented in the assessment to account for this
12 uncertainty. For example, a larger (1,000 m) zone-of-influence was applied to the
13 transiting ship to account for potential effects on marine birds although the actual zone
14 of influence is expected to be smaller. TJLP acknowledged that general shipping activity
15 in the Salish Sea may cumulatively affect marine birds; however, the effects from TMJ-
16 related shipping were not predicted to be measurable. Further, based on the Committee
17 on the Status of Endangered Wildlife in Canada (COSEWIC) and federal assessment
18 reports and recovery strategies, shipping has not been identified as the dominant threat
19 to the focal species assessed in the MSA; although the risk of a large oil spill has been
20 identified as an emerging threat/ risk.

21 The EAO notes that vessel lighting is mandated by international regulations and standards and
22 that TMJ-related vessels transiting through the existing shipping lanes would follow the federal
23 "On the Water " guidelines⁹⁷. The EAO recommends a KMM under CEEA 2012 regarding the
24 required participation in the VFPA-led ECHO Program seasonal slowdown initiatives. Although
25 vessel-based survey data was not included in the MSA, the EAO has considered the uncertainty
26 of potential effects on Marine Birds in the EAO's assessment and is satisfied with the baseline
27 information presented in the MSA.

28 **5.9.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

29 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
30 on:

- 31 • The Wildlife and Wildlife Habitat VC;

⁹⁷ "On the Water" Guidelines", as part of the Guidelines to avoid disturbance to seabird and waterbird colonies in Canada. Available at: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/avoid-disturbance-seabird-waterbird-colonies-canada.html>

- 1 • The Marine Birds VC;
- 2 • CEAA 2012 5(1)(a)(iii): migratory birds as defined in subsection 2(1) of the
- 3 *Migratory Birds Convention Act, 1994*; and
- 4 • Wildlife species subject to SARA 79(2): great blue heron, barn owl, little brown myotis,
- 5 Cassin's auklet and marbled murrelet.

6 The EAO evaluated the potential effects to the above by considering construction, operations
7 and decommissioning activities that could affect wildlife and marine bird habitat quality and
8 quantity, distribution and abundance.

9 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

10 Based on mitigations proposed in the Application and issues raised during Application review,
11 the EAO proposes the following provincial conditions and recommends KMMs under CEAA
12 2012:

- 13 • Condition 10: Construction Environmental Management Plan (provincial condition),
14 which includes requirements for lighting, noise and wildlife and wildlife habitat
15 management, and stormwater management and erosion and sediment control;
- 16 • Condition 11: Operational Environmental Management Plan (provincial condition),
17 which includes the requirements for vegetation and wetland management, lighting,
18 noise and wildlife and wildlife habitat management and monitoring;
- 19 • Condition 18: Vegetation and Wetland Management and Wetland Offsetting Plan, which
20 includes requirements for vegetation and wetland creation and restoration; and
- 21 • Key mitigation measures under CEAA 2012 to reduce effects to migratory birds,
22 including a Wetland Compensation Plan (KMM).

23 **Residual effects:** After considering all relevant proposed mitigation measures, the EAO
24 concludes that TMJ would result in the following residual adverse effects for the Application
25 scenario and BVS:

- 26 • Wildlife and Wildlife Habitat VC:
 - 27 ○ Loss or alteration of habitat from site preparation, ground stabilization, and
 - 28 construction of onshore and offshore facilities during construction and
 - 29 associated with the removal of facilities during decommissioning;
 - 30 ○ Sensory disturbance from noise and light during construction, operations and
 - 31 decommissioning; and
 - 32 ○ Increased risk of mortality during construction, operations, and
 - 33 decommissioning.
- 34 • Marine Bird VC:
 - 35 ○ Mortality due to collisions with vessels and disorientation from vessel lighting.

- 1 The EAO's characterization of the expected residual effects of TMJ on the Wildlife and Wildlife
- 2 Habitat VC (Table 23) and Marine Bird VC (Table 24) are summarized below, as well as the
- 3 EAO's level of confidence in the effects determination (including likelihood and significance).

4 **Table 23: Summary of residual effects for Wildlife and Wildlife Habitat**

Criteria	Assessment Rating	Rationale
Context	Low to Moderate Resilience	TMJ would occur in an area with a history of anthropogenic disturbances, including past habitat loss and sensory disturbance. Species occurring in the LAA are expected to be habituated to industrial noise and light given the location of TMJ. However, given the current industrialized nature of the TMJ area, wildlife species could possibly be sensitive to further industrial development and increases in vessel traffic and noise. Effects from past development in the region have contributed to moderate resiliency for most wildlife species but have resulted in low resiliency for species of conservation concern.
Magnitude	Habitat Loss or alteration: Negligible to Low	Habitat loss from TMJ would range from 0.13-0.23 ha for amphibians, waterbirds, migratory birds, and little brown myotis, which represents around 0.2% of similar habitat in the RAA.
	Sensory Disturbance: Negligible to Low	<p>The suitability of approximately 0.3 ha (0.33 percent of similar habitat in the RAA) of amphibian habitat, 9.1 ha of double-crested cormorant foraging habitat, 6.9 ha (0.5 percent of similar habitat in the RAA) of great-blue heron foraging habitat, and 0.5 ha of song sparrow nesting and foraging habitat would be affected by noise and light during all TMJ phases. Artificial light is predicted to affect little brown myotis foraging behaviour and use of the LAA due to increased light levels. In-water works would produce the highest noise level and are expected to occur during the day, avoiding bat foraging periods. Daytime noise could affect barn owls roosting in structures (such as manmade buildings).</p> <p>TMJ is located in an industrial area adjacent to existing industrial facilities and various other industrial users which are substantially lit. Mitigation measures proposed to reduce light trespass and noise are expected to be effective in minimizing effects to foraging waterbirds, song sparrow nesting and foraging habitat, migratory birds, little brown myotis and barn owl.</p> <p>Wetland creation and enhancement is also expected to increase the amount and suitability of foraging habitat in the LAA, offsetting a portion of the amount of habitat disturbed. The residual effect of sensory disturbance is predicted to be negligible to low in magnitude for amphibians, water birds, migratory birds, little brown myotis and barn owl.</p>
	Mortality: Negligible to Low	<p>Pre-construction surveys and salvages are predicted to minimize mortality of Pacific chorus frog.</p> <p>Vegetation clearing is expected to occur outside of the general nesting periods for birds, in accordance with applicable provincial and federal regulations.</p>

Criteria	Assessment Rating	Rationale
		<p>Double-crested cormorant, great-blue heron and little brown myotis that forage in the LAA and RAA are expected to be adapted to noise, light, and other infrastructure features associated with an industrial setting and are therefore not expected to strike jetty features.</p> <p>Cormorants are expected to be able to avoid vessels given the slow speed of vessel movements between the TMJ site and Sand Heads; however, mortality associated with vessel strikes could occur. Potential mortality of migratory birds and little brown myotis due to strikes with jetty infrastructure is limited by mitigation measures proposed to reduce light trespass during construction and operations and because TMJ structures would not be supported by a guy wire system or exceed 20 m in height.</p> <p>There are a limited number of vehicles associated with TMJ construction, and TMJ is not located within barn owl nesting or foraging habitat.</p> <p>The residual effect of mortality is predicted to be negligible to low magnitude. TMJ is not anticipated to influence the short- or long-term viability of amphibians, waterbirds, migratory birds, barn owl and little brown myotis.</p>
Extent	Local	Habitat loss: The residual effect of habitat loss is expected to be restricted to the LAA.
	Beyond Regional	Sensory disturbance: Sensory disturbance is primarily expected to be local. However, due to the shape of the RAA, which is generally restricted to the South Arm of the Fraser River and the south half of Tilbury Island and close to the TMJ site, sensory disturbance from light and noise is expected to extend beyond the RAA.
	Regional	Mortality: The residual effect of mortality is expected to be primarily restricted to the LAA; however, strikes with vessels could occur in the RAA.
Duration	Medium-term	Habitat loss: The effects of habitat loss are expected to be medium-term following construction, until estuarine marsh enhancements to offset the loss of habitat and improvements to the riparian are fully functional, which could take several years to achieve.
	Long-term	Sensory disturbance: Noise and light are predicted to affect habitat during all TMJ phases. Noise levels are predicted to be highest during construction.
	Long-term	Mortality: The effect of mortality is predicted to occur during all TMJ phases.
Frequency	Continuous	Habitat loss: The residual effects of habitat loss are expected to be continuous until estuarine marsh enhancements to offset the loss of foraging habitat and improvements to the riparian area are fully functional following construction.
	Continuous	Sensory disturbance: The residual effect of sensory disturbance is predicted to occur continuously over the life of TMJ.
	Infrequent	Mortality: The residual effect of mortality is predicted to be infrequent.

Criteria	Assessment Rating	Rationale
Reversibility	Reversible	Habitat loss: The residual effects of habitat loss are considered reversible in the long term because the jetty and other structures would be removed during decommissioning and habitat would be restored.
		Sensory disturbance: The residual effect of sensory disturbance is considered reversible, as noise and light produced by TMJ would cease following decommissioning.
		Mortality: The residual effect is present for the duration of TMJ and the effect pathway is reversible during decommissioning. Losses due to infrequent mortality are likely to be offset by natural recruitment through reproduction and migration, and the populations are expected to recover from possible mortality.
Likelihood	There is a high likelihood of residual effects due to unavoidable habitat loss and sensory disturbance. It is expected that riparian and estuarine marsh enhancements and creation would offset the direct loss of habitat. There is a low likelihood of long-term residual effects following successful implementation of habitat offsetting. Given the location of TMJ, it is expected that species using the LAA are adapted to the industrial setting. With effective implementation of mitigation (pre-construction surveys and salvage, lighting) and monitoring measures identified in TJLP’s Wildlife Management Plan, the likelihood of mortality is predicted to be low.	
Confidence	The EAO’s confidence in the effects assessment is moderate. There is a high degree of certainty that habitat would be lost and some uncertainty in the wetland restoration and creation related to the success of the offsetting and the lag time to become effective. TJLP would be required to construct offsets or conduct enhancements promptly to minimize time lag effects between the removal and offsetting. There is also some uncertainty in the response of wildlife, in particular migratory birds, in a highly industrialized setting to increases in light and noise, and risk of mortality of aquatic birds due to vessel strikes during transit.	
Significance	Given the low magnitude of predicted residual effects, the primarily local extent and the EAO’s proposed TOC and recommended KMMs under CEAA 2012 (Appendix 1), the EAO concludes that the residual effects of the habitat loss and alteration, sensory disturbance and mortality are not likely to cause significant adverse environmental effects to wildlife and wildlife habitat in the region.	

1 **Table 24: Summary of residual effects for Marine Birds**

Criteria	Assessment Rating	Rationale
Context	Low to Moderate Resilience	The Marine Bird MSA Area includes Important bird areas (IBA), provincial parks, ecological reserves, wildlife management areas, and two national park reserves. Although shipping related mortality (excluding accidents and malfunctions) are not considered a major threat to marine bird species at risk, the MSA area is a heavily utilized marine environment with occasionally high levels of marine traffic in the shipping lanes. Marine birds are expected to have a moderate degree of resilience to imposed stresses from shipping.

Criteria	Assessment Rating	Rationale
Magnitude	Negligible to Low	TMJ-related LNG carriers, bunker vessels and tugs are not expected to use high-powered artificial lights for navigation that are shown to have the most pronounced effect on marine birds. Overall vessels movements associated with TMJ are predicted to be 0.6 percent, on average, of the overall movements in the Marine Bird MSA area. Residual effects of mortality due to collisions with or disorientation from TMJ-related vessels is considered negligible to low magnitude as it is expected to affect only a small number of individuals.
Extent	Marine Bird MSA	The extent of the residual effect of mortality is the Marine Bird MSA Area, although it is acknowledged that shipping associated with TMJ would continue beyond the 12 nm limit.
Duration	Long-term	The potential for interaction with LNG vessels is expected to continue throughout operations. The risk or mortality would cease after decommissioning; however, residual effects of mortality may persist beyond the termination of TMJ-related shipping.
Reversibility	Reversible	The residual effect is present for the duration of TMJ and is reversible during decommissioning. Losses due to infrequent mortality are likely to be offset by natural recruitment through reproduction and migration, and the populations are expected to recover from possible mortality.
Frequency	Infrequent	Although vessel movements would occur more frequently than once per week, the residual effect of mortality is predicted to be infrequent. Fork-tailed storm petrel mortality is predicted to occur infrequently as mortality due to collisions or fatigue from disorientation due to lights from TMJ-related vessels is expected to be rare. Marbled murrelet and Cassin's auklet mortality associated with TMJ-related shipping is predicted to occur infrequently given the limited overlap between foraging habitat and the shipping route.
Likelihood		The likelihood of the fork-tailed storm petrel, marbled murrelet or Cassin's auklet injury or mortality due to TMJ-related shipping is considered low. It is expected that species occurring in the Marine Bird MSA have moderate resiliency to imposed stresses from shipping related activities
Confidence		The EAO's confidence in the effects assessment is moderate for the at-risk marine bird focal species recognizing that there is uncertainty in the time required for a population to recover from individual mortality. Although there may be a lack of vessel-based survey data within the MSA and existing information regarding populations trends of marbled murrelet and Cassin's auklet and recovery of marbled murrelet, conservative assumptions have been made in the assessment.
Significance		Given the negligible to low magnitude and infrequency of predicted residual effects in the Marine Bird MSA Area, the EAO concludes that the residual effects of the mortality due to collisions with vessels and disorientation from vessel lighting are not likely to cause significant adverse effects to the Marine Bird VC in the region. Collisions with vessels is not considered a dominant threat to fork-tailed storm petrel, marbled murrelet or Cassin's auklet in B.C. TMJ-related shipping is not expected to contribute to the factors that have been established as major threats to the species. Collisions with vessels are not expected to

Criteria	Assessment Rating	Rationale
		change the viability of the populations or result in a measurable effect to regional populations.

1 5.9.5 CUMULATIVE EFFECTS ASSESSMENT

2 During the EA, Indigenous Groups noted that under existing conditions, without TMJ, industrial
3 activities are collectively affecting wildlife and wildlife habitat in the RAA and Marine Bird MSA
4 Area. The EAO notes that there are cumulative effects occurring to wildlife habitats and
5 ecosystems without TMJ which may be affecting wildlife populations. The EAO notes that there
6 are uncertainties regarding the thresholds for population level health and viability for wildlife
7 species in the Regional Study Area (RSA) and Marine Bird MSA.

8 5.9.5.1 WILDLIFE AND WILDLIFE HABITAT

9 The Fraser River Delta is both an area of historic wetland loss and an area of regional
10 importance to birds. Approximately 70 percent of the Fraser River Estuary's wetlands have
11 been diked, drained and filled to reclaim land for development. The shoreline of the
12 Fraser River South Arm is generally characterized by extensive industrial activity. TJLP's wetland
13 enhancements and creation to offset the direct loss of habitat may take several years to
14 achieve full functionality, and sensory disturbance from noise, light and mortality are predicted
15 during all phases of TMJ.

16 Residual effects from TMJ may cumulatively interact with past, present and reasonably
17 foreseeable future projects and activities in the Wildlife and Wildlife Habitat RAA, including:

- 18 • Coast 2000 Terminals;
- 19 • Vancouver Fraser Port Authority Fraser River Annual Dredging Program;
- 20 • FortisBC Tilbury LNG Plant expansion project;
- 21 • Fraser Wharves;
- 22 • Delta Grinding Facility;
- 23 • Marine shipping;
- 24 • Pattullo Bridge;
- 25 • SeaSpan;
- 26 • Urban infrastructure development;
- 27 • VAFFC;
- 28 • Vancouver Fraser Port Authority Habitat Enhancement Program; and
- 29 • Varsteel.

30 Contributions from past and present sources were captured by TJLP in its description of
31 baseline conditions and informed the identification and analysis of the residual effects

1 discussed above. These projects and activities were considered in the EAO's assessment of
2 cumulative effects.

3 ***LOSS OR ALTERATION OF HABITAT***

4 TMJ would result in a direct loss of 0.23 ha of wetland habitat, and TJLP is expected to create or
5 enhance approximately 1.2 ha of wetland habitat, which would result in a gain of 0.97 ha. Once
6 achieved, the quality of the habitat for wildlife and migratory birds would be improved over the
7 current condition in which the site has existed in recent decades as a result of heavy industry.
8 As explained in the cumulative effects section of the Vegetation VC ([Section 5.8.5](#)), it is
9 anticipated that future projects and activities in the RAA would be required to apply best
10 management practices and offsetting for any wetland losses that cannot be adequately
11 addressed through other mitigation measures. Cumulative effects related to habitat loss or
12 alteration are predicted to be medium-term (with effective creation and enhancement of
13 wetland habitat), low in magnitude, reversible after decommissioning and not significant.

14 ***SENSORY DISTURBANCE FROM NOISE AND LIGHT***

15 In the RAA, TMJ is situated within a noise scape where the existing noise conditions are
16 generally greater levels that tend to alter wildlife behaviour. The EAO acknowledges that
17 continued presence of birds and bats in the region may not indicate that they are fully
18 habituated to the level in noise and artificial lighting. The shoreline of the Fraser River South
19 Arm is generally characterized by extensive industrial activity and is highly urbanized and TMJ is
20 not expected to influence existing level of brightness regionally. Migratory birds, in particular,
21 are sensitive to the existing artificial light at night. For both the Application scenario and BVS,
22 cumulative effects related to sensory disturbance from noise and light are predicted to be
23 moderate magnitude during construction (when noise levels are highest), low magnitude during
24 operations, continuous during all phases of TMJ, reversible after decommissioning and not
25 significant. The EAO acknowledges that there is some uncertainty in how vessel movements
26 may affect the patterns of river use by aquatic birds given the industrial and urbanized setting.
27 Future projects in the RAA would be required to adhere to safety standards for lighting and
28 would apply BMPs to reduce noise as well as fugitive lighting at night.

29 ***INCREASED RISK OF MORTALITY***

30 Artificial light may also contribute to cumulative effects on migratory bird mortality in the RAA.
31 As stated above, the TMJ site is not expected to influence existing level of brightness in the LAA
32 or RAA. The RAA is in a busy shipping area, and cumulative effects related to mortality
33 associated with vessel strikes could occur. Beyond the TMJ site, vessels would follow
34 navigational routes regularly used for vessel movements within the LAA and RAA. Given the
35 slow speed of vessel movements in the Fraser River and the highly industrialized landscape, the
36 predicted magnitude of cumulative effects of wildlife mortality related to artificial light and

1 vessel strikes for both the Application scenario and BVS is predicted to be low magnitude,
2 reversible after decommissioning and not significant.

3 **5.9.5.2 MARINE BIRDS**

4 All projects and activities with a marine shipping or vessel activity component were considered
5 to interact with residual effects to the Marine Bird VC. For the Marine Bird MSA Area, a
6 complete list of existing and reasonably foreseeable projects considered is provided in the MSA
7 (Table 2.0-6). Reasonably foreseeable future projects and activities that involve shipping
8 activities would contribute to increase the risk of injury and mortality on marine birds. In the
9 MSA, TMJ would contribute an additional 236 vessel movements, which is 0.6 percent, on
10 average, of the total overall vessel movements in the Marine Bird MSA area. This increase in
11 marine traffic has the potential to affect Marine Birds through increased mortality risk. The
12 cumulative effects of marine bird mortality related to vessels in the Marine Bird MSA Area is
13 predicted to be low magnitude, the mortality risk would be reversible after decommissioning
14 and overall not significant.

15 **5.9.6 CONCLUSIONS**

16 Considering the above analysis and the conditions identified in the CPD and TOC, including
17 Condition 10: Construction Environmental Management Plan, Condition 11: Operations
18 Environmental Management Plan, Condition 12: Water Quality Management Plan, and
19 Condition 18: Vegetation and Wetland Management and Wetland Offsetting Plan, (which would
20 become legally binding if an EAC is issued), and recommended KMMs under CEAA 2012 to
21 reduce effects to migratory birds, including a Wetland Compensation Plan (Appendix 1), the
22 EAO is satisfied that TMJ would not have significant residual or cumulative adverse effects on
23 the Wildlife and Wildlife Habitat or Marine Birds VCs.

24 **6 ASSESSMENT OF HUMAN HEALTH EFFECTS**

25 **6.1 HUMAN HEALTH**

26 **6.1.1 BACKGROUND**

27 Human Health was selected as a VC based on its importance to Indigenous Groups, the public
28 and other stakeholders as well as for its regulatory importance. The Application evaluated
29 potential adverse effects to Human Health through effects stemming from potential changes to
30 air quality, water quality, soil quality and country foods.

1 Effects to community connectedness and social support as well as the effects of noise and light
2 are considered in the Socio-community section ([Section 8.1](#)) of this Report. For the EAO's
3 assessment of potential effects of dredgeate disposal to the Human Health VC, please see
4 [Section 2.2.5](#) (Alternative Means of Undertaking the Project) of this Report. The assessment of
5 potential effects to Human Health supports the assessment of potential effects to Socio-
6 community ([Section 8.1](#)), Land and Marine Resource Use ([Section 8.2](#)), Health and Socio-
7 Economic Conditions of Indigenous Peoples ([Section 11.3](#)) and Current Use ([Section 11.4](#)) of this
8 Report.

9 **MARINE SHIPPING ASSESSMENT**

10 Human Health was included as a VC for the MSA because marine shipping may affect Human
11 Health beyond the RAA of the original assessment area (that is, jetty to Sand Heads) from
12 exposure to chemical emissions associated with marine shipping in the Salish Sea and the Strait
13 of Juan de Fuca. The MSA evaluated potential adverse effects to Human Health through effects
14 stemming from potential changes to soil, sediment, surface water, country food and air quality.

15 The MSA for Human Health incorporates conclusions found from the MSA of Air Quality
16 ([Section 5.1](#)) and Greenhouse Gas Management ([Section 5.2](#)), Land and Marine Resource Use
17 ([Section 8.2](#)), Current Use ([Section 11.4](#)) and Visual Quality ([Section 8.3](#)).

18 **6.1.1.1 REGULATORY CONTEXT**

19 The assessment of risk to the Human Health VC was evaluated using relevant federal and
20 provincial risk assessment guidance provided by:

- 21 • The B.C. Ministry of Environment and Climate Change Strategy (ENV) (ENV 2017a, b);
- 22 • Health Canada (Health Canada 2010a, 2012); and
- 23 • The United States Environmental Protection Agency (US EPA 1989).

24 Section 5(1)(c)(i) of the CEAA 2012 is also relevant to the human health assessment as changes
25 to the environment from TMJ could be linked to the health and socio-economic conditions of
26 Indigenous peoples (see [Section 11.3](#) of this Report, Health and Socio-Economic Conditions of
27 Indigenous Peoples).

28 In addition, this assessment relied on recommended exposure limits for airborne contaminants
29 of potential concern (COPC) that are predicted to be released from TMJ. Referenced exposure
30 limits include the California Environmental Protection Agency (CalEPA) - Office of
31 Environmental Health Hazard Assessment, the Agency for Toxic Substances and Disease
32 Registry, HC, Metro Vancouver, ENV, CCME, United States Environmental Protection Agency,
33 World Health Organization, Ontario Ministry of the Environment, Conservation and Parks, and
34 Texas Commission on Environmental Quality.

1 6.1.1.2 BOUNDARIES

2 The LAA for the Human Health VC includes a 10 km by 10 km area centered around the TMJ site
3 boundary plus a one km buffer on each side of the navigation route between the TMJ site and
4 Sand Heads. The RAA includes a 25 km (north-south) by 30 km (east-west) rectangle comprising
5 the TMJ site and the LAA. The Human Health RAA corresponds to the Air Quality VC RAA
6 ([Section 5.1](#) of this Report). The Air Quality RAA was established to provide a regional context
7 for the assessment of potential TMJ effects. The RAA also encompasses the area within which
8 the residual effects of TMJ on Air Quality are likely to combine with the effects of other projects
9 and activities to result in a cumulative effect.

10 MARINE SHIPPING ASSESSMENT

11 The LAA is defined as a 10 km buffer around the inbound and outbound marine shipping lanes
12 within the MSA spatial boundary reflecting the area where TMJ associated vessels could
13 interact with Human Health. The MSA RAA (MRAA) corresponds to the Salish Sea area which
14 includes the southern part of the Georgia Strait, Rosario Strait, Middle Channel and Juan de
15 Fuca Strait from south of Puget Sound to the 12-nautical mile limit. The RAA was defined to
16 allow for selection of near-shore land-based receptor locations and is consistent with the Air
17 Quality RAA. The human health MSA spatial boundaries are shown in Figure 4.5-1 of the MSA.

18 The MSA spatial boundaries include the northern part of the Olympic Peninsula and western
19 parts of Washington, United States of America (USA). Health agencies in Canada and the USA
20 report statistics in a different manner, which may constrain the direct comparisons of health
21 indicators between the two countries.

22 6.1.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE 23 APPLICATION

24 6.1.2.1 BASELINE INFORMATION AND POTENTIAL PROJECT EFFECTS

25 The Application conducted a review of existing conditions of concentrations of metals and
26 polycyclic aromatic hydrocarbons (PAH) in soil, berries and fish tissue in the LAA and RAA. The
27 review included information on water quality, sediment quality and air quality baseline data.

28 To determine the potential health effects of TMJ, a Human Health Risk Assessment (HHRA) was
29 conducted to evaluate potential risks at receptor locations where people are known to be
30 present, including communities, Indigenous harvesting areas and recreational areas that are in
31 proximity of TMJ (the list of receptor locations is provided in Figure 9 of this Report). This was
32 done by identifying the chemicals anticipated to be present in the emissions from TMJ,
33 predicting the TMJ-related changes to environmental media (such as, soil, water, country foods
34 and air) which people could be exposed to and estimating and assessing the risk these

1 predicted changes could have on human health. The COPCs were selected by identifying the
2 chemicals anticipated to be present in the emissions from TMJ which exceed their respective
3 most stringent applicable screening criteria.

4 Two scenarios were identified in the Application to represent operations: 1) the Normal
5 Operations Scenario which represents the typical operation at the facility (LNG carrier and
6 bunker vessel calls and loading, security boat and tug activity as well as fugitive emissions from
7 the pipeline); and 2) the Dredger Operations Scenario which represents the two-week period of
8 maintenance occurring once per year where dredging takes place at the TMJ site (no LNG
9 vessels would call during this period)

10 The Application stated that the potential primary pathways of effects on Human Health were
11 determined to be changes to air quality, soil quality and country food (berries and game)
12 quality. Considering mitigations, TJLP did not predict residual effects to water quality due to
13 TMJ; therefore, exposure to surface water was not considered a primary pathway and not
14 evaluated further in the Human Health assessment.

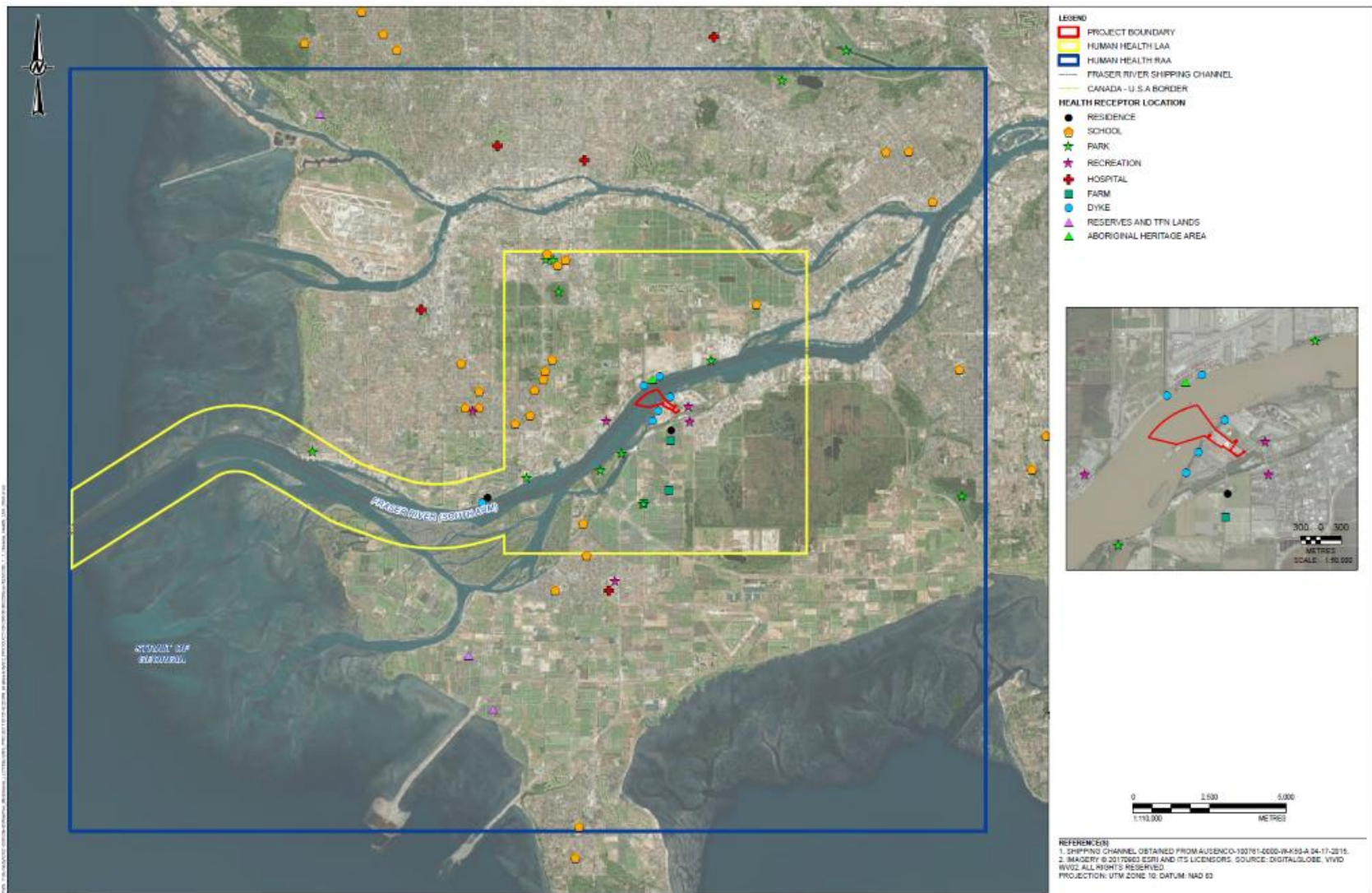
15 **AIR QUALITY**

16 Residents and people spending time in the RAA may be exposed to airborne contaminants
17 emitted from TMJ (mainly from combustion exhaust from LNG carriers and bunker vessels, as
18 well as fugitive emissions) through direct inhalation. Baseline information for air quality
19 collected by TJLP includes metals, VOCs, PAHs and criteria air contaminants (e.g., PM, including
20 PM₁₀ and PM_{2.5}, NO₂ and SO₂).

21 The Application used Hazard Quotients (HQ) and Incremental Lifetime Cancer Risk (ILCR) as the
22 two indicators to predict TMJ-related change to the Human Health VC. The HQ compares the
23 potential concentration of a substance as a result of TMJ with human health exposure limits.
24 HQs equal to or below 1.0 indicate negligible predicted adverse health effect. The residual
25 effects analysis was completed using HQs calculated based on acute 1-hour exposure to the
26 *maximum* predicted air concentration, which were based on conservative assumptions
27 generally occurring for short durations. ILCRs indicate the increased risk attributed to
28 constituent exposure above background cancer risks. ILCRs were calculated for substances
29 identified as carcinogenic in the chronic inhalation assessment by comparing the *maximum*
30 predicted concentrations with toxicity benchmarks.

31

32



1
2 **Figure 9: Human Health Receptor Locations for the original Application area (jetty to Sand Heads).**

1 Acute Inhalation Assessment

2 The acute inhalation assessment evaluated contaminants potentially emitted from TMJ that
3 may have an adverse effect on Human Health following short-term (one-hour) exposure.

4 The HQs for NO₂ exceeded 1.0 at each of the 58 human health receptor locations in both the
5 Dredger and Normal Operations Scenarios for the Baseline and Application Case (the CAAQS
6 were used as the human exposure limit for NO₂). The Application Case (baseline plus project)
7 Dredger Scenario HQs ranged from 1.1 to 2.0 at the human health receptor locations while
8 Application Case Normal Operations Scenario HQs ranged from 1.1 to 2.6. Project Only HQs
9 during the Dredger Scenario ranged from 0.00064 to 0.9 and 0.012 to 1.5 during the Normal
10 Operations Scenario (Project Only HQs greater than 1.0 were identified at three human health
11 receptor locations: maximum discrete receptor⁹⁸, Dyke North 1 and TI'uqtinus⁹⁹).

12 Application Case HQs for DPM ranged from 0.43 to 4.6 at the receptor locations (HQ of 4.6 at
13 the maximum discrete receptor and Dyke North 1) and 9.6 at the maximum point of
14 impingement¹⁰⁰, benzo(a)pyrene HQs ranged from 0.046 to 2.1, cyclopenta(c,d)pyrene HQs
15 ranged from 0.057 to 2.6, 2,5-dimethylbenzaldehyde HQs ranged from 0.037 to 1.6 and
16 crotonaldehyde HQs ranged from 0.017 to 0.75 at the receptor locations and (exceeded 1.0 at
17 the maximum point of impingement only (HQ = 1.6)). HQs for these constituents (except for
18 crotonaldehyde, which exceeded at the maximum point of impingement only) exceeded 1.0 at
19 3 to 18 of the human health receptor locations.

20 Project Only HQs for DPM ranged from 0.094 to 4.2 (Project Only HQ of 4.2 at the maximum
21 discrete receptor and Dyke North 1) and 0.046 to 2.1 for benzo(a)pyrene. Baseline Case HQs for
22 DPM and benzo(a)pyrene were below 1.0. Baseline Case HQs were not calculated for
23 cyclopenta(c,d)pyrene, 2,5-dimethylbenzaldehyde and crotonaldehyde as the predicted
24 baseline concentrations were zero and not expected to be emitted from any of the existing
25 facilities within the RAA. For this reason, Application Case and Project Only Case HQs for these
26 constituents were the same. HQs for each receptor location and COPC can be found in
27 Appendix 08.1-5 (Human Health Inhalation Risk Assessment Tables) of the Application.

⁹⁸ The maximum discrete receptor is the maximum concentration of the 1,090 sensitive receptor locations.

⁹⁹ The Application refers to this receptor location as 'TI'uqtinus', however, this location is referred to as the 'former Indigenous village site' in the EAO's Assessment Report as multiple Indigenous have interest in this site.

¹⁰⁰ The maximum point of impingement is the maximum concentration predicted within the RAA, outside of developed TMJ areas where public access is not restricted, and where the Ambient Air Quality Objectives apply (see Air Quality assessment Figure A-1 in Section 4.4). The Maximum Point of Impingement (MPOI) is considered to be a hypothetical "worst case" location and it did not overlap with any of the receptor locations.

1 The Application reported that while there are exceedances of the threshold HQ of 1.0 at certain
2 human health receptor locations (indicating there are potential effects to human health), the
3 effects are not significant as the predicted effects are highly conservative and the probability
4 (percent of time per year) of an exceedance is low (ranging from 0.00071 percent to
5 3.1 percent).

6 **Chronic Inhalation Assessment**

7 The chronic inhalation assessment evaluated contaminants potentially emitted from TMJ that
8 may have an adverse effect to human health following long-term exposure for two receptors,
9 resident and recreational. The estimated HQs for the recreational receptor were below 1.0 and
10 not discussed further. For the resident, Baseline Case HQs for NO₂ (based on the annual
11 maximum air concentration) ranged from 1.0 to 1.1. The annual NO₂ Application Case HQs
12 ranged from 1.0 to 1.1. The annual NO₂ Project Only Case HQs ranged from 0.00033 to 0.045.
13 The potential health effects from chronic exposures to NO₂ include allergic reactions, asthma,
14 and an increased susceptibility to respiratory infections. Chronic cadmium and chromium HQs
15 were below 1.0 at each receptor location evaluated in the Baseline Case, Application Case and
16 Project Only Case.

17 The potential health effects from chronic exposures to cadmium and chromium include
18 increased incidences of lung, tracheal and bronchus cancer. ILCRs for both the cadmium and
19 chromium exceeded the threshold of 1×10^{-5} (1 in 100,000) at each receptor location evaluated
20 in the Baseline and Application Cases. Baseline ILCRs were the same as the Application Case
21 ILCRs indicating that current conditions are driving the increased ILCRs rather than emissions
22 from TMJ.

23 **SOIL QUALITY**

24 Particulate matter containing constituents from dust generation or from incomplete
25 combustion may deposit directly and accumulate onto soil in the LAA and RAA.

26 Baseline soil quality was determined through the analysis of soil data collected in July 2015 at
27 15 sample locations which were analyzed for metals and PAHs. These soil concentrations
28 represent the baseline soil quality. Predicted surface soil concentrations as a result of TMJ were
29 compared to soil quality guidelines. The predicted metal and PAH concentrations including the
30 contribution from TMJ were found to be below the applicable soil quality guidelines and no
31 constituents of potential concern were identified. Therefore, no exposure pathways to humans
32 were identified.

33 **COUNTRY FOODS - BERRIES**

34 Particulate matter containing constituents from dust generation or from incomplete
35 combustion may deposit directly onto berry surfaces in the LAA and RAA. Berries may also take

1 up contaminants directly from the soil. Some constituents (for example, metals and PAHs) can
2 accumulate in berries that are significant country food sources for local residents. Constituents
3 of potential concern in berries were identified based on the soil data. No constituents of
4 potential concern were identified in the baseline soil data or the predicted Application Case soil
5 quality, therefore, there were no exposure pathways to humans identified through the
6 ingestion of berries.

7 **COUNTRY FOODS - GAME**

8 Game (for example, mammals and birds) may ingest soil, surface water or vegetation from the
9 LAA and RAA. Surface water quality is not expected to be affected by TMJ; however, changes to
10 constituent concentrations in game tissue may occur if there are changes to soil and vegetation
11 quality. No constituents of potential concern were identified in measured baseline or predicted
12 Application Case soil or vegetation quality; therefore, no exposure pathway to humans was
13 identified through the ingestion of game.

14 **BUNKER VESSEL SCENARIO**

15 For the air quality pathway, TJLP determined the list of COPCs defined in the Application did not
16 change with the updated predictions for the BVS and there were no new COPCs identified due
17 to changes in the predicted annual air quality concentrations for the BVS. For the BVS, the
18 changes in the air quality predictions for the Application Case were negligible, with SO₂
19 increasing by <0.1% in the updated predictions and methane increasing by <0.1%.
20 Concentrations of all other parameters either stayed the same or decreased compared to those
21 presented in the Application. TJLP concluded that the comparative analysis confirmed that BVS
22 does not result in changes to air quality that would affect the conclusions of the Human Health
23 Assessment presented in the Application.

24 For the multimedia pathway, TJLP evaluated predicted deposition rates and determined that
25 the BVS would not result in an increase in deposition rates (i.e., deposition of COPCs onto soil
26 and country foods would not increase) from what was assessed in the Application. TJLP
27 concluded that a quantitative multimedia analysis was not warranted.

28 **MARINE SHIPPING ASSESSMENT**

29 Air quality was determined to be the only primary pathway to potential effects on human
30 health for the MSA area. Constituents considered in the assessment were those identified to be
31 emitted by TMJ-related marine shipping which include carbon monoxide (CO), NO₂, SO₂, PM_{2.5}
32 and PM₁₀. Concentrations of CO, SO₂, and PM₁₀ were below the respective one-hour and
33 24-hour air quality thresholds and were therefore not carried forward in the assessment. The
34 MSA evaluated the short-term (acute) health effects. Long-term (chronic) exposure health
35 effects from these constituents were not evaluated because the TMJ-related vessel traffic is

1 small compared to the existing marine traffic. The TMJ vessels are transient and an intermittent
2 emission source with respect to individual receptor locations on an annual basis.

3 Air concentrations for NO₂ and PM_{2.5} were predicted for two scenarios; Normal Case (emissions
4 from LNG-powered vessel and escort tug) and Abnormal Case (worst case scenario, considering
5 emissions from a diesel-powered vessel and escort tug). One-hour NO₂ Baseline Case HQs were
6 below 1.0 at each receptor location ranging from 0.60 – 0.97. Application Case HQs were above
7 1.0 at all receptor locations except at two locations during the Normal Case (ranging from 0.67
8 – 1.9) and exceeded 1.0 at all receptor locations during the Abnormal Case (ranging from 1.2 –
9 3.6). 24-hour PM_{2.5} HQs for the Baseline and Application Case were similar (ranging from 0.67
10 to 1.3) during both the Normal and Abnormal Cases indicating the existing concentrations in
11 the MSA area are the main contributor to PM_{2.5}, not TMJ.

12 **6.1.2.2 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

13 The Application noted that mitigation measures proposed for Water Quality in [Section 5.5](#) of
14 this Report and Air Quality in [Section 5.1](#) of this Report are classified as highly effective and
15 were factored into the Human Health assessment and are expected to mitigate potential
16 effects on Human Health. TJLP did not propose monitoring plans specific to Human Health as
17 the mitigation measures for Water Quality and Air Quality would address the key pathways of
18 exposure that have the potential to affect human health.

19 The Application proposed to develop an Air Quality Management Plan that would include
20 measures to manage air emissions and fugitive dust during construction, operations and
21 decommissioning. The following BMPs to address air emissions were proposed under the plan:

- 22 • Ongoing routine maintenance of vehicles and implement engine idling time restrictions
23 where practical on vehicles/ vessels during construction;
- 24 • Reducing emissions as far as possible from marine vessels by reducing engine use
25 whenever practicable during operations; and
- 26 • Implementing an appropriately designed leak detection and repair program for the
27 project LNG conveyance system.

28 No additional mitigation measures were proposed by TJLP as part of the BVSA.

29 **6.1.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 30 **IDENTIFIED DURING APPLICATION REVIEW**

31 The following key issues related to the assessment of Human Health for TMJ were identified
32 during Application review and based on feedback from the Working Group:

- 33 • A quantitative carcinogenic evaluation of risks associated with exposure to DPM;

- 1 • Inclusion of a quantitative evaluation of PM_{2.5} in the Human Health Assessment; and
- 2 • Residual effects of one-hour NO₂ and 24-hour PM_{2.5}.

3 ***DIESEL PARTICULATE MATTER CARCINOGENIC RISK CALCULATION***

4 HC expressed concerns that a carcinogenic risk assessment was not completed for DPM, as
5 background exposure concentrations themselves may be sufficient to be associated with
6 adverse health effects. HC suggested potential health risks be characterized using the CalEPA
7 approach for a quantitative assessment or using a robust qualitative assessment.

8 In response to HC's request, TJLP provided a quantitative evaluation of carcinogenic
9 risks from exposure to DPM to determine if DPM as a carcinogen would pose an adverse
10 health effect to humans following chronic exposure. TJLP concluded that both the
11 Baseline and Application Case ILCRs exceeded the threshold of 1 in 100,000 (1x10⁻⁵) at
12 each receptor location. The Application Case ILCRs were similar to Baseline Case ILCRs
13 indicating that TMJ's overall contribution to DPM is minimal. TJLP stated that these
14 predictions are considered highly conservative as diesel powered vessels were used in
15 the modelling (i.e., to predict air concentrations), whereas TJLP is expecting at least
16 90 percent of vessels called to be LNG powered, greatly reducing DPM emissions.

17 Overall, TJLP found the residual effect of exposure to DPM negligible and not significant.

18 The EAO is of the view that the issue discussed is adequately resolved for the purposes of the
19 EA. In the modelling conducted for the Application, TJLP assumed that the number of crude oil-
20 based fueled LNG carriers calling to TMJ would be no greater than 10 percent, which would
21 reduce DPM emissions. The EAO is proposing Condition: 19: Air Quality Management Plan,
22 which would include mitigation measures TJLP would implement to reduce adverse effect to air
23 quality, require TJLP to estimate or measure air quality parameters attributable to TMJ, and
24 include triggers that would cause TJLP to take corrective action to reduce air quality
25 parameters. The EAO is also recommending a KMM under CEEA 2012 for an Air Quality
26 Management Plan, which would include how TJLP is participating in the identification and
27 implementation of regional environmental management measures and cumulative effects
28 monitoring to manage Air Quality.

29 ***INCLUSION OF PM_{2.5} IN THE HUMAN HEALTH ASSESSMENT***

30 HC recommended that PM_{2.5} be carried forward into the Human Health assessment for the
31 original assessment area (that is, jetty to Sand Heads) as a COPC because it is a non-threshold
32 contaminant, meaning there is no threshold below which there would be no potential for
33 adverse health effects as per HC's Air Quality guidance. HC suggested that the consideration of
34 PM_{2.5} would aid in the implementation of proper mitigation measures and monitoring
35 requirements as well as the development of best practices and follow-up programs.

1 In response to HC, TJLP stated that they agree with the management portion of the
2 request, but because there are already regional comprehensive monitoring plans and no
3 predicted exceedances of PM_{2.5} due to TMJ (which is why PM_{2.5} did not screen in as a
4 COPC for the human health assessment), TJLP is unsure if monitoring on a project
5 specific level would be appropriate. TJLP also noted that there are no additional
6 mitigation measures they could add to reduce PM_{2.5} emissions from vessels in response
7 to PM_{2.5} monitoring as the vessels are not owned by TJLP.

8 The EAO is of the view that inclusion of PM_{2.5} in the Air Quality assessment and not the Human
9 Health assessment for the original assessment area is sufficient in assessing the adverse
10 residual effects as 24-hour PM_{2.5} is only predicted to increase to 26 percent of the air quality
11 objective; annual concentrations are not predicted to increase at all. Additionally, it is the EAO's
12 understanding that this is a highly conservative assessment which uses diesel fueled vessels in
13 the modelling calculations when TJLP estimates that most of the vessels would be LNG powered
14 (minimum 90 percent). The EAO is proposing Condition 19: Air Quality Management Plan and
15 recommending a KMM under CEAA 2012 for an Air Quality Management Plan which would
16 include mitigation measures to reduce adverse effects to air quality. The EAO is of the view that
17 monitoring PM_{2.5} as part of the already existing regional comprehensive monitoring plans is
18 sufficient and not required on a project-specific level. 24-hour PM_{2.5} was included in the MSA
19 and found that 24-hour PM_{2.5} HQs for the Baseline and Application Case are similar (ranging
20 from 0.67 to 1.3) during both the Normal and Abnormal Cases indicating the existing
21 concentrations are the main contributor to PM_{2.5}, not TMJ.

22 **MARINE SHIPPING ASSESSMENT**

23 **Residual Effects of One-hour NO₂ and 24-hour PM_{2.5}**

24 The Agency raised concerns that the predicted concentrations for NO₂ and PM_{2.5} exceed the HQ
25 threshold of 1.0 in several receptor locations and requested further rationale from TJLP as to
26 why these effects are considered negligible. Additionally, Fraser Health requested further
27 information from TJLP regarding the significance for these potential HQ exceedances on human
28 health.

29 In response, TJLP stated that the characterization of residual effects takes into
30 consideration the results of the HHRA. Under the Normal Case, the estimated HQs were
31 less than one for the Project Only Case, indicating that risks from exposure to NO₂ and
32 PM_{2.5} from TMJ by itself are negligible. The Application Case HQs were negligible to low,
33 meaning that the risk to human health is low. TJLP also outlined the conservative
34 assumptions used to predict the HQs including using the most conservative objectives
35 (the CAAQS) which uses values associated with air shed targets, modelling emission

1 levels based on vessels with the largest engine size and using the most conservative
2 screening model.

3 Based on the low risk to human health in the MSA, the conservative assumptions used in the
4 screening model and the low frequency and duration exceedances of the HQ threshold of 1.0,
5 the EAO is of the view that the rationale for negligible effects on human health through air
6 quality is satisfactory and that this issue is adequately resolved for the purposes of the EA. The
7 EAO does not propose any related conditions specific to the issue identified.

8 **6.1.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

9 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
10 on the Human Health VC.

11 The EAO evaluated the potential effects to the Human Health VC by considering construction,
12 operations and decommissioning activities that could affect human health.

13 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

14 Based on mitigations proposed in the Application and issues raised during Application review
15 for air quality, the EAO proposes the following provincial conditions and recommends KMMs
16 under CEAA 2012 for air quality that would also apply to human health:

- 17 • Condition 10: Construction Environmental Management Plan (provincial condition);
- 18 • Condition 11: Operations Environmental Management Plan (provincial condition); and
- 19 • Condition 19: Air Quality Management Plan (provincial condition) and Air Quality
20 Management Plan (KMM) with best management practices to mitigate effects on air
21 quality.

22 **Residual effects:** After considering the proposed mitigation measures to the air quality
23 pathway, the EAO concludes that TMJ would result in the following residual adverse effects to
24 the Human Health VC for the Application scenario and BVS:

- 25 • Acute inhalation exposure to:
 - 26 ○ Nitrogen Dioxide (Normal Operations Scenario);
 - 27 ○ Diesel Particulate Matter;
 - 28 ○ Benzo(a)pyrene;
 - 29 ○ Cyclopenta(c,d)pyrene; and
 - 30 ○ 2,5-dimethylbenzaldehyde.

31 The EAO concludes that the residual effects of one-hour acute exposure to NO₂ (Dredger
32 Scenario) and crotonaldehyde as well as annual chronic exposure to NO₂ (Normal Operations
33 Scenario), cadmium and chromium would be negligible and are therefore not carried forward
34 to significance determination. The EAO came to this conclusion because these COPCs were

- 1 screened through based on a conservative threshold. They also either do not exceed provincial
- 2 objectives or their probability of exceedance is very low (for example, 0.00071 percent chance
- 3 exceedance for crotonaldehyde during Normal Operations Scenario).
- 4 Due to the conservative nature of the air quality predictions and considering most of the
- 5 contributions are from existing conditions, the EAO concludes that effects for one-hour NO₂
- 6 and 24-hour PM_{2.5} in the MSA area are negligible and are therefore not carried forward for
- 7 significance determination.
- 8 The EAO’s characterization of the expected residual effects of TMJ on human health is
- 9 summarized below, as well as the EAO’s level of confidence in the effects determination
- 10 (including their likelihood and significance).

11 **Table 25: Summary of Residual Effects to Human Health**

Criteria	Assessment Rating	Rationale
Context ¹	Low - Moderate resilience	Effects of NO ₂ on human health are characterized as low resiliency and are sensitive to existing conditions as the Baseline Case HQs of NO ₂ exceeds the threshold of 1.0 and Project Only Case HQs are below 1.0 at most locations evaluated. Effects of DPM, benzo(a)pyrene; cyclopenta(c,d)pyrene and 2,5-dimethylbenzaldehyde on human health have moderate resiliency (not sensitive to existing conditions) as Baseline Case HQs are below the threshold of 1.0
Magnitude ²	Moderate	As a result of TMJ, Application Case NO ₂ , DPM, benzo(a)pyrene, cyclopenta(c,d)pyrene and 2,5-dimethylbenzaldehyde HQs are predicted to exceed the established acute threshold of 1.0, ranging from 1.1-4.6 (range of HQs excludes the maximum point of impingement), at the maximum exposure at several of the human health receptor locations. At the maximum point of impingement, the DPM HQ is 9.6 with a probability of exceedance at 0.089 percent. For the BVS, concentrations stayed the same or decreased compared to those presented in the Application.
Extent	Local	Effects on Human Health from TMJ are expected to be localized within the LAA at receptors locations nearest to the TMJ facility.
Duration	Normal Operations: Long-term Dredger Operations: Short Term	The duration of the effect of TMJ on Human Health during the Normal Operations scenario is classified as long-term as effects would persist throughout the entire life-span of TMJ but are not expected to surpass that. The duration of the effect of TMJ on Human Health during the Dredger Operations scenario is classified as short-term as effects would persist for up to two weeks per year during operations.
Reversibility	Reversible to Irreversible	It is expected that air quality would return to its pre-operation conditions following the closure of TMJ. Effects on human health from short-term exposure to air contaminants would generally be

Criteria	Assessment Rating	Rationale
		reversible; however, effects on human health from chronic exposures may be irreversible.
Frequency	<p>Normal Operations: Frequent</p> <p>Dredger Operations: Infrequent</p>	<p>The greatest emission sources, such as LNG bunker vessels and carriers, during the Normal Operations Scenario are not continuous but would be present frequently in the LAA and RAA.</p> <p>Dredging would only occur once for a duration of up to two weeks per year during operations.</p>
Likelihood	<p>There is a low likelihood that TMJ would have an adverse residual effect on the Human Health VC, for the Application scenario or BVS. The probability of the predicted exceedances of benzo(a)pyrene, cyclopenta(c,d)pyrene and 2,5-dimethylbenzaldehyde in a given year are less than 0.05 percent at the receptor locations evaluated, for both the Application scenario and BVS. The predicted probability of exceedance for the one-hour NO₂ ranges from 3.1 percent to 8.3% in a given year, for the Application scenario and BVS, respectively. The probability of the predicted exceedance of DPM in a given year are less than 0.05 percent and 0.25 percent in a given year, for the Application scenario and BVS, respectively. The predicted air concentrations evaluated in the assessment were based on maximum emission rates (i.e., peak emissions and maximum vessel sizes), which are not representative of exposures throughout the entire life of TMJ.</p>	
Significance Determination	<p>In consideration of the conditions identified in the TOC and recommended KMMs under CEAA 2012 as well as the conservative nature of the assessment, the EAO concludes that TMJ would not have significant adverse residual effects on the Human Health VC.</p>	
Confidence	<p>Air quality predictions used the maximum emission rates, however, most of the equipment would not be operating at maximum capacity on a continuous basis. The predicted HQs are considered highly conservative as these compounds screened in as a COPC based on conservative thresholds and the concentrations used to estimate the HQs were highly conservative. One-hour predictions were based on peak hour emissions which are not expected to occur throughout the year. Maximum vessel size was used for all carriers it is assumed that all LNG carriers would be diesel powered while only up to 10 percent of vessels are expected to be diesel powered with the remaining 90 percent (or more) powered by LNG, which would reduce emissions. For the BVS, the highest emitting of the two bunker vessels assessed during operations activities (i.e., berthing, loading, departing) were used for the air quality assessment. In reality, TJLP anticipates a mix of LNG and diesel-powered bunkers. These conservative assumptions produce an overestimate of the potential effects. Considering this, and Air Quality mitigation measures in Section 5.1 of this Report which are classified as highly effective, the EAO has a high level of confidence that residual effects have not been underestimated. However, due to uncertainties around the air thresholds and the air quality predictions, the overall level of confidence for the Human Health assessment is moderate.</p>	
<p>NOTES:</p> <ol style="list-style-type: none"> Context - In the case of the HHRA, context is the comparison of the Application Case risk estimates to those of the Baseline Case to evaluate changes that could be attributed to TMJ. Magnitude – In the case of the HHRA, this is identified based on calculated HQs and ILCRs. 		

1 6.1.5 CUMULATIVE EFFECTS ASSESSMENT

2 The Application stated that it was not possible to conduct a quantitative cumulative effects
3 assessment for Human Health because there was not enough information available to conduct
4 air quality modelling for other certain and reasonably foreseeable projects and activities. Please
5 see Air Quality ([Section 5.1](#)) of this Report for a qualitative analysis of cumulative effects on the
6 Air Quality VC.

7 Benzo(a)pyrene, cyclopenta(c,d)pyrene and 2,5-dimethylbenzaldehyde emissions result from
8 diesel combustion in marine vessels. Benzo(a)pyrene emissions also occur from the adjacent
9 Fortis facility (in the Application Case), although the emissions are much lower than the Project
10 Only emissions. Potential interactions could occur with the VAFFC, the proposed Delta Grinding
11 Facility and the proposed expansion of the Tilbury Seaspans ferries jetty as operation of these
12 projects are likely to contribute emissions of benzo(a)pyrene, cyclopenta(c,d)pyrene and 2,5-
13 dimethylbenzaldehyde at a level that may generate residual effects. Exposure to
14 benzo(a)pyrene, cyclopenta(c,d)pyrene and 2,5-dimethylbenzaldehyde may result in respiratory
15 effects. Since these emissions are caused by combustion of diesel in marine vessels, the
16 interaction would be intermittent. The interaction with VAFFC would be infrequent as only one
17 marine vessel is expected every two weeks. The residual cumulative effects for benzo(a)pyrene,
18 cyclopenta(c,d)pyrene and 2,5-dimethylbenzaldehyde are not considered significant.

19 6.1.6 CONCLUSIONS

20 Considering the above analysis, and having regard to the mitigation measures identified in the
21 provincial TOC including Condition 10: Construction Environmental Management Plan,
22 Condition 11: Operations Environmental Management Plan and Condition 19: Air Quality
23 Management Plan (which could become legally binding as conditions of the provincial EAC) and
24 KMMs under CEAA 2012 for an Air Quality Management Plan (Appendix 1), the EAO is satisfied
25 that TMJ would not have significant adverse residual or cumulative effects on the Human
26 Health VC.

27 6.2 NOISE

28 6.2.1 BACKGROUND

29 Noise was selected as a VC based on its importance to Indigenous Groups, regulators and the
30 public. Results of the noise assessment are incorporated into the assessment of potential
31 effects to Wildlife and Wildlife Habitat and Marine Birds ([Section 5.9](#)), Socio-Community
32 ([Section 8.1](#)), Land and Marine Resource Use ([Section 8.2](#)), Federal Lands, Other Provinces, and

1 Outside Canada ([Section 11.1](#)), Health and Socio-Economic Conditions of Indigenous Peoples
2 ([Section 11.3](#)) and Current Use ([Section 11.4](#)) of this Report.

3 The Application assessed the change in atmospheric noise due to TMJ construction and
4 operations, related to daytime and nighttime noise levels, frequencies of noise level and
5 percentage of highly annoyed people (%HA). Decommissioning-related noise effects were
6 considered equal or similar to those noise effects for construction.

7 The Noise VC was not included in the MSA, because the Application concluded no residual
8 effects to the noise environment from LNG carrier vessels moving in the shipping lanes in the
9 Fraser River. As such, no interactions were predicted for the MSA area as the only TMJ activity
10 in the MSA would be vessel movement.

11 **6.2.1.1 REGULATORY CONTEXT**

12 In support of the assessment, TJLP considered regulatory information from the following
13 sources:

- 14 • BC OGC Liquefied Natural Gas Facility Regulation (Regulation);
- 15 • BC OGC's British Columbia Noise Control Best Practices Guideline (BC OGC Guideline);
- 16 • Health Canada's Guidance for Evaluating Human Health Impacts in Environmental
17 Assessment: Noise (Health Canada Guidance);
- 18 • City of Delta's Noise Control Bylaw; and
- 19 • City of Delta's Zoning Bylaw.

20 **6.2.1.2 BOUNDARIES**

21 The LAA for Noise includes a 1.5 km buffer from the TMJ site boundary and a 1 km buffer that
22 extends along either side of the shipping route, from the TMJ site boundary, ending at Sand
23 Heads. The RAA includes the 3 km buffer from the TMJ site boundary and a 1.5 km buffer that
24 extends from the TMJ site boundary along either side of the shipping route, ending at
25 Sand Heads.

26 Four noise assessment receptors also referred to as noise monitoring sites, were identified in
27 the LAA (Figure 10). The noise assessment receptors varied in distances of 150 to 1,300 m from
28 the TMJ site boundary which included:

- 29 • Receptor 1 (R1) – Residence 440 m south of the TMJ site boundary;
- 30 • Receptor 2 (R2) – Animal shelter 150 m southeast of the TMJ site boundary;
- 31 • Receptor 3 (R3) – Indigenous village site located 300 m north of the TMJ site boundary;
32 and
- 33 • Receptor 4 (R4) – Residence 1,300 m southwest of the TMJ site boundary and within 300
34 m of the shipping route.

1 **6.2.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 2 **APPLICATION**

3 **6.2.2.1 BASELINE INFORMATION AND POTENTIAL PROJECT EFFECTS**

4 The existing conditions are considered the Baseline Case for the acoustic environment and the
5 factors influencing noise. The Baseline Case measured noise sources from natural elements and
6 existing facilities and activities in the RAA using field level measurements at the four
7 assessment receptors (designated noise monitoring sites).

8 The Application considered the noise generated during construction to be temporary with a
9 variability in noise emission levels at the receptors. The potential for adverse residual effect is
10 predicted to occur in the construction of the FTBB and jetty at the R3 monitoring site. R3 is
11 located on the shoreline, described as an industrial area with no residential dwellings.

12 The Application predicted noise levels without mitigations and concluded moderate magnitude
13 residual effects for the increase in noise during construction. The effect on speech
14 comprehension¹⁰¹ is predicted to have a low magnitude effect at R3. The effect on sleep
15 disturbance was predicted to be moderate at R3. Decommissioning activities are expected to be
16 similar to those during construction.

17 Operational noise¹⁰² was estimated as equivalent over daytime and nighttime periods. The
18 Application predicted that the noise generated during operations would have no potential
19 adverse effects at the monitoring sites R1, R2, R3 and R4. Operational activities through all
20 three scenarios, represented a negligible likelihood of a residual effect occurring resulting from
21 an increase in operational noise.

22 ***BUNKER VESSEL SCENARIO***

23 In the BVSA, TJLP noted that noise is assessed over the daytime or nighttime periods and the
24 noise modelling scenarios considered in the Application were established based on the
25 expected capacity of TMJ at a given time (i.e., a maximum of two vessels at berth, plus vessels
26 arriving, departing, and transiting along the route). TJLP stated that the maximum scenario
27 remains unchanged with the proposed increase in annual bunker vessel movements (i.e., no
28 more than two LNG vessels would be present at TMJ at any particular time and therefore no
29 additional vessels would arrive, depart, or transit along the shipping route in the daytime or

¹⁰¹ Health Canada Guidance indicates outdoor noise levels above 55 dBA interferes with speech comprehension. Application noise levels greater than 55 dBA is associated with potential adverse effects.

¹⁰² Noise levels during Operations are calculated through the logarithmic addition of the ambient sound level, established through baseline noise monitoring, and the predicted operations noise level.

1 nighttime periods modelled in the maximum scenario). TJLP concluded that the daytime or
2 nighttime predicted noise levels due to this maximum scenario and the corresponding residual
3 effects characterization would not change with the BVS compared to the Application. TJLP
4 predicts the increase in annual bunker vessels would result in a negligible effect on Noise.

5 **6.2.2.2 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

6 The Application proposed the following mitigation measures to address potential noise effects:

- 7 • Development of a Noise Management Plan, as part of the Construction Environmental
8 Management Plan, including:
 - 9 ○ Advising nearby residents of noise generating activities and scheduling these
10 events to reduce disruption;
 - 11 ○ Establishing heavy equipment muster points at least 500 m from any residential
12 dwelling;
 - 13 ○ Fit equipment with standard mufflers or silencers and maintaining these
14 mufflers/ silencers in good working order; and
 - 15 ○ Take advantage of acoustics screening from existing on-site barriers to shield
16 dwellings from construction equipment noise.
- 17 • Development of a Noise Management Plan, as part of the Operations Environmental
18 Management Plan, including:
 - 19 ○ Schedule noise-emitting maintenance activities during the day whenever
20 possible;
 - 21 ○ Notify residents prior to high noise-emitting maintenance activities where
22 appropriate; and
 - 23 ○ Set up and implement a call-in number that people can call when experiencing
24 high noise activity that includes response and follow-up procedures.

25 No additional mitigation measures were proposed by TJLP as part of the BVSA.

26 **6.2.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 27 **IDENTIFIED DURING APPLICATION REVIEW**

28 The following key issue related to the assessment of Noise for TMJ were identified during
29 Application review and based on feedback from the Working Group.

30 **CONSTRUCTION NOISE MODELLING AND CONFIDENCE**

31 Cowichan Nation Alliance expressed concerns related to the level of detail provided in TJLP's
32 proposed noise monitoring program, and concerns relating to the confidence of the predictive
33 modelling inputs of the sound emissions of the LNG carriers. Cowichan Nation Alliance
34 suggested the Low Frequency Noise (LFN) had been underestimated for TMJ and requested
35 that TJLP commit to ensuring all sound sources are less than estimated and that noise levels be

1 validated by surveys. HC raised concerns with the baseline noise levels that exceeded existing
2 guidance limits and thresholds and suggested that a complaint resolution process be
3 implemented for construction, similar to what has been proposed during operations.

4 TJLP responded, clarifying their interpretation of the American National Standards
5 Institute (ANSI S12.9-2005) annoyance calculation noting that annoyance is minimal when
6 octave band sound pressure levels are below 65 dB at 31.5 and 63 hertz (Hz). TJLP
7 confirmed that measured spectral data at R3 noise levels in the 31.5 and 63 Hz octave
8 bands are below 65 dB and that most monitoring equipment does not measure the 16 Hz
9 octave band. TJLP also responded that conservative assumptions were made in the
10 modelling to reflect a worst-case scenario. TJLP also noted that they would consider
11 implementing a complaint resolution process for construction and operations.

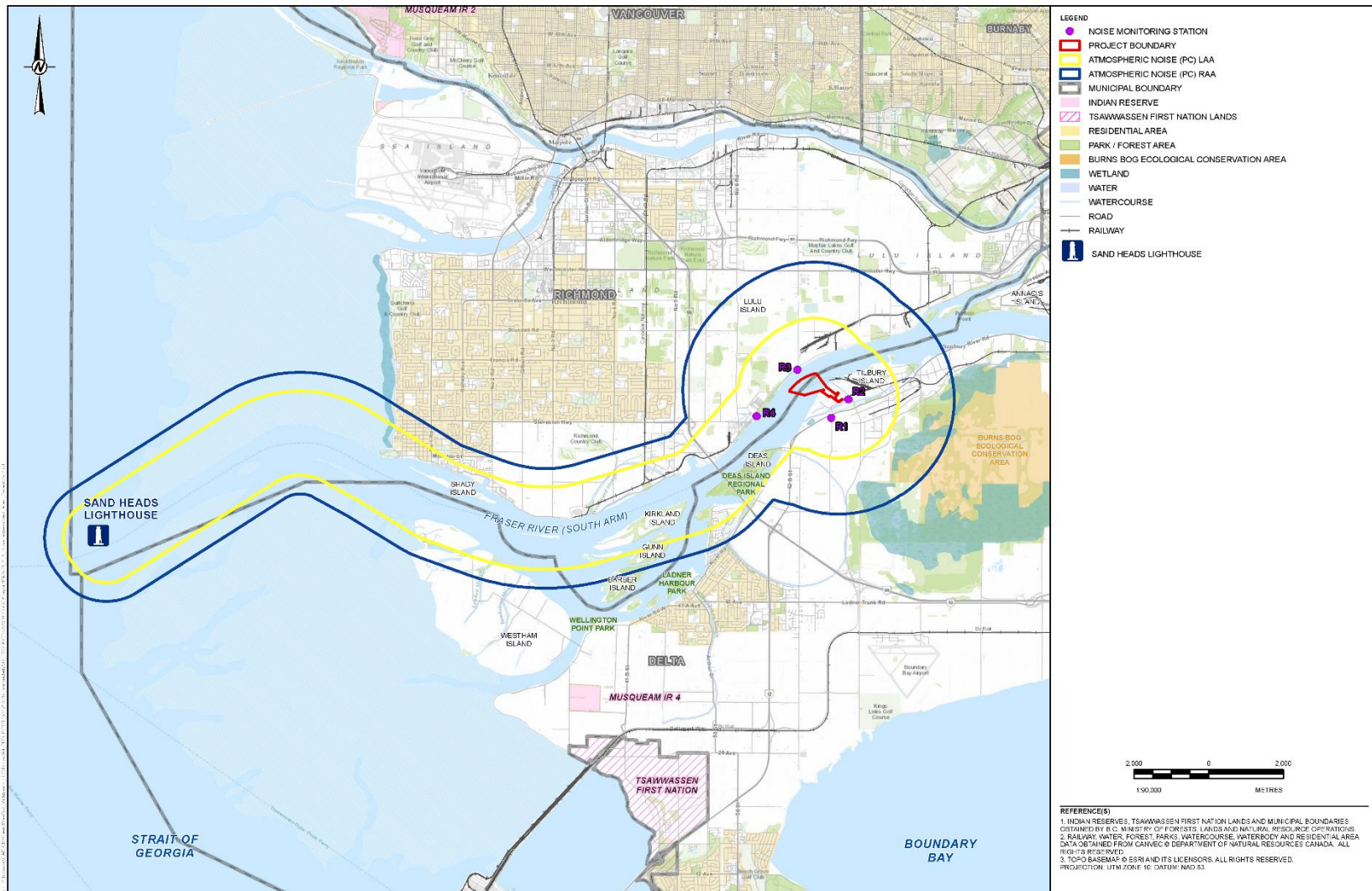
12 The EAO is proposing noise and vibration mitigations as part of Condition 10: Construction
13 Environmental Management Plan and Condition 11: Operations Environmental Management
14 Plan and is recommending a Noise Management Plan as a KMM under CEAA 2012. These would
15 include the noise mitigations noted in [Section 6.2.2.2](#) above and a complaint resolution
16 procedure. Additionally, the EAO is proposing Condition 15: Public Information to apprise the
17 public of TMJ activities and to provide a means to solicit and receive feedback.

18 **6.2.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

19 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
20 on the Noise VC.

21 The EAO evaluated the potential effects to noise by considering construction, operations and
22 decommissioning activities that could affect the noise environment from increased noise levels
23 due to increased marine construction, marine vessel traffic, and vessel birthing, loading, and
24 departing.

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Figure 10: Noise Assessment Areas and Receptors for the original Application area (jetty to Sand Heads).

1 Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)

2 Based on mitigations proposed in the Application and issues raised during Application review,
3 the EAO proposes the following provincial conditions and recommend KMMs under CEAA 2012:

- 4 • Condition 10: Construction Environmental Management Plan and Condition 11:
5 Operations Environmental Management Plan (provincial conditions), capturing noise
6 management measures described in [Section 6.2.2.2](#);
- 7 • Noise Management Plan, including a complaint resolution process (KMM); and
- 8 • Condition 15: Public Information to provide information to the public on TMJ activities
9 and a means to solicit and receive feedback (provincial condition).

10 **Residual Effects:** After considering the proposed noise mitigation measures, the EAO concludes
11 that TMJ would result in the following residual adverse effects to the Noise VC for the
12 Application scenario and BVS:

- 13 • Increase in noise levels during construction and decommissioning.

14 The EAO's characterization of the expected residual effects of TMJ on the Noise VC are
15 summarized below in Table 26 and reflect the EAO's level of confidence in the effects
16 determination (including their likelihood and confidence).

17 **Table 26: Summary of residual effects for Construction and Decommissioning Noise**

Criteria	Assessment Rating	Rationale
Context	Moderate - High Resilience	The TMJ site boundary has a moderate to high resiliency to noise disturbances as the location is set in an established urban and industrial area associated with a transportation corridor and shipping lane. However, there are a few receptor-sites near the TMJ site boundary that are more sensitive to a change in the noise environment.
Magnitude	R1 – Negligible R2 – Negligible R3 – Negligible to Low R4 – Negligible	An increase in noise during construction and decommissioning is expected to occur but remain within regulatory criteria with the application of mitigation measures at the assessment receptors R1, R2 and R4. Effects to the noise environment would be largely mitigated by noise barriers/ screens and the implementation of mitigation measures at the source of the noise and at the sensitive receptors. Without mitigation, Application noise levels at R3, the Indigenous village site, during construction are expected to increase by 4 dBA and 5 dBA for daytime and a 7 dBA noise increase for nighttime. Noise annoyance (%HA) is also expected to increase by 7.0 percent and 7.7 percent during construction, without mitigation. A negligible to low magnitude is expected for the assessment receptor R3 during construction with mitigation applied, as it is expected to be closer to baseline noise levels.

Criteria	Assessment Rating	Rationale
Extent	Local	Effects to noise from TMJ are expected to be localized within the LAA during construction and decommissioning. In particular, noise levels would be more perceptible closer to the noise sources such as at R3, the Indigenous village site. Any noise level exceedances would be restricted to the LAA.
Duration	Short to Medium term	Construction (3 years) and decommissioning (1 year) noise would be short to medium term with noise effects present for the duration of construction and decommissioning and is not expected to persist past the duration of TMJ.
Frequency	Frequent	Noise effects from construction would occur regularly over 2 to 3 years. Frequent construction noise may occur for up to 24 hours per day. Decommission activities would be similar to that of the construction activities but would occur over a duration of 1 year.
Reversibility	Reversible	Noise effects from construction and decommissioning activities are considered reversible as noise levels are expected to return to pre-project baseline levels upon completion of the activities.
Likelihood	The likelihood that there would be an effect to the noise environment from construction and decommissioning activities is high.	
Confidence	The EAO's confidence in this assessment is moderate. There is some uncertainty with regards to the conservative inputs for the modelling predictions, and some baseline measurements exceeded HC's 55 dBA limit at the R1 receptor site under the existing conditions primarily due to existing vehicle traffic and intermittently airplane traffic.	
Significance	In consideration of the provincial conditions identified in the TOC and KMMs under CEAA 2012 (listed in Appendix 1) as well as the conservative nature of the predicted effects, the EAO concludes that TMJ would not have significant adverse residual effects on the Noise VC.	

1 *Note: Criteria and assessment ratings are defined in Appendix 5: Residual Effects Characterization Definitions.*

2 6.2.5 CUMULATIVE EFFECTS ASSESSMENT

3 The Application considered past, present and reasonably foreseeable future projects in the
4 cumulative effects assessment. The Fraser Surrey Docks Direct Transfer Coal Facility, PBRP,
5 RBT2, VAFFC, Fraser River Tunnel Project, VFPA Habitat Enhancement Program, TMX, Delta Link
6 Business Park and Deas Island BC Hydro Transmission Line were all considered in the
7 cumulative effects assessment. The Application determined that these projects did not have
8 any potential interaction with TMJ due to either the distance to TMJ or no spatial overlap of
9 effects on noise. The Application identified FortisBC's Tilbury Phase 1 LNG Expansion Project
10 operations to have the potential to act cumulatively with TMJ's residual effects for the Noise
11 VC.

1 The EAO has also considered the proposed Delta Grinding Facility on Tilbury Island and
2 concluded that there would be no overlap between the construction phases of TMJ and this
3 project as Delta Grinding is at an earlier phase in the EA process. Tilbury Phase 2 LNG Expansion
4 Project was also considered in the cumulative effects assessment, which was not included in
5 TJLP's Application. The EAO does not have specific predictions for the Tilbury Phase 2 LNG
6 Expansion Project; however, it is reasonable to assume that the projects could interact
7 cumulatively if there is overlap during construction. The EAO also notes that Tilbury Phase 2
8 LNG Expansion Project is subject to an EA and potential effects would be assessed in that EA
9 process.

10 Noise from the Tilbury Phase 1 LNG Expansion Project was assessed based on the expectation
11 that the facility would meet the BC OGC Guideline at the assessment receptors after
12 completion of the expansion project. The Tilbury Phase 2 LNG Expansion Project would expand
13 LNG storage and liquefaction capacity at the existing FortisBC Tilbury LNG facility in Delta, B.C.
14 directly adjacent to TMJ. The Application considered that this project's operations may
15 temporarily overlap with the construction phases of TMJ.

16 The Application characterized the residual cumulative effect with TMJ as moderate in
17 magnitude during construction, and a 7.8 - 8.4 percent increase in noise annoyance (%HA) due
18 to the increase in noise levels. The effect on speech comprehension was predicted to have a
19 low magnitude at R1, and moderate at R2 and R3, measured daytime baseline noise level. The
20 effect on sleep disturbance was predicted to be moderate at R2 and R3 and low at R4
21 monitoring sites as nighttime noise did not exceed the measured baseline noise level by more
22 than 10 dB. Nighttime baseline noise levels at all the four monitoring sites exceeded the Health
23 Canada Guidance nighttime limit of 45-dBA. Health Canada noted that TJLP's contribution to
24 noise represents a cumulative effect in an area where baseline levels for sleep disturbance and
25 speech comprehension are already exceeding existing guidance limits.

26 Residual cumulative effects during construction (of both the FTBB and jetty) have a high
27 likelihood of occurring resulting from an increase in construction noise from industrial
28 infrastructure. The EAO concludes that significant cumulative effects to the Noise VC are not
29 expected as a result of the effects of TMJ interacting with the effects of other past, present and
30 reasonably foreseeable future projects and activities.

31 The EAO is proposing Condition 15: Public Information to apprise the public of TMJ activities
32 and to provide a means to solicit and receive feedback. The EAO concludes that with this and
33 noise management measures in Condition 10: Construction Environmental Management Plan,
34 Condition 11: Operations Environmental Management Plan and the recommended KMM under
35 CEAA 2012 for a Noise Management Plan, there would not be any significant residual
36 cumulative effects from the interaction of TMJ (for either the Application scenario or BVS) with
37 other reasonably foreseeable projects.

1 6.2.6 CONCLUSIONS

2 Considering the above analysis and having regard to the mitigation measures identified in the
3 provincial TOC, including Condition 10: Construction Environmental Management Plan,
4 Condition 11: and Operations Environmental Management Plan, Condition 15: Public
5 Information (which would become legally binding as conditions of the provincial EAC) and
6 KMMs under CEAA 2012 for a Noise Management Plan (Appendix 1), the EAO is satisfied that
7 TMJ would not have significant adverse residual or cumulative effects on the Noise VC.

8 7 ASSESSMENT OF HERITAGE EFFECTS

9 7.1 HERITAGE RESOURCES

10 This chapter assesses potential TMJ effects to subcomponents of Heritage Resources (Chapter 7
11 of the Application) and Physical Heritage and Effects on Historical, Archeological,
12 Paleontological or Architectural Sites or Structures (CEAA 2012 requirements in Sections
13 11.2.3.2 and 11.2.3.4 of the Application). Potential effects to Cultural Heritage (a component of
14 CEAA 2012 5(1)(c)(ii)), including access to cultural heritage, are assessed in Current Use ([Section](#)
15 [11.4](#) of this Report).

16 7.1.1 BACKGROUND

17 Heritage Resources were selected as a VC due to their importance to Indigenous Groups, the
18 public, and other stakeholders, regulatory requirements, and conservation/ scientific
19 importance and given their sensitivity to physical disturbance. TMJ is located in an area with a
20 long history of human habitation and high archeological potential.

21 The Application assessed the effects of TMJ on historical resources, the physical remains of
22 human activity post-dating 1846, and physical heritage including: burial sites; culturally
23 significant landscapes; and features such as village sites or historic travel-ways including trails
24 and canoe landing sites (linkage to CEAA 2012 Sections 5(1)(c)(iv) and 5(1)(c)(ii).

25 The Application modelled the potential for Heritage Resources based on a range of sources
26 including: Aboriginal Traditional Knowledge; paleontological databases and scientific reports;
27 ethnographic and historical sources including maps, reports, photographs and aerial
28 photographs; heritage inventories, libraries and registrars; and known archaeological sites.

29 The effects assessment on Heritage Resources is linked to the River Processes PC ([Section 5.3](#)),
30 Current Use ([Section 11.4](#)) and Accidents and Malfunctions ([Section 9](#)) sections of this Report.

1 **MARINE SHIPPING ASSESSMENT**

2 The MSA presented the potential effects of marine shipping on archaeological and historical
3 resources. Archaeological and historical resources along the shores of the marine shipping
4 corridor. Indigenous Groups raised concerns about potential wake effects of marine shipping on
5 archaeological sites within the MSA area, such as middens, particularly those featuring burials
6 of human remains.

7 TJLP based the characterization of baseline conditions on the desktop reviews of existing and
8 publicly available EA and regulatory filings consideration of TEK, where available, and
9 modelling. The key information source for Heritage Resources was the RBT2 Marine Shipping
10 Supplemental Report¹⁰³.

11 The effects assessment for the Heritage Resources MSA is related to the Vessel Wake ([Section](#)
12 [5.4](#)), Current Use ([Section 11.4](#)) and Accidents and Malfunctions ([Section 9](#)) sections of this
13 Report.

14 **7.1.1.1 REGULATORY CONTEXT**

15 Heritage sites, including archaeological, historical and paleontological sites, are protected under
16 the HCA and are provincially regulated by the Archaeology and Heritage Branches of FLNRORD.
17 Historic sites may also be protected by the *Local Government Act* regulated by local
18 governments and included in the Community Heritage Register.

19 CEAA 2012 (Sections 5(1)(c)(ii) and 5(1)(c)(iv)) requires the assessment of effects related to
20 changes to the environment on “physical and cultural heritage” and “any structure, site or thing
21 that is of historical, archaeological, paleontological or architectural significance”.

22 Musqueam Indian Band, Squamish Nation, Stó:lō Research and Resource Management Centre,
23 and Tsleil-Waututh Nation, whose established or asserted territories overlap TMJ, have
24 heritage and permitting policies in place, and have issued permits to Golder Associates Ltd. for
25 archaeological assessments within their asserted Traditional Territories.

26 **7.1.1.2 BOUNDARIES**

27 **SPATIAL BOUNDARIES**

28 The LAA for heritage resources encompasses the TMJ site, including onshore and offshore
29 components and a 100 m buffer around the TMJ site. The RAA for heritage resources consists of
30 the LAA and the South Arm of the Fraser River from the TMJ site downstream to Sand Heads,

¹⁰³ Port of Vancouver. 2015. Roberts Bank Terminal 2: Marine Shipping Supplemental Report (Addendum to the Environmental Impact Statement). Available at: <https://iaac-aeic.gc.ca/050/evaluations/document/103783>.

1 upstream to Annacis Island, and extending one km inland from the north and south shores of
2 the Fraser River. The Cumulative Effects Assessment Area is the same as the RAA.

3 **TECHNICAL BOUNDARIES**

4 The presence of deep, historical fill at the dike and nearshore portions of the TMJ area
5 precludes assessment of those areas for archaeological and historical remains using
6 conventional methods. Areas inland of the dike are likely to have shallower fill deposits and
7 may be assessed prior to, or concurrent with, proposed future ground disturbance activities
8 (e.g., ground stabilization under the pipe rack).

9 **MARINE SHIPPING ASSESSMENT**

10 The MLAA for Heritage Resources in the MSA area is based on the three zones of wake affected
11 shorelines as defined in RBT2 Marine Shipping Supplemental Report and in the Vessel Wake
12 Effects Assessment (Section 3.1 of the MSA):

- 13 • Zone 1: Eastern ends of Tumbo and Saturna Islands;
- 14 • Zone 2: Western end of Stuart Island; and
- 15 • Zone 3: Vancouver Island in the vicinity of Victoria/ Discovery, Chatham, Chain and Trial
16 Islands.

17 Secondary areas of focus including the southern ends of North Pender and South Pender Island,
18 the southeastern part of Sidney Island, and Discovery and Chatham Islands, were considered as
19 representative areas for Accidents and Malfunctions and are assessed in the Accidents and
20 Malfunctions chapter ([Section 9](#)) of this Report.

21 The MSA RAA includes the MSA navigation channel and the shorelines in Segments A, B, C and
22 D of the marine shipping area (see Figure 11 and 12 below).

23 **7.1.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 24 **APPLICATION**

25 **7.1.2.1 BASELINE INFORMATION**

26 **BASELINE INFORMATION AND EXISTING CONDITIONS**

27 TJLP conducted a heritage resources overview assessment to determine the Heritage Resource
28 potential for, and assess potential effects on, known and potential Heritage Resources within
29 the RAA and LAA. Traditional use information provided by Indigenous Groups was also
30 considered.

31 The Application notes there is potential for currently unidentified Heritage Resources, including
32 previously unknown and unrecorded sites to be encountered in the LAA. Areas that have

1 Heritage Resource potential include terrestrial portions of the LAA that would be subject to
2 land-based ground stabilization and pile works during construction, and which may be subject
3 to accidents and malfunctions (such as, spills) during operations.

4 **Historical Resources**

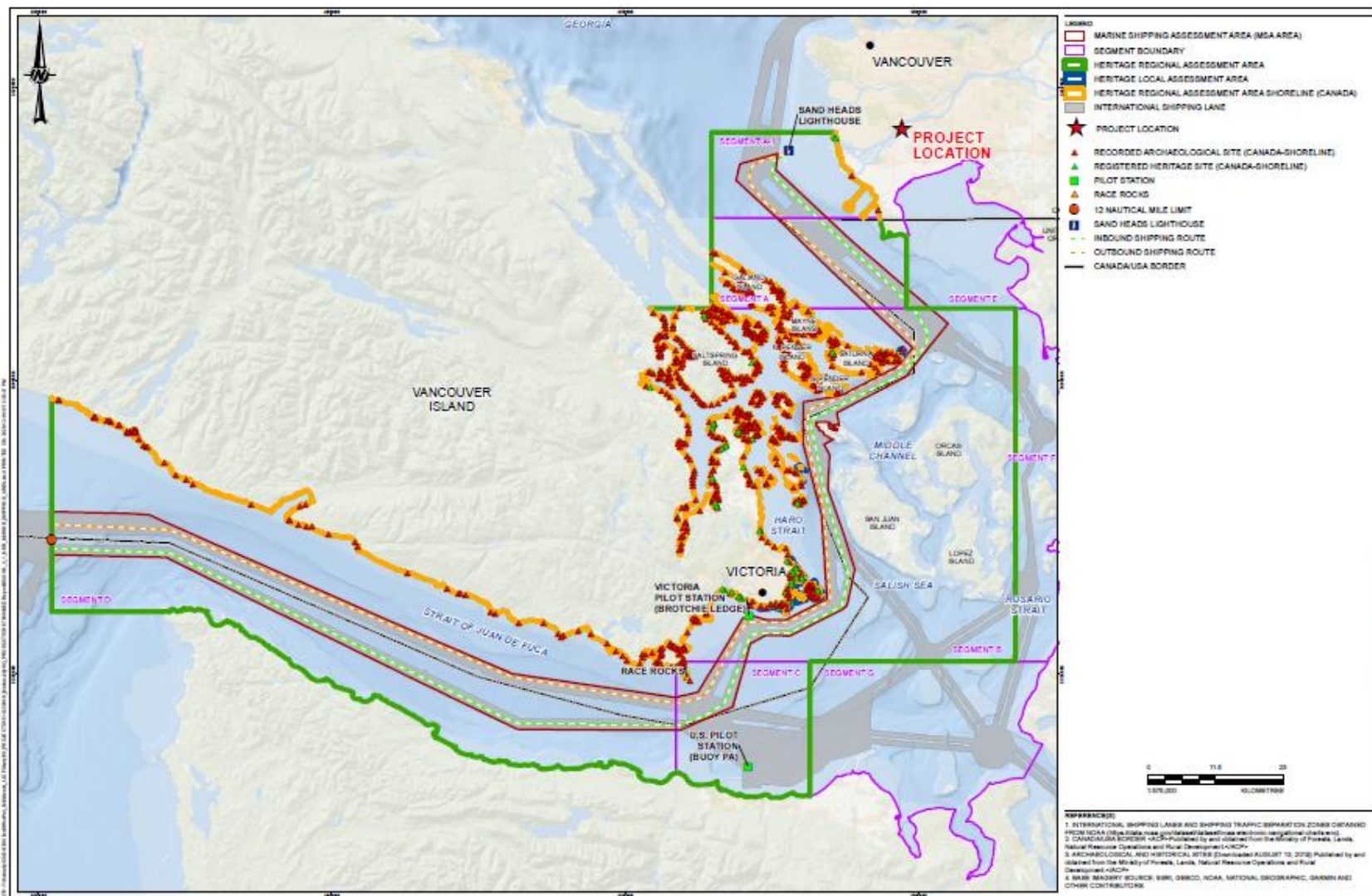
5 The Application considered historical resources and sites of architectural significance listed in
6 heritage registrars, and archaeological sites and heritage wrecks protected under the HCA. In
7 the RAA, 76 historical heritage properties and landscapes were identified during the desktop
8 study (Figure 12). None of the sites are specifically identified as Indigenous historical sites but,
9 one example of a site used by Indigenous people is the First People's House, a communal
10 dwelling built in 1919 for the Phoenix Cannery in Steveston, is represented (DgRt-6). Five
11 historical heritage properties are located within 5 km downstream of the TMJ site, but none
12 were located in the LAA. In addition, there were five sites (including heritage wreck sites and
13 archaeological sites with historical components) among the archaeological sites (protected
14 under the HCA) reviewed within 5 km of the LAA (DgRr-023, DgRs113, DgRs-114, DgRr-025 and
15 DgRr-041) (Figure 13). No heritage wrecks or archaeological sites with historical components
16 were located in the LAA.

17 **Physical Heritage (CEAA 2012 5(1)(c)(iv))**

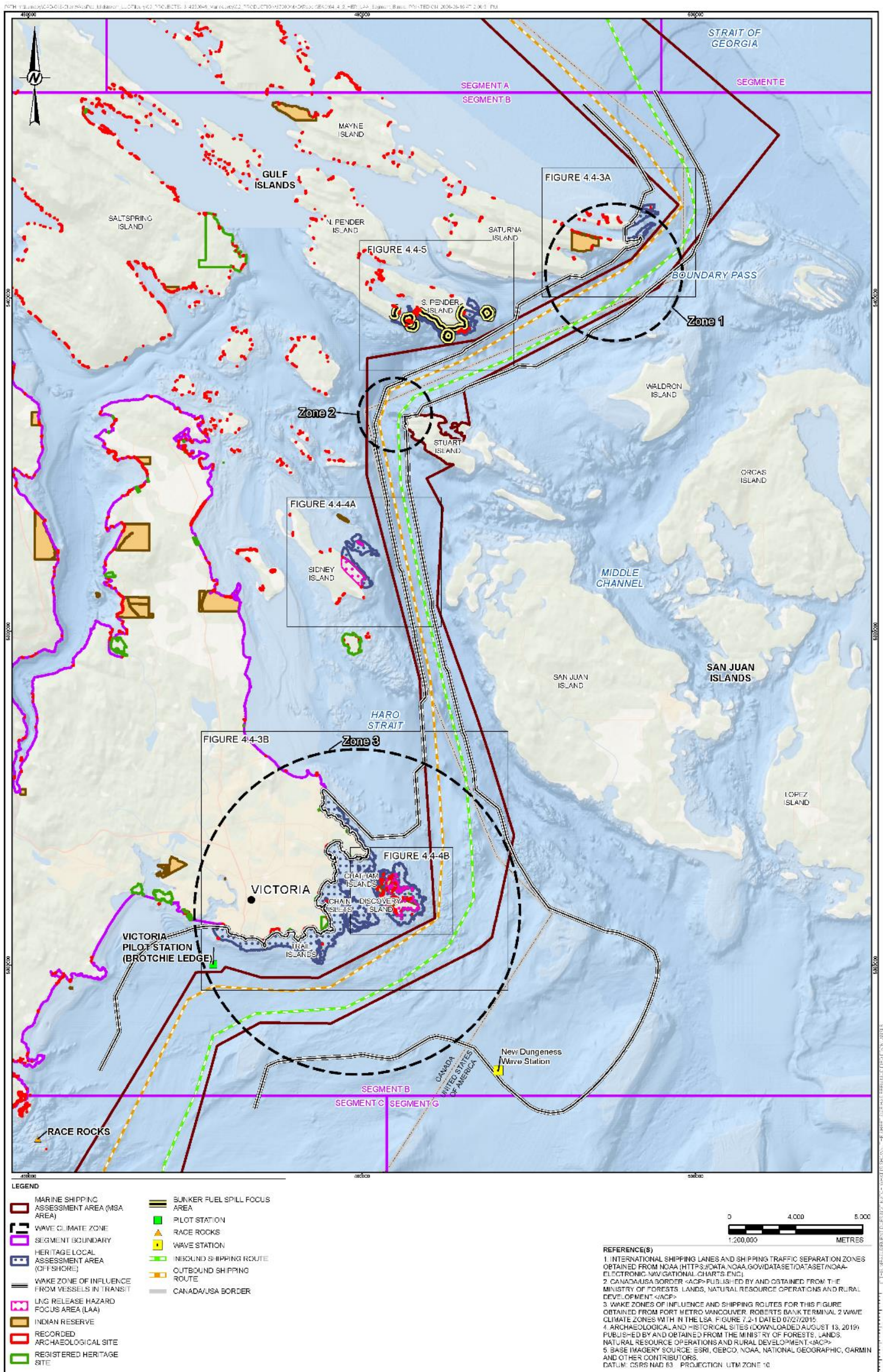
18 The sedimentary nature of the bedrock within the LAA and RAA provides potential for fossils to
19 occur in this area. However, given the depth of bedrock (that is, 200 – 1,000 m) below existing
20 sediments, it is unlikely that paleontological resources, if they exist, would be encountered
21 during TMJ related activities.

22 Previously recorded pre-contact archaeological sites located in the RAA within five km of the
23 TMJ site include (Figure 13): DgRr-023, a pre-contact fish weir, surface lithics (including ground
24 slate knife); DgRr-039, pre-contact surface lithics and shell midden; DgRs-017, pre-contact
25 surface fire broken rock, subsurface lithics, fishing weir; and DgRs-039, pre-contact fishing weir
26 and surface lithics.

27 DgRs-017, located on the river bank directly opposite to TMJ, was identified by the Cowichan
28 Nation Alliance, Kwantlen First Nation, Musqueam Indian Band, Tsawwassen First Nation and
29 Tsleil-Waututh Nation as an important resource gathering (plant harvesting and fishing),
30 habitation site, boat landing place, and also a place of spiritual and cultural value. The recorded
31 site is 2 km in length, consisting primarily of wooden stakes in the intertidal area, some of
32 which have been dated to the pre-contact period and are considered to represent fish weirs,
33 and understood to be a historic Indigenous village site (former Indigenous village site). The
34 former Indigenous village site has been reported as the largest pre-contact settlement on the
35 South Arm of the Fraser River. The Application reported that according to the Provincia.



1
2 **Figure 11: Marine Shipping Assessment Spatial Boundaries for Heritage Resources.**



1
2 **Figure 12: Marine Shipping Assessment LAA Spatial Boundaries in Segment B for Heritage Resources.**

1 Heritage Register, most of the site has either been destroyed by development or erosion, or is
2 covered by 2 to 3 m of fill and is possibly set back from the existing riverbank. There is potential
3 for Physical Heritage resources to exist anywhere along the banks of the Fraser River or sloughs.
4 Based on analysis of known archaeological sites within the Metro Vancouver region, 90 percent
5 of the known midden sites occur within 100 m of the shoreline.

6 **MARINE SHIPPING ASSESSMENT**

7 TJLP reviewed existing information including the RBT2 Marine Shipping Supplemental Report,
8 recent traditional use and TEK studies provided by Indigenous Groups, and publicly available
9 data to conduct the MSA for Heritage Resources.

10 **Wave Effects**

11 TJLP identified a number of known archaeological and historical resources in the MSA LAA that
12 may be affected by wave effects (see Figure 12 and 13) including those with shell middens,
13 surface lithics, culturally modified trees, burials, canoe skids, cairns and other cultural
14 depressions and sites. The Application reports that many of these sites have been affected by
15 significant erosion. Numerous known historical sites and heritage wreck sites are also located in
16 the MSA LAA along the waterfront, and in less than 20 m of water, off southern Vancouver
17 Island.

18 **Accidents and Malfunctions**

19 The effects for Heritage Resources in the event of an LNG or bunker fuel oil release are assessed
20 in the Accidents and Malfunctions chapter ([Section 9](#)) of this Report.

21 **Potential for Archaeological and Historical Resources**

22 The Application identified that while hundreds of sites have been recorded in the MSA RAA and
23 are identified in the Provincial Heritage Registrar, there is potential for archaeological and
24 historical sites to exist along the shoreline areas that are not bedrock. Indigenous Groups have
25 identified unrecorded sites. Songhees Nation has expressed concern about adverse effects to
26 cultural and spiritual sites at *Tl'ches* on Chatham and Discovery Islands, including archaeological
27 deposits in intertidal zones.

28 **7.1.2.2 POTENTIAL PROJECT EFFECTS**

29 TJLP predicted archaeological or historical site alteration and changes to the level of
30 accessibility as potential effects of TMJ-related activities on Heritage Resources.

31 **Archaeological or Historical Site Alteration**

32 In the Application, TJLP reported that ground-altering activities associated with construction or
33 decommissioning that disturb, excavate or remove sediment or soil have the potential to

1 damage or change the integrity of archaeological and historical sites. TMJ activities could result
2 in potential encounters with deeply buried archaeological remains in the near river shore.
3 However, TJLP noted that this is unlikely given the depths (likely up to 7 m) of recent deposits.
4 Encountering archaeological remains in the dredge area is considered unlikely, given the
5 location in an active, regularly dredged river channel, seasonal cycles of sediment erosion and
6 deposition due to river current, and depth of recent deposits in areas not previously dredged.
7 Discovery of new sites could occur during TMJ activities, most likely during construction.

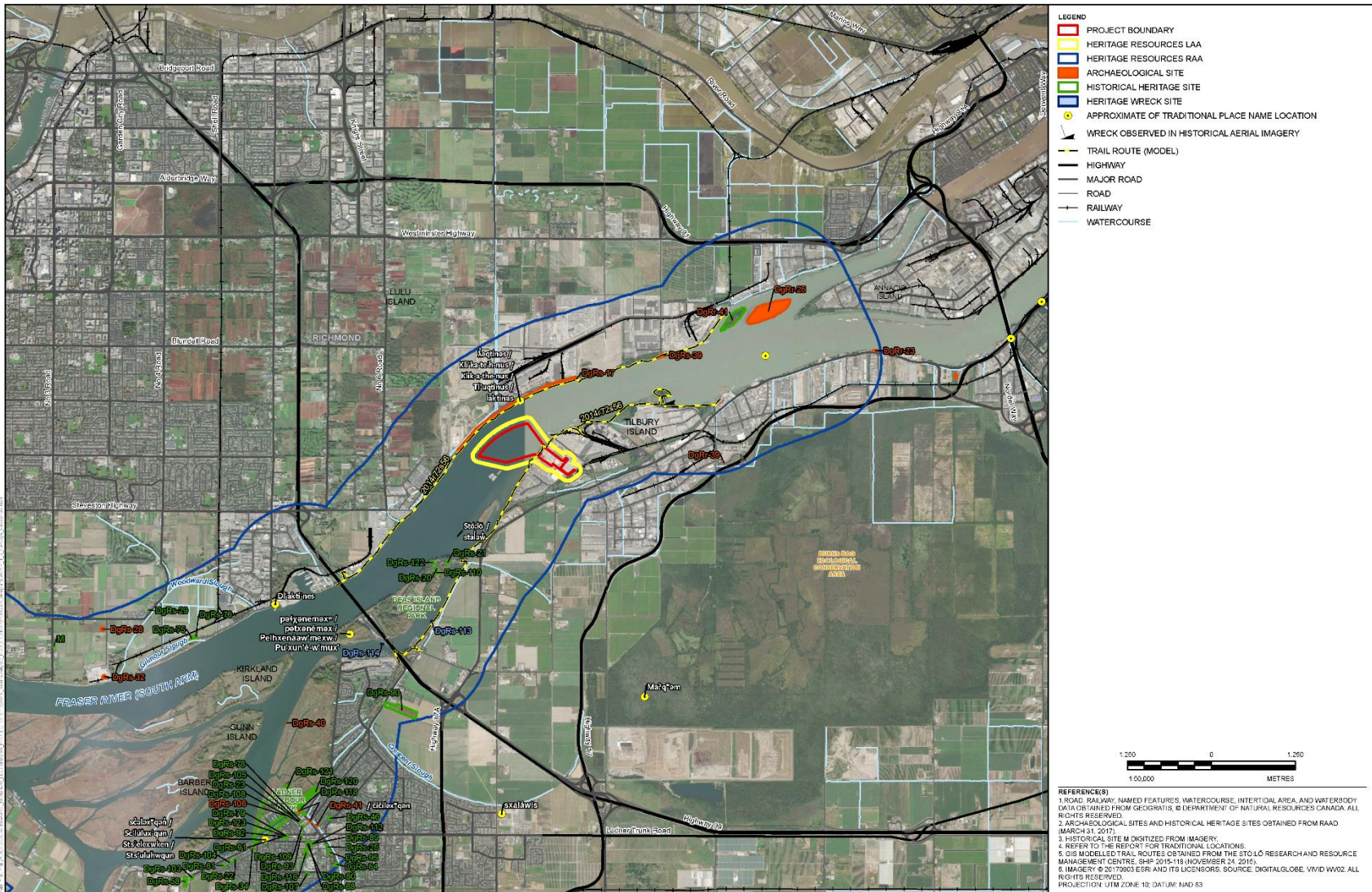
8 The Application stated that potential effects to physical heritage resources encountered by
9 chance during TMJ activities in the LAA is expected to be avoided or reduced through
10 realignment or redesign of TMJ components, therefore residual effects are not expected.

11 **Changes in the Level of Accessibility**

12 The Application identified that TMJ construction and decommissioning activities may change
13 the level of accessibility to historical sites, features, and objects, if present, in the following
14 ways:

- 15 • Historical and archaeological sites, features and objects might be buried by fill or placed
16 behind a security fence effectively precluding scientific investigations for the
17 foreseeable future;
- 18 • Intentional burial or fencing can be a positive effect, particularly in locations prone to
19 unauthorized artifact gathering;
- 20 • Historical sites, features and objects may be exposed in publicly accessible areas such as
21 the riverbank, thereby increasing the likelihood of illicit collecting by members of the
22 public; and
- 23 • During decommissioning, historical sites, features and objects, if present, may no longer
24 be protected by a security fence, thereby increasing the likelihood of illicit collecting by
25 members of the public.

26 TJLP concluded that the likelihood of adverse residual effects is considered low, given the
27 assessed potential for the presence of historical resources in the LAA and the effectiveness of
28 the mitigation methods proposed in the Application. Presence/ absence of heritage wrecks may
29 be further determined with review of remote sensing data, if available, and depending on the
30 data and results of further assessment, archaeological monitoring of construction activities may
31 be recommended.



1
2 **Figure 13: Archaeological and Historical Resources in the original Application area (jetty to Sand Heads).**

1 **Potential Wake Effects in RAA**

2 The Application examined potential adverse effects of vessel wake and propeller wash on
3 Historical Resources (in recorded sites on the river bank in the RAA and adjacent to the South
4 Arm Navigation channel), including during marine transportation of materials, carrier berthing
5 and departure, and marine shipping from the TMJ site to Sand Heads. TJLP's wake study
6 ([Appendix 4.1-2 of the Application](#)) reported that the TMJ LNG carrier wake heights are
7 anticipated to be lower than existing vessels, and TMJ LNG barge wake heights are anticipated
8 to be similar to other vessels presently using the river. TJLP predicted that wave effects would
9 be negligible given the minimal contribution of TMJ's vessel traffic to existing wake in the RAA
10 (see [Section 5.3](#), River Processes).

11 ***BUNKER VESSEL SCENARIO***

12 In the Application, for berthing and departure of vessels, it was determined that effects of
13 vessel wakes and propeller wash on archaeological site DgRs-17 (located directly opposite to
14 the jetty) would be negligible, given the limited change to wake and propeller wash effects
15 from existing river traffic predicted due to TMJ-related vessel traffic. For shipping from the TMJ
16 site to Sand Heads, it was determined that effects of vessel wake on archaeological remains and
17 to recorded sites along the riverbank within the RAA and adjacent to the South Arm navigation
18 channel would be negligible, given the limited change to existing wake effects anticipated due
19 to TMJ-related vessel traffic.

20 In the BVSA, TJLP concluded that no changes in the conclusions of the River Processes
21 assessment are predicted compared to what was presented in the Application; therefore, no
22 change in effects to heritage resources are anticipated. TJLP did not identify an interaction for
23 paleontological resources and historical resources from vessel berthing and departure, and
24 shipping from the TMJ site to Sand Heads, and effects remain negligible to archaeological
25 resources. TJLP concluded that the increase in annual bunker vessels is predicted to result in a
26 negligible effect on Heritage Resources, and the effects assessment in the Application is
27 expected to remain unchanged.

28 ***MARINE SHIPPING ASSESSMENT***

29 The MSA identified increase in breakage and weakening of artifacts in intertidal sites and loss of
30 site integrity from increased shore erosion as potential effects of vessel wake on archaeological
31 and historical resources.

32 The MSA predicted that the magnitude of nearshore wave energy caused by vessel wake would
33 be negligible in the MSA area, and, as such, vessel wake associated with TMJ-related shipping is
34 not predicted to increase coastline erosion or resuspension of sediments beyond natural

1 processes. TJLP concluded in the MSA that vessel wake interaction with Heritage Resources
2 would be negligible.

3 **7.1.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

4 The Application proposed numerous measures to mitigate effects to Heritage Resources
5 including the following mitigation hierarchy:

- 6 • Conducting field investigations (that is, an Archaeological Impact Assessment [AIA]) in
7 areas with archaeological or historical potential prior to, or concurrent with construction
8 activities, to identify unknown historical or archaeological sites;
- 9 • Realigning or redesigning TMJ components to avoid Heritage Resources should any be
10 found during subsequent studies or during construction;
- 11 • If avoidance is not feasible, implementing alternative protection methods including
12 protective coverings, stabilization and physical barriers aimed to reduce effects on
13 Heritage Resources;
- 14 • If affects cannot be avoided or minimized, effects would be reduced through a variety of
15 measures, including surface artifact collection, additional inventory studies or
16 systematic data recovery (for example, excavation, detailed recording and
17 documentation, construction surveillance or monitoring) to achieve no net loss. TJLP has
18 committed to consulting with Indigenous Groups on proposed measures to avoid or
19 reduce effects; and
- 20 • A Heritage Resources Chance Find Management Procedure would be implemented to
21 ensure preservation and proper management of Heritage Resources that are
22 unexpectedly encountered during TMJ activities. The document would include
23 guidelines to follow in the event of a discovery of known or suspected heritage materials
24 during TMJ activities.

25 TJLP has committed to working with Indigenous Groups during field investigations and
26 consulting with Indigenous Groups on the Heritage Resources Chance Find Management
27 Procedure and a communications plan for construction, operations and decommissioning
28 activities that may affect access and use opportunities for Indigenous Groups related to
29 harvesting or cultural activities.

30 No additional mitigation measures were proposed by TJLP as part of the BVSA.

31 **MARINE SHIPPING ASSESSMENT**

32 TJLP stated that no mitigation measures are recommended for vessel wake from Marine
33 Shipping associated with TMJ as the potential wake-related effects on archaeological and
34 historical resources and physical heritage are predicted to be negligible.

1 **7.1.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 2 **IDENTIFIED DURING APPLICATION REVIEW**

3 The following key issues related to the assessment of Heritage Resources for TMJ were
4 identified during Application review and based on feedback from the Working Group:

- 5 • Erosion from propeller and wake wash/ river processes;
- 6 • Archaeological assessment;
- 7 • Erosion from vessel wake in the MSA; and
- 8 • Accidents and Malfunctions.

9 ***EROSION FROM PROPELLER AND WAKE WASH/ RIVER PROCESSES***

10 Tsleil-Waututh Nation and Musqueam Indian Band expressed concern about the potential
11 effects of wave erosion caused by vessel wake on archaeological sites within the RAA (in
12 particular the former Indigenous village site) due to increased marine traffic. Tsleil-Waututh
13 Nation expressed particular concern about effects to a possible fish weir that was recently
14 discovered in the riparian zone associated with the former Indigenous village site and
15 Tsleil-Waututh Nation requested that TJLP develop a management plan to specifically mitigate
16 effects. During the review of TJLP's BVSA Report, Tsleil-Waututh Nation raised concerns related
17 to increased vessel frequency and scour that could potentially result in higher potential effects
18 to archeology and heritage resources, including the culturally important fish weir located
19 upstream from the marine terminal area for TMJ.

20 TJLP responded that the wake and propeller wash study completed for the Application
21 concluded that there would be a negligible increase in marine traffic which would result
22 in a negligible increase in wake effects on the riverbank. For the BVS, TJLP maintains
23 that wake associated with TMJ-related vessels would be less than the wake of other
24 vessels operating in the Fraser River shipping lanes, and that the increased frequency of
25 bunker vessels would not change the magnitude of the effect (e.g., higher wake waves
26 are not expected for the BVS). TJLP also clarified that upstream archeological and
27 heritage resources (e.g., DgRs-39), were not included because the majority of bunkering
28 vessel traffic is anticipated travel downstream of the jetty, therefore interaction
29 between TMJ-related vessels and archeological and heritage resources is not expected.

30 TJLP responded that the fish weir site location would be identified as a sensitive area in
31 the spill response plan and the intertidal area would be monitored for erosion through
32 geophysical survey. TJLP also committed to conducting bathymetric surveys of the
33 riverbed to collect data through construction and into operations which may help
34 determine whether sites are being affected by erosion due to increased traffic.

1 The EAO is in agreement with TJLP, that the increased frequency of vessels would not change
2 the magnitude of the effect (e.g., higher wake waves are not expected in the BVS) and as such
3 the interaction remains negligible under either the Application scenario or BVS considered for
4 TMJ. The EAO is proposing Condition 13: River Bed Monitoring Plan, which would require TJLP
5 to conduct bathymetry surveys of the entire channel width every five years during operations,
6 and monitoring of scour, erosion, and river-bed morphology, and describe how Indigenous
7 Groups would be informed of the results of monitoring studies.

8 **ARCHAEOLOGICAL ASSESSMENT**

9 Musqueam Indian Band disagreed with the Application's conclusions that heritage and
10 archaeology resources would unlikely occur within the marine environment, particularly in the
11 river bed below and beside the former Indigenous village site where heritage resources might
12 have been deposited as a result of erosion.

13 TJLP stated that the heritage resources overview assessment determined that there is
14 low archaeological potential in the river and in the dredge footprint due to seasonal
15 cycles of deep erosion and deposition on the river bed and the strength of prevailing
16 river currents which carry sediments and any potential eroded archeological material
17 downstream more than downslope from the source. In the intertidal area up to and
18 including the dike, the depths of recent deposits measured in geological core samples
19 make testing for any potential older archaeological deposits impractical. As such, no
20 marine field testing is planned.

21 Tsleil-Waututh Nation and Musqueam Indian Band requested that TJLP conduct further
22 archaeological assessment including a pedestrian survey and testing of areas that have the
23 potential to be affected by erosion prior to finalizing design and construction plans. Tsleil-
24 Waututh Nation and Musqueam Indian Band also requested to be consulted with on and
25 participate in any archaeological assessment and on the development of the Heritage
26 Resources Chance Find Management Procedure, including if any change in accessibility is
27 proposed.

28 TJLP committed to archaeological testing and conducting an AIA in the terrestrial
29 portion of the LAA prior to construction, with participation from Indigenous Groups.

30 The EAO notes that Heritage Resources are protected under the HCA, whether they are known
31 or unknown, and may not be altered or changed in any manner without a permit. In addition,
32 permits would also be required from some Indigenous Groups to conduct an AIA. TJLP would
33 require an HCA Section 12.2 permit prior to conducting site investigations and, should Heritage
34 Resources be found, a Section 12.4 permit would be required to authorize the removal of
35 residual archaeological deposits. The Section 12.4 permit includes a condition which stipulates
36 that in the event ancestral remains are encountered, all work must cease in the vicinity of the

1 remains. Mitigation measures would be determined in consultation with Indigenous Groups,
2 the Archaeology and Heritage Branches of FLNRORD and the B.C. Oil and Gas Commission.

3 The EAO has proposed Condition 14: Cultural and Archaeological Resources Management Plan
4 which would require TJLP to develop a plan in consultation with Indigenous Groups to mitigate
5 effects of TMJ to archaeological resources and cultural sites in the marine terminal area. The
6 EAO is also recommending KMMs under CEAA 2012 for cultural and archeological resources.

7 Both the proposed provincial condition and the recommended KMMs include the following:

- 8 • Conducting an AIA prior to construction and consulting Indigenous Groups on the means
9 by which they can be involved in the assessment;
- 10 • Developing a Chance Find Management Procedure in consultation with Indigenous
11 Groups which would include the procedures by which TJLP addresses any discovered
12 archaeological resources and human remains; and
- 13 • Developing a procedure to prevent unauthorized access, and to address access
14 preferences of Indigenous Groups to archaeological and cultural sites during the
15 completion of the AIA and during construction.

16 ***EROSION FROM VESSEL WAKE IN THE MSA***

17 Tseil-Waututh Nation expressed concern that the MSA did not account for the cumulative
18 effects of increased vessel traffic on heritage resources and that the study does not consider
19 potential effects of wake energy on unknown sites in an area of high archaeological potential.
20 Tseil-Waututh Nation requested that a new site inventory be conducted along the shipping
21 lane.

22 TJLP responded that since no residual effects for Heritage Resources from wake waves
23 are predicted, no cumulative effects have been determined. TJLP acknowledged that no
24 comprehensive archaeological inventory was completed for the MSA area and provided
25 that the effort in undertaking a complete inventory of potentially vulnerable Heritage
26 Resources would be disproportionate for TMJ given their determination of no residual
27 effects from wake waves.

28 Malahat First Nation expressed concern with TJLP's estimation that the waves from the
29 shipping lane would be indiscernible from the natural wave environment. Malahat First Nation
30 commented that this might be true at large distances but in cases where vessels pass close to
31 shore (e.g., Areas in zones 1, 2 and 3, around the southern gulf islands and Victoria), vessel
32 wake could be over the natural wave environment statistic. Malahat First Nation asked whether
33 TJLP could enforce a mandatory vessel slowdown in these areas to mitigate effects on heritage
34 resources.

1 TJLP has committed to TMJ-related vessels participating in the VFPA-led ECHO Program
2 seasonal slowdown initiatives, which includes a seasonal slowdown in the waters of
3 Haro Strait and Boundary Pass. Additionally, the EAO accepts TJLP's modelling for areas
4 where vessel wake will be closer to shorelines, such as the areas identified by Malahat
5 First Nation, and the EAO does not expect waves in these areas to be outside the natural
6 range of variation.

7 **ACCIDENTS AND MALFUNCTIONS**

8 Tsleil-Waututh Nation commented that they disagree with the conclusions of the MSA which
9 states that effects to archaeological sites as a result of a fire or spill are low magnitude of
10 disturbance, short duration and partially reversible. Disturbance to archaeological sites, in
11 Tsleil-Waututh Nation's view, especially to burials/ cairns, would be significant and permanent
12 effects.

13 TJLP responded that the MSA rated the risk of an LNG or bunker fuel release as having a
14 consequence severity that ranges from moderate to very high. The very high
15 consequence rating accounts for the potentially irreversible effects. However, the
16 likelihood for LNG or bunker fuel release leading to irreversible damage is extremely
17 rare since irreversible damage would happen only if the fuel release occurred within the
18 vicinity of susceptible heritage resources.

19 The EAO acknowledges that a release of LNG or bunker fuel in the vicinity of heritage resources
20 could potentially have significant and irreversible effects. However, the EAO understands that
21 such an occurrence is rated as being rare. The EAO proposes Condition 9: Construction
22 Environmental Management Plan and Condition 10: Operations Environmental Management
23 Plan, which would require TJLP to develop an emergency response plan and spill prevention
24 plan in consultation with Indigenous Groups which would include communication procedures
25 should an accident or malfunction occur in the TMJ area. The EAO also recommends KMMs
26 under CEAA 2012 for an Emergency Response Plan and Marine Shipping Emergency Response
27 Outreach Program in the MSA.

28 **7.1.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

29 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
30 on historical resources and physical heritage.

31 The EAO evaluated the potential effects to the above by considering construction, operations
32 and decommissioning activities that could affect Heritage Resources through historical or
33 archaeological site disturbance due to ground altering activities or vessel wake effects.

1 Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)

2 Based on mitigations proposed in the Application and issues raised during Application review,
3 the EAO proposes the following provincial conditions and recommends KMMs under CEAA
4 2012:

- 5 • Condition 14: Cultural and Archaeological Resources Management Plan (provincial
6 condition) and heritage KMMs, that include the requirement for TJLP to conduct an AIA,
7 identification of the measures TJLP would use to prevent any unauthorized access to
8 archaeological and cultural sites, and how TJLP would manage any archaeological
9 resources and ancestral remains should any be found during TMJ activities.

10 **Residual effects:** After considering the proposed mitigation measures, the EAO concluded the
11 following with respect to residual effects on Heritage Resources for both the Application
12 scenario and BVS:

- 13 • Historical resources: no residual effects; and
- 14 • Physical heritage: no residual effects.

15 TJLP have undertaken archaeological studies that did not identify evidence of archaeological
16 resources, resulting in reduced potential for the TMJ site. The EAO is satisfied that further
17 archaeological studies undertaken prior to construction would reduce the uncertainty of
18 unexpectedly encountering historical or physical heritage resources in the LAA and combined
19 with the proposed mitigation measures would reduce the probability of adverse effects.
20 Heritage Resources are protected under the HCA and mitigations for potentially affected sites
21 would be determined in consultation with FLNRORD's Archaeology and Heritage Branch. A
22 Chance Find Management Procedure, developed in consultation with Indigenous Groups, would
23 outline the process for ensuring the preservation and proper management of Heritage
24 Resources should any be unexpectedly encountered during TMJ activities. Therefore, the EAO
25 does not predict residual effects to Heritage Resources due to ground altering activities in the
26 LAA.

27 The EAO concludes that given predicted increase in marine traffic¹⁰⁴ over current conditions,
28 and that the majority of TMJ-related vessels being bunker vessels in the BVS, TMJ would have
29 no residual effects on Heritage Resources from erosion due to wake effects/ propeller wash
30 along the shorelines of the Fraser River in the RAA.

¹⁰⁴ TJLP predicted the increase in vessel traffic due to TMJ, based on 2018 baseline levels estimated near the TMJ site at Gravesend Reach. For the Application scenario of 137 vessel calls annually, TJLP predicted a 4.1% increase in large vessels and 1.2% increase for bunker vessel-size ships (comparable to size of a tug). For the BVS of 365 vessel calls annually, TJLP predicted a 3.5% increase in large vessels and 5.2% increase for bunker vessel-sized ships.

1 The EAO does not predict residual effects on Heritage Resources presented in the MSA due to
2 wave erosion as the magnitude of the vessel wake is predicted to be within the range of natural
3 variation for wave activity in the MSA area.

4 **7.1.5 CONCLUSIONS**

5 Considering the above analysis and proposed mitigation measures identified in the provincial
6 TOC, including Condition 14: Cultural and Archaeological Resources Management Plan (which
7 would become legally binding as a condition of an EAC), and recommended KMMs under CEAA
8 2012 for heritage resources (Appendix 1), the EAO is satisfied that TMJ would not have residual
9 effects on Heritage Resources, including components related to Sections 5 (1)(c)(ii) and
10 5(1)(c)(iv).

11 **8 ASSESSMENT OF SOCIAL AND ECONOMIC EFFECTS**

12 **8.1 SOCIO-COMMUNITY**

13 **8.1.1 BACKGROUND**

14 The Socio-Community VC was selected to assess potential TMJ effects on health and emergency
15 services, community infrastructure, and community health and well-being. Socio-Community
16 was included as a VC due to TMJ's use of municipal water and solid waste infrastructure, as well
17 as the potential for use of health and emergency services.

18 The Application selected the following subcomponents of Socio-Community to evaluate
19 potential effects:

- 20 • *Change in demand for health and emergency services* (Health and Emergency Services)
21 from an increased demand for fire, police, ambulance, marine rescue, and other
22 healthcare services because of TMJ activities;
- 23 • *Change in demand for community infrastructure* (Community Infrastructure) from
24 increased demand for water, solid waste disposal, and transportation infrastructure as a
25 result of TMJ activities; and
- 26 • *Change in community health and well-being* (Health and Well-being) from TMJ-induced
27 nuisance from noise, nighttime light, changes to air quality, and other social
28 determinants of health, that may affect community health and well-being.

29 The Socio-Community VC is linked to the following VCs:

- 1 • Noise VC as a change in noise could increase nuisance, and in turn affect community
- 2 health and well-being;
- 3 • Economy VC as changes to social determinants of health due to TMJ could influence the
- 4 community health and well-being, particularly for Indigenous Groups. Additionally, the
- 5 results of the Socio-Community assessment informed parts of the Economy VC as
- 6 change in demand for community infrastructure could affect local government finances;
- 7 • Land and Marine Use VC as demand on local marine emergency services due to TMJ
- 8 direct use of services could affect marine emergency service demand and supply;
- 9 • Human Health VC as changes to air and water quality due to TMJ could influence
- 10 community health and well-being, including to Indigenous Groups;
- 11 • Current Use of Lands and Resources for Traditional Purposes VC as changes in access to
- 12 marine areas used for traditional purposes due to TMJ marine use could influence
- 13 community health and well-being for Indigenous Groups; and
- 14 • Visual Quality VC as visibility changes in daytime viewing and nighttime lighting could
- 15 increase during TMJ Operation, which could affect community health and well-being.

16 Physical determinants of health associated with air quality are assessed in Air Quality ([Section](#)
17 [5.1](#)) and Human Health ([Section 6.1](#)) chapters of this Report.

18 Effects on the Health and Socio-Economic Conditions of Indigenous Peoples Related to the
19 CEAA 2012 subparagraph 5(1)(c)(i) (Section 9) are also linked to the Socio-Community VC as
20 changes to demand in health and emergency services are connected to the health and socio-
21 economic conditions of Indigenous Groups. Effects under 5(2)(b)(i) of CEAA 2012 are also linked
22 to the assessment of Socio-Community.

23 TJLP did not assess the Socio-Community VC as part of the MSA. Relevant marine-based
24 subcomponents are captured under the Marine Resource Use VC ([Section 8.2](#)). Indigenous
25 community health and wellbeing is addressed in Current Use of Lands and Resources for
26 Traditional Purposes ([Section 11.4](#)).

27 **8.1.1.1 REGULATORY CONTEXT**

28 Healthcare is publicly funded and provided by the provincial government in the Lower Mainland
29 through the Fraser Health and Vancouver Coastal Health Authorities. Indigenous healthcare is
30 funded and administered by the Government of Canada through the *Canada Health Act*. Police
31 services are governed by the *Police Act* and provided in the TMJ site boundary by the Delta
32 Police Force; ambulatory services are governed by the *Emergency Health Services Act* and
33 provided by the British Columbia Ambulance Service; and fire services are the responsibility of
34 local government authorities as directed under the *Fire Services Act*. The CCG is responsible for
35 the management of vessel traffic for marine risk reduction, including marine rescue services,
36 under the *Canada Shipping Act*.

1 The *Local Government Act* provides the framework for regional districts regarding planning and
2 land use. The *Community Charter* provides municipalities jurisdiction over water, wastewater,
3 solid waste management systems and other utilities.

4 There are no provincial regulatory requirements that directly guide community health and
5 well-being; however, the B.C. Ministry of Health has several programs which support health
6 promotion, health protection, disease and injury prevention, health assessment, and disease
7 surveillance. Key federal and provincial legislation, policy, and regulatory guidelines apply to the
8 Socio-Community VC. CEAA 2012 Sections 5(1)(c)(i) and 5(2)(b)(i) requires the assessment of
9 effects related to changes to the environmental relevant to the human health assessment as
10 changes to air and water quality are linked to the health and socio-economic conditions of
11 Indigenous peoples and the public.

12 **8.1.1.2 BOUNDARIES**

13 Spatial boundaries for the LAA for the Health and Emergency Services and Community
14 Infrastructure and the Social Determinants of Health aspects of community Health and Well-
15 being include Metro Vancouver, with a focus on Delta; the RAA includes Metro Vancouver. The
16 LAA for the Nuisance Noise and Light aspects of the Community Health and Well-being sub-
17 component include the combined LAA for the Noise and Visual Quality VCs, while the RAA is the
18 combined RAA for the Noise and Visual Quality RAAs.

19 **8.1.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 20 **APPLICATION**

21 **8.1.2.1 BASELINE INFORMATION**

22 Baseline information on the Socio-Community subcomponents was developed through publicly
23 available studies such as the Census, B.C. Stats reports, reports from B.C. Ministry of Health and
24 Ministry of Transportation and Infrastructure (MOTI), Indigenous and municipal government
25 reports, and included consideration of Traditional Use Studies (TUS) and TEK where available.
26 The Application notes, however, that the TMJ-specific studies undertaken by Indigenous Groups
27 and that are available through publicly available sources did not provide specific information on
28 potential health and well-being effects.

29 **HEALTH AND EMERGENCY SERVICES**

30 Health services in Delta are provided by the Fraser Health Authority. Land based emergency
31 services (Police, Fire, and Ambulance) from Delta are predicted to be the first responders to
32 arrive at TMJ in the event of an incident that requires assistance from these services. In the
33 event of a marine based emergency, response is provided by the CCG Service, Canadian
34 Lifeboat Institution, and the Royal Canadian Marine Search and Rescue. The CCG operates from

1 Sea Island, approximately 18.5 km from TMJ by boat, providing vessels (for example, life boat
2 and hovercraft) and rescue divers as necessary; secondary rescue vessels are provided by the
3 CCG Auxiliary. A marine-based emergency that involves a spill of LNG may require a
4 coordinated effort between both the marine-based and the land-based emergency response
5 organizations listed. Additional discussion regarding LNG spills can be found in Accidents and
6 Malfunctions section ([Section 9](#)) of this Report.

7 **COMMUNITY INFRASTRUCTURE**

8 Water provisions and management responsibilities are shared between Metro Vancouver and
9 its member municipalities. Solid waste is also managed by Metro Vancouver once residential,
10 industrial, commercial, and institutional waste is collected by municipal collection crews.

11 River Road, the primary service road to TMJ, is part of the B.C. Major Road Network jointly
12 managed by TransLink and local municipalities. Traffic on this road reflects a predominantly
13 commuter-based profile with relatively stable traffic levels throughout the year (that is, little
14 seasonal tourism-based travel).

15 **HEALTH AND WELL-BEING**

16 The Application notes noise and nighttime light levels collected at four receptor sites,
17 representative of residences, that were in proximity to TMJ:

- 18 • Receptor 1 (R1) - Residences located 440 m south of the TMJ site boundary;
- 19 • Receptor 2 (R2) - Animal shelter located across from Tilbury Road from the TMJ site,
20 approximately 150 m southeast of the TMJ site boundary;
- 21 • Receptor 3 (R3) - Site representing First Nations village of Tl'uq̓tinus, which is also a
22 proposed future habitation site, located 300 m north of the TMJ site boundary; and
- 23 • Receptor 4 (R4) - Residences located approximately 1,300 m southwest of the TMJ site
24 boundary and within 300 m of the proposed shipping route.

25 Baseline noise level measurements (day-night) and baseline nighttime light levels from the
26 Application are presented below. The Application also noted that nighttime light measurements
27 were not collected at R1 as the TMJ site is not visible from this location.

28 **Table 27: Baseline Noise Measurements and Nighttime Light Measurements by Receptor location**

Assessment Receptor (site)	Baseline Case Noise Level (day-night) (dBA)	Light Trespass		Sky Glow	
		Illuminance (lux)	Environmental Light Zone Classification ^(a)	Sky Glow (% above natural background)	Environmental Light Zone Classification
R1	63.0	n/a	n/a	n/a	n/a
R2	58.0	2.935	E4	70,372	E4
R3	57.9	0.419	E2	5,871	E4

R4	56.0	0.846	E2	5,148	E4
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1 (a) Environmental Light Zone Classification based on the Commission Internationale de L'Eclairage (CIE) guidelines. E1:
 2 Natural, intrinsically dark; E2: Rural, low district brightness; E3: Suburban, medium district brightness; E4: Urban, high
 3 district brightness.

4 The Application describes baseline information regarding other social determinants of health in
 5 the LAA and RAA, including, community connectedness and social support networks, education
 6 and literacy, employment and working conditions, personal health practices and coping skills,
 7 and healthy child development.

8 **8.1.2.2 POTENTIAL PROJECT EFFECTS**

9 **HEALTH AND EMERGENCY SERVICES**

10 The Application predicted that that there could be an increased demand on local ambulances
 11 during construction. The Application also noted that in the event of a water-based emergency,
 12 which would be rare, marine-based rescue could result in increased demand for marine
 13 emergency services for all phases of TMJ.

14 **COMMUNITY INFRASTRUCTURE**

15 The Application notes that use of community infrastructure during all phases of TMJ would be
 16 minimal. Waste streams generated on site would be disposed of in accordance with applicable
 17 regulatory requirements and bottled potable water would be provided for workers. Effects to
 18 local public roads would be negligible as the construction materials would be transported by
 19 barge; while the workforce of seven full time equivalent employees is not anticipated to
 20 measurably increase local vehicle traffic during operations.

21 **HEALTH AND WELL-BEING**

22 Changes in the social determinants of health (community connectedness, social support
 23 networks, education and literacy, employment and working conditions, personal health
 24 practices, and healthy child development) are not anticipated to result during construction,
 25 operations or decommissioning. This is due in large part to TJLP sourcing most of its workforce
 26 locally during construction and continuing to utilize the existing local workforce for operations.
 27 The Application noted that the estimated TMJ employment and income was considered a
 28 benefit to community health and well-being (see Economy, [Section 8.4](#) of this Report).

29 Noise has the potential to exceed HC thresholds for change in %HA at a proposed future
 30 habitation site (that is, R3) during the construction of the temporary and permanent berth.
 31 Noise modelling results at R3 did not exceed thresholds for %HA during operations. Noise
 32 modelling results for all other receptors (two residences and an animal shelter) were below the
 33 HC threshold for change in %HA during both construction and operations. Noise levels during

1 decommissioning are expected to be similar to those predicted for construction, and mitigation
2 measures were proposed for predicted potential effects. Construction, operations and
3 decommissioning associated lighting emission increase at night is not anticipated to change the
4 overall baseline lighting conditions in the LAA.

5 The Application notes that community well-being may be affected with respect to Indigenous
6 Groups and changes in their access to areas for FSC purposes. The Application points out that
7 FSC fishers are limited to DFO fishing windows and, if they are in designated shipping lanes,
8 must give way to oncoming vessels that are required to transit in these lanes. TJLP committed
9 to avoiding transiting known fishing areas during DFO openings, where possible, and proposed
10 a Marine Access and Transportation Plan and Marine Communications Plan that would outline
11 specific procedures to maintain commercial and non-commercial navigation throughout all TMJ
12 phases. TJLP noted that these plans would be further supplemented by a Marine and
13 Indigenous Communications Plan.

14 The Application concluded that potential effects of changes in access for FSC and Domestic
15 purposes would have a negligible effect on Indigenous people's health and well-being, following
16 mitigation. Marine use and access is assessed further in the Land and Marine Resource Use
17 ([Section 8.2](#)), Current Use ([Section 11.4](#)), and Part C chapters in this Report, addressing the
18 issues relating to access in more detail.

19 ***BUNKER VESSEL SCENARIO***

20 Health and emergency services could be affected if the increased frequency of vessels resulted
21 in an increase in marine-related accidents, which in turn, could result in increased demand for
22 marine emergency service providers. In the BVSA, TJLP concluded that the residual risk of
23 collision, grounding, or collision resulting in LNG release and fire associated with the additional
24 bunker vessel traffic is consistent with what was identified in the Application. Therefore, no
25 change in demand for marine emergency service providers associated with the increased
26 frequency of bunker vessels is anticipated by TJLP compared to the negligible finding identified
27 in the Application.

28 Community health and wellbeing could be affected if changes in vessel frequency resulted in
29 increases to noise and nighttime light, which could result in increased nuisance to nearby
30 residents. In the BVSA, TJLP concluded that the effects from the increase in annual bunker
31 vessels on Noise (see Section 6.2.2) is not predicted to result in changes in effects from what
32 was presented in the Application. Therefore, no change in nuisance to nearby residents and
33 effect on community health and wellbeing is anticipated from the negligible interaction
34 identified in Section 6.1 of the EAC Application.

35 TJLP assessed predicted effects to Visual Quality in the Application based on the larger LNG
36 carrier vessels, which are more visually prominent than the much smaller LNG bunkers. In the

1 BVSA, TJLP concluded that no additional effects to visual quality from increased frequency of
2 bunker vessels are anticipated. Therefore, no change in nuisances from noise and nighttime
3 light associated with the increased frequency of bunker vessels to nearby residents is
4 anticipated by TJLP compared to the negligible finding identified in the Application.

5 Overall, TJLP's BVSA did not predict changes to the results of the visual quality or noise
6 assessment; therefore, TJLP did not predict a change to the results of the Socio-community
7 assessment.

8 **8.1.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

9 The Application proposed the following management plans to support mitigation of potential
10 effects: noise, light, waste, wastewater, stormwater, marine access and transportation,
11 security, spill, emergency response, worker safety, and separate emergency response
12 communication plans for Indigenous Groups and local governments and the public. Additional
13 Socio-Community specific mitigations include:

- 14 • Annual emergency response planning workshops: TJLP would annually engage local first
15 responders and relevant local government staff to orient them to the site, identify areas
16 of concern, and reduce uncertainty for first responders who may be called to respond to
17 incidents on site; and
- 18 • Local and Indigenous Hiring and Procurement Policies: TJLP would require engineering,
19 procurement, and construction contractors to have local and Indigenous hiring policies
20 and strategies to maximize project employment for these groups. Annual reporting by
21 the contractors and verified by a third party, would track success of recruitment and
22 retention of local and Indigenous workers.

23 No additional mitigation measures were proposed by TJLP as part of the BVSA.

24 **8.1.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 25 **IDENTIFIED DURING APPLICATION REVIEW**

26 During Application review, the Working Group did not raise concerns about key issues on
27 Health and Emergency Services or Community Infrastructure. Key issues raised related to
28 Health and Well-Being are discussed in relevant VC chapters, including Human Health ([Section](#)
29 [6.1](#)), Noise ([Section 6.2](#)), Land and Marine Resource Use ([Section 8.2](#)), Visual Quality ([Section](#)
30 [8.3](#)), Economy ([Section 8.4](#)), Health and Socio-Economic Conditions of Indigenous Peoples
31 ([Section 11.3](#)), and Current Use ([Section 11.4](#)).

1 8.1.4 THE EAO'S ANALYSIS AND CONCLUSIONS

2 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
3 on the Socio-Community VC for the Application scenario and BVS.

4 The EAO evaluated the potential effects to Socio-Community by considering construction,
5 operations and decommissioning activities that could affect Socio-Community through changes
6 to health and emergency services, community infrastructure, and community health and
7 well-being.

8 **Residual Effects:** After considering the proposed mitigation measures, the EAO concludes that
9 there would be negligible residual adverse effects to the Socio-Community VC related to Health
10 and Emergency Services or Community Infrastructure. The EAO has concluded on the pathway
11 of effects (noise, night-time light, and other social determinants of health) for Community and
12 Well-being, which are assessed in the Human Health ([Section 6.1](#)), Noise ([Section 6.2](#)), Visual
13 Quality ([Section 8.3](#)), Land and Marine Resource Use ([Section 8.2](#)), Economy ([Section 8.4](#)),
14 Health and Socio-Economic Conditions of Indigenous Peoples ([Section 11.3](#)), and Current Use
15 ([Section 11.4](#)) chapters in this Report.

16 8.1.5 CONCLUSIONS

17 Considering the above analysis and the proposed conditions in the TOC (which would become
18 legally binding if an EAC is issued), and the recommended KMMs under CEAA 2012 (Appendix
19 1), the EAO is satisfied that TMJ would not have significant adverse effects on the
20 Socio-Community VC.

21 8.2 LAND AND MARINE RESOURCE USE

22 8.2.1 BACKGROUND

23 Land and Marine Resource Use was selected as a VC because TMJ would be located in an
24 important commercial transportation corridor used for deep-sea and domestic navigation,
25 including Indigenous commercial fishing, commercial shipping, barging and towing, other
26 commercial uses such as log storage and handling, commercial and recreational fisheries, and
27 other commercial and non-commercial land and marine use (for example, marine recreation).
28 Marine vessels, including LNG carriers, that utilize the lower Fraser River shipping channels may
29 have effects on Land and Marine Resource Use during construction and operations.

1 The Land and Marine Resource Use assessment relied upon the findings of Air Quality ([Section](#)
2 [5.1](#)), River Processes ([Section 5.3](#)), Vessel Wake ([Section 5.4](#)), Fish and Fish Habitat ([Section](#)
3 [5.6](#)), Marine Mammals ([Section 5.7](#)), Wildlife and Wildlife Habitat and Marine Birds ([Section](#)
4 [5.9](#)), Noise ([Section 6.2](#)) and Visual Quality ([Section 8.3](#)) assessments in the Application. The
5 Land and Marine Resource Use assessment informed the assessments of Socio-Community
6 ([Section 8.2](#)), Visual Quality ([Section 8.3](#)), Health and Socio-Economic Conditions for Indigenous
7 Peoples ([Section 11.3](#)), and Current Use ([Section 11.4](#)) of this Report. A discussion of potential
8 accidents and malfunctions related to TMJ marine activities are addressed under Accidents and
9 Malfunctions ([Section 9](#)) of this Report.

10 Potential effects on Indigenous economic opportunities and other food, social, and ceremonial
11 fisheries are assessed in Health and Socio-Economic Conditions for Indigenous Peoples ([Section](#)
12 [11.3](#)). Several Indigenous Groups engage in other marine use activities of traditional and
13 cultural importance, and potential effects on these activities are also assessed in Current Use.

14 The Land and Marine Resource Use assessment was based on potential changes to navigation,
15 commercial and non-commercial marine resource use (including Indigenous fishing), and
16 commercial and non-commercial land resource use.

17 **MARINE SHIPPING ASSESSMENT**

18 Marine Resource Use was included as a VC in the MSA because TMJ-related shipping could
19 affect access to and the use of marine areas for shipping and transportation and commercial
20 and non-commercial marine resource use, including potential effects on Indigenous Groups
21 with known commercial and non-commercial marine use interests and activities.

22 The Marine Resource Use assessment was based on potential changes to navigation, marine
23 commercial use, and outdoor recreation.

24 **8.2.1.1 REGULATORY CONTEXT**

25 The following federal legislation and maritime requirements are applicable to Land and Marine
26 Resource Use:

- 27 • *Canadian Navigable Waters Act*;
- 28 • *Canada Shipping Act* and its regulations governing marine safety and marine
29 environment protection;
- 30 • *Canada Marine Act*;
- 31 • *Marine Liability Act*;
- 32 • *Marine Transportation Security Act*;
- 33 • *Pilotage Act*; and
- 34 • *Fisheries Act*.

1 The following provincial legislation is applicable to Land and Marine Resource Use:

- 2
- *Land Act*.

3 TMJ is not located on federal lands; however, the study areas for the assessment are in an area
4 of the Fraser River where navigation is under the jurisdiction of the VFPA and FLNRORD has
5 jurisdiction over the land covered by water.

6 **MARINE SHIPPING ASSESSMENT**

7 In addition to the regulatory context above, the MSA considered:

- 8
- The Canada-British Columbia Marine Protected Area Strategy which is a program that
9 aims to create a marine protected area within 13 bioregions in Canada;
 - Gulf Islands National Park Reserve Interim Management Guidelines, guiding policies,
10 procedures and actions that protect the integrity and cultural heritage of the
11 Gulf Islands Nation Park Reserve; and
 - The Islands Trust Area that includes policy and planning objectives detailed in local
12 government specific plans and bylaws to guide development in the Trust Area.
13
14

15 **8.2.1.2 BOUNDARIES**

16 The LAAs for the Land and Marine Resource Use VC varied by the subcomponent and its
17 indicator; as such the Application assessment boundaries for this VC were (Figure 14):

- 18
- *Navigation LAA*: entire marine area of the South Arm of the Fraser River from the Fraser
19 Surrey Docks downstream to Pilot Area 1 including the Sand Heads Lighthouse;
 - *Marine Use LAA*: entire marine area of the South Arm of the Fraser River from the Fraser
20 Surrey Docks downstream to the Sand Heads Lighthouse and includes a 1 km buffer on
21 either side of the shipping lane; and
22
 - *Land Use LAA*: includes land within two km of the TMJ site boundary and a 50 metre (m)
23 buffer area along the foreshore of the South Arm of the Fraser River from Fraser Surrey
24 Docks to the mouth of the Fraser River that could experience effects from LNG marine
25 shipping (i.e., vessel wake) during operations.
26

27 For the Land and Marine Resource Use VC subcomponents, the RAA and the cumulative effects
28 assessment area were the same as the LAA boundaries.

29 **MARINE SHIPPING ASSESSMENT**

30 Two spatial boundaries were used for the Marine Resource Use VC in the MSA:

- 31
- The Marine Assessment Area (MAA) was the marine area between Sand Heads and the
32 12-nautical mile limit of Canada's territorial sea within the inbound and outbound
33 shipping channels (Figure 15). The boundaries of the MAA were not an extension of the

- 1 spatial boundaries described in the Application, but rather a separate, additional study
2 area and was used in place of an RAA. The MAA was broken down into segments A
3 through G to facilitate analysis; and
- 4 • The Marine Resource Use VC's Local Assessment Area (MLAA) for the MSA was the
5 inbound and outbound shipping lanes (plus a two-km buffer extending on either side of
6 these shipping lanes) that TMJ-related LNG carriers would use.

7 The same administrative (for example, DFO fisheries reporting areas) and technical boundaries
8 (for example, automatic identification systems for vessels) that were considered in the
9 Application were also considered and identified in the MSA.

10 **8.2.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 11 **MEASURES IN THE APPLICATION**

12 **8.2.2.1 BASELINE INFORMATION**

13 The Fraser River has been used by Indigenous Groups for transportation, harvesting activities
14 (hunting, trapping and fishing), trade and other cultural activities. Over the last 200 years, the
15 Fraser River has served as a primary transportation corridor in the lower mainland for
16 commercial industries such as forestry, agriculture, and fishing. Planned infrastructure projects,
17 project population growth, and development of commercial lands adjacent to the lower Fraser
18 River will place increased demands on the land and marine use along the lower Fraser River.

19 The EAO notes that during Application review, Tsawwassen First Nation identified errors in the
20 Application from misrepresented information relayed from Tsawwassen First Nation reports,
21 inconsistencies with language from the Tsawwassen Final Agreement, and updated fisheries
22 information and report references. Tsawwassen First Nation drafted an erratum, which TJLP
23 issued, to capture the corrected information.

24 **8.2.2.1.1 Navigation**

25 The South Arm of the Fraser River's deep-sea shipping channel is used by deep-sea shipping
26 vessels, tugs, barges, commercial fishing boats, and pleasure crafts. It is connected to several
27 domestic navigation channels that provide access to fishing vessels, tugs and barges, and
28 commercial and pleasure boating traffic in the Marine Use LAA.

29 The Application noted that from July 2010 to June 2011, of the total number of vessel transits
30 (14,336) past the TMJ site in the Fraser River, 83.7 percent were tugs and cargo ferries,

1 7.7 percent dredgers, and 7.5 percent deep-water vessels¹⁰⁵; with the remaining 0.8 percent
2 comprised of Search and Rescue (0.53 percent), Fishing (0.2 percent), Passenger (0.14 percent),
3 unspecified (0.03 percent) and Pilot vessels (0.01 percent). In a separate study, estimated traffic
4 in 2018 was not anticipated to grow substantially and the proportion of 2018 vessel traffic was
5 predicted to remain similar to 2013 proportions used in the study.

6 In the Application, TJLP provided a navigation study ([Appendix 1.0-1 of the Application](#)) of
7 potential risks associated with constructing and operating the TMJ marine terminal and
8 associated LNG carriers and barges. The Application noted that Tsawwassen First Nation
9 reported that their fishing vessels are frequently involved in near miss incidents on the Fraser
10 River, mainly with deep-sea vessels. The study assessed the risk of collision, allision¹⁰⁶,
11 grounding, and spills and provided mitigation measures to reduce risks following which, were
12 considered low (see [Section 9](#) Accidents and Malfunctions).

13 8.2.2.1.2 Commercial and Non-Commercial Marine Use

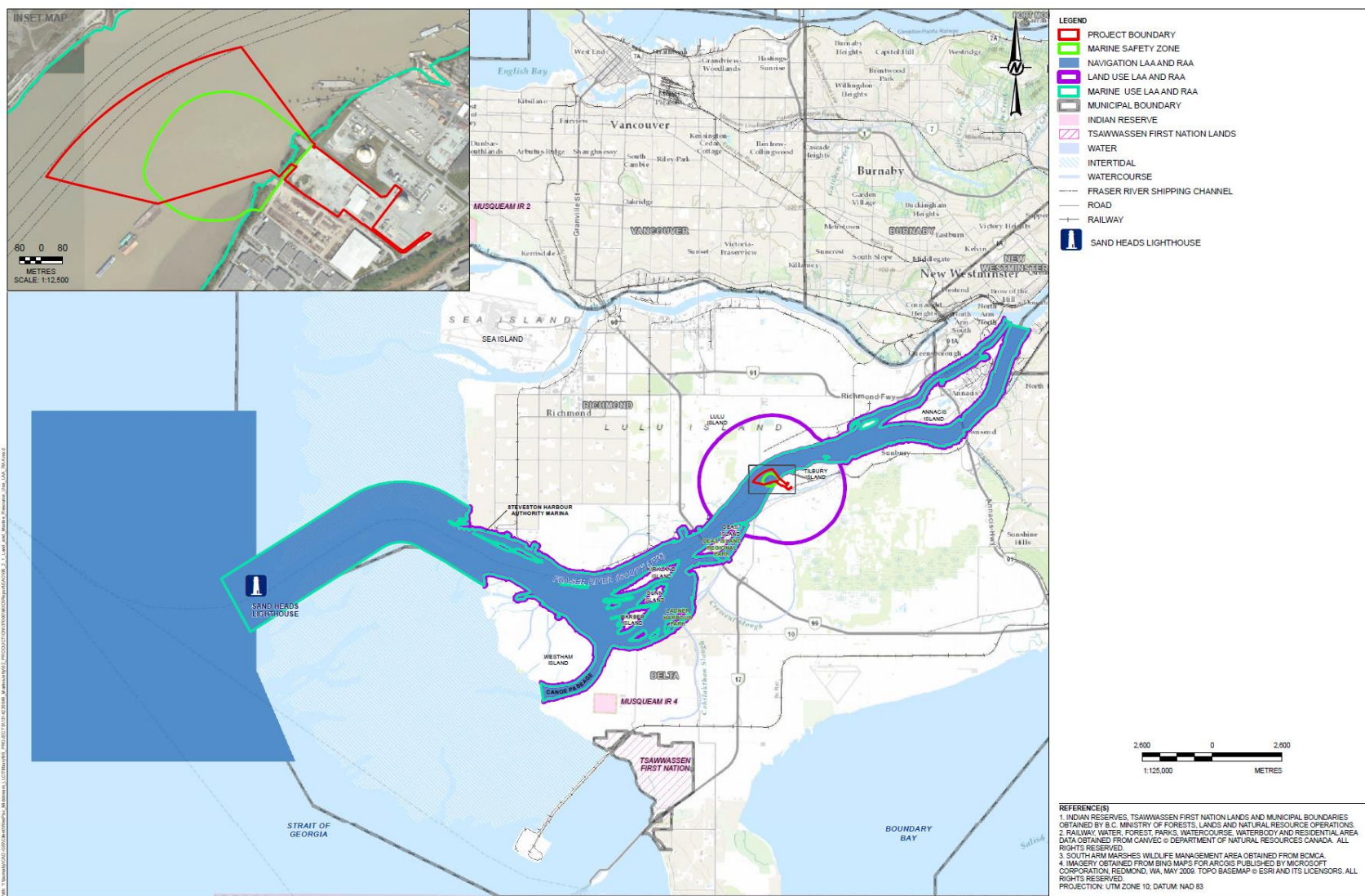
14 Commercial shipping is a key marine activity in the lower Fraser River, where automobile cargo,
15 bulk and container cargo vessels, tugs and barges, and freight vessels are the common vessel
16 types found.

17 The Seaspan Ferry Terminal is located approximately 200 m upstream of the TMJ site boundary.
18 The terminal provides 28 weekly round-trip ferry services destined for Nanaimo, and 24 weekly
19 round-trips destined for Swartz Bay. Seaspan also provides tug-related ship docking services to
20 vessels calling terminals within the Port of Vancouver. The Lehigh Hanson Cement plant on
21 Tilbury Island and the LaFarge Cement Plant in Richmond ship domestic drybulk goods such as
22 aggregate and cement by tug and barge in the Fraser River.

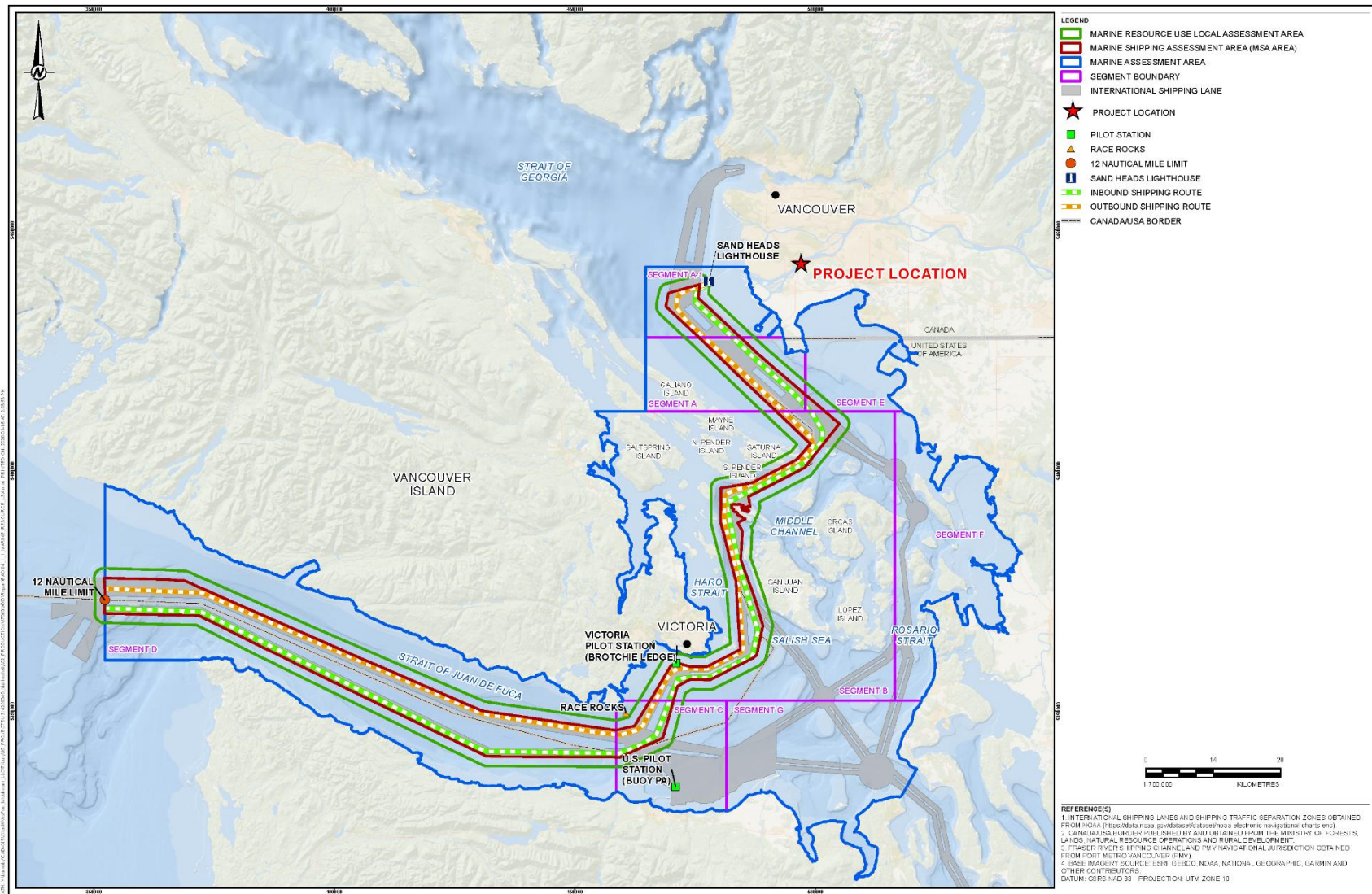
23 The commercial salmon fishery is the main fishery in the Marine Use LAA. DFO regulates
24 openings for commercial fisheries, by species (for example, sockeye, chum, and chinook). TMJ is
25 located in Pacific Fishery Management Area (PFMA) 29 which is the primary harvesting area in
26 Salmon Gillnet Management Area E, with fishing activity focused in-river and at the mouth of
27 the South Arm of the Fraser River. In the Marine Use LAA, most commercial licenses are related
28 to Seine and gillnet (approximately 87 percent).

¹⁰⁵ Deep-water vessels include general cargo, bulk cargo, and container ships.

¹⁰⁶ "Allision" is when a vessel underway collides with a vessel at berth (that is, a stationary vessel).



1
2 **Figure 14: Local and Regional Assessment Areas for Land and Marine Resource Use VC (original Application area).**



1

2 **Figure 15: Marine Resource Use Assessment Areas for the Marine Shipping Assessment.**

- 1 Indigenous Groups participate in fisheries for communal commercial (FA licence), and domestic
2 purposes in the lower Fraser River and in the vicinity of TMJ under the licences issued.
3 Tsawwassen First Nation, Tseil-Waututh Nation, Hul'qumi'num Fisheries Society,
4 Cowichan Tribes, and Salish Seas LP hold communal fisheries licences that allow the harvesting
5 of salmon for commercial purposes in the Fraser River. Musqueam Indian Band and
6 Tsawwassen First Nation currently have negotiated agreements¹⁰⁷ and Treaty agreements,
7 respectively, that permit the sale of domestic or FSC fish.
- 8 Tsawwassen First Nation, Musqueam Indian Band, Penelakut First Nation, and Kwantlen
9 First Nation hold commercial fisheries licences (separate from communal licences) that are valid
10 in the Marine Use LAA. Portions of FSC fish and seafood allocations that are harvested under
11 their FSC communal licence can be transferred to an economic opportunity licence. The
12 Application noted that Musqueam Indian Band commercial harvesters have been affected in
13 recent years due to higher levels of marine traffic in the Fraser River limiting the amount of
14 time their gillnets can remain in the water and the requirement to move them to give way to
15 other industrial marine users. The time spent moving nets lessens the narrow temporal window
16 in which fish can be harvested in some cases.
- 17 Tsawwassen First Nation Final Agreement and Tsawwassen Harvest Agreement (THA) allows
18 the Tsawwassen First Nation to fish the Fraser River up to the Port Mann Bridge. The THA
19 allows for the operation of a commercial fishery for each year's salmon allocation of sockeye,
20 chum and pink. Allocations are calculated based on run size or Total Allowable Catch and in
21 some years, there are no THA fisheries. The Application noted that in some years Tsawwassen
22 First Nation did not harvest their full allocation under the THA and in some cases transferred
23 allocation to other Indigenous Groups up river for (commercial or non-commercial) fisheries
24 when they are no longer able to access the fish or there are no further opportunities to harvest
25 the fish.
- 26 The Fraser River is identified as a year-round destination sport fishery, with peak season
27 generally occurring from June through September. The Application also noted that some
28 members of Tsawwassen First Nation use their fishing vessels for tourism opportunities
29 including wildlife tours and fishing charters on a casual basis.
- 30 The Application reported that along with recreational fishing and boating, other popular
31 recreational water activities in the Marine Use LAA (e.g., Steveston Harbour, Westham Island,

¹⁰⁷ Musqueam Indian Band has an established Aboriginal right to fish for FSC purposes, as established in the Sparrow decision (R v. Sparrow, [1990] 1 S.C.R. 1075).

1 Deas Slough and South Arm Marshes) include kayaking, canoeing, water skiing, and stand-up
2 paddle boarding.

3 8.2.2.1.3 **Commercial Land Use**

4 TMJ is located in the Tilbury Industrial Area, in Delta. The Application identified the properties
5 overlapped by TMJ's onshore boundary and almost all the properties in the Land Use LAA on
6 Tilbury Island are classified as Industrial land use. Other properties found in the Land Use LAA,
7 not located on Tilbury Island, include Industrial, Agricultural, Road and Environmentally
8 Sensitive Areas land use classes.

9 8.2.2.1.4 **Non-commercial Land Use**

10 Hunting, parks and trails, and bird watching were identified in the Application as the non-
11 commercial land use activities that occur in the Land Use LAA. Hunting occurs both on land and
12 water in the Land Use LAA, primarily for ducks and geese. The Application identifies portions of
13 parks and protected areas that are overlapped by the Land Use LAA include Deas Island
14 Regional Park, Burns Bog Ecological Conservation Area, Dow Delta Bar Fishing Park, and Tilbury
15 Island. No formal trail networks or other designated areas (other than parks) were identified by
16 in the Land Use LAA.

17 **MARINE SHIPPING ASSESSMENT**

18 The MAA has been used by Indigenous Groups since pre-contact for transportation, marine
19 harvesting activities (including fish, shellfish, and marine mammals), trade and other cultural
20 activities. Marine transportation, commercial and non-commercial fish and seafood harvesting
21 (including Indigenous commercial harvesting), marine tourism and marine recreational
22 activities such as guided sport fishing, recreational fish and seafood harvesting, and recreational
23 boating have a long history in the MAA. Additionally, there is a variety of residential
24 development along the coastlines found in the MAA, including the Metro Vancouver area, the
25 Lower Mainland, the Southern Gulf Islands, the Greater Victoria area and communities found in
26 Puget Sound, in Washington State. Many recreational areas (shoreline access and beaches,
27 walking and hiking trails, sightseeing etc.) as well as several national, provincial, and regional
28 parks can be found in and adjacent to the MAA.

29 The MSA noted that current levels of use for these activities have caused increased pressure on
30 fish stocks and changes in the environmental and social setting of the MAA.

31 **Marine Transportation**

32 TMJ vessels would use established shipping lanes through the Strait of Georgia, Boundary
33 Passage, Haro Strait and the Strait of Juan de Fuca which are also utilized by a variety of other
34 shipping vessels. There are also several established vessel traffic crossings along the shipping

1 lane, including BC Ferries and US public and private ferry systems that are active between ports
2 in the MAA.

3 In Segment A of the MAA (Figure 15), 37 percent of total traffic was represented by passenger
4 vessels including cruise ships and ferries. Cargo/ carrier vessel traffic represented
5 approximately 20 percent of the total traffic in Segment A.

6 In Segment B of the MAA (Figure 15), both Haro Strait and Boundary Passage are relatively
7 narrow passages, with strong tidal currents, and several navigational hazards. In 2017,
8 24 percent of vessel movements was from pleasure craft and sailing vessels in Haro Strait, in
9 Segment B. The Application estimated by 2030, vessel movements in Segment B are expected
10 to increase by close to 18 percent.

11 In Segment C of the MAA (Figure 15), 37 percent of traffic was represented by cargo and carrier
12 ships. In Segment D, the Juan de Fuca Strait is used by cargo, container and tanker vessels for
13 both inbound and outbound transits. Passenger ferry routes operating between Victoria and
14 Washington State overlap with the shipping lanes in the Juan de Fuca Strait. Fishing vessels also
15 operate during fishery openings, though there has been a decrease in large fishing vessels that
16 transit through the strait due to a decline in profitability and changes in management regimes
17 between 1995 and 2011. In Segment D (Figure 15), cargo, carrierships represented 42 percent
18 of the traffic. Vessel traffic was predicted to increase by 34 percent and 33 percent, in
19 Segments C and D, respectively, by 2030.

20 **Commercial Marine Fish and Seafood Harvesting**

21 Commercial fishing and seafood harvesting are managed by DFO in B.C. tidal waters, and the
22 Washington Department of Fish and Wildlife is responsible for fishing and harvesting in US
23 waters. Designated shipping lanes and navigable channels within the MLAA are used by
24 commercial harvesters to transit and through throughout the year. The MLAA overlaps with
25 multiple Fisheries Management Areas and PFMAs. Commercial fisheries are allowed in PFMAs
26 based on licences to harvest by fish or seafood species, and in some cases, by harvesting gear.

27 **Indigenous Marine Fish and Seafood Commercial Harvesting**

28 In the MLAA, Indigenous Groups have commercial, as well as economic opportunity fisheries
29 through their agreements with DFO. The MSA reported that 469 communal commercial
30 licences in the MLAA were held by Indigenous Groups, for harvest of halibut, herring spawn on
31 kelp, prawn and shrimp by trap, red sea urchin, rockfish, salmon gillnet, and salmon troll.
32 Commercial crab harvesting also takes place in segments of the MAA.

33

34

1 8.2.2.2 POTENTIAL PROJECT EFFECTS IN THE APPLICATION

2 The Application predicted potential effects to navigation use and navigability and commercial
3 and non-commercial marine area use and access.

4 *EFFECT ON NAVIGATION USE AND NAVIGABILITY*

5 In the Application, adverse effects on navigation from decommissioning activities were
6 considered negligible because marine vessel traffic volumes from TMJ-related vessels are
7 anticipated to be minimal, including a one-time towing of the dismantled FTBB and piling for
8 storage or reuse and therefore were not assessed further.

9 In the Application, TJLP assessed up to 68 LNG carrier vessel calls and up to 69 LNG bunker
10 vessel calls annually during operations, with an anticipated average of one vessel every three
11 days calling into the jetty, along with various tugs and a security monitoring patrol boat to
12 monitor the proposed marine safety exclusion zone¹⁰⁸. The LNG carriers (roughly 250 m long for
13 the largest) would be piloted by a Fraser River Pilot and have three tethered tugs to assist in the
14 1-2-hour transit from Sand Heads pilot station (at the Sand Heads Lighthouse) to the TMJ site.
15 The LNG bunker barges (approximately 120 m for the longest) would have a tethered tug.

16 In the Application, TJLP proposed a marine safety exclusion zone for public safety that would be
17 approximately 20 ha in size and extend up to 300 m from the jetty structure¹⁰⁹. TJLP predicted
18 access to the TMJ site would be affected two to three times a week while vessels are berthing,
19 loading and unberthing within the proposed zone, situated south of the outer limit of the
20 navigation channel. Berthing and unberthing for all size of LNG carriers is anticipated to take
21 less than one hour; vessel turning in the navigational channels is anticipated to take
22 approximately 10 minutes. As required under the Collision Regulations, smaller vessels such as
23 sailboats and fishing boats, must yield to larger vessels that are constrained by their draft.
24 Therefore, smaller vessels transiting within the navigation channels in the LAA at the same time
25 as TMJ-related vessels during construction and operations may need to occasionally change
26 speed or direction to yield to larger TMJ-related vessels, resulting in minor transit delays.
27 During LNG carrier turning in the navigational channel, movement of larger non-project vessels

¹⁰⁸ In the Application, TJLP proposed a “marine safety exclusion zone” / “marine security zone”. In response to Working Group comments during Application Review, TJLP no longer proposes a spatially defined zone and instead proposes a protocol-based approach to ensure public safety (“Marine Safety Protocol”). Please refer to Section 8.2.3 below and Section 9.3 (in the Accidents and Malfunctions section) for more details. The term “marine safety exclusion zone” is used in Section 8.2.2.2 of this Report, consistent with the Application.

¹⁰⁹ Ibid.

1 (for example, large cargo vessels) could be intermittently restricted for approximately
2 10 minutes.

3 Construction dredging would take roughly 55 calendar days per year of construction and
4 maintenance dredging (during operations) would take roughly 13 calendar days per year. TJLP
5 concluded that effects on navigation from construction and operational dredging would be
6 negligible.

7 ***EFFECT ON COMMERCIAL AND NON-COMMERCIAL MARINE AREA USE AND ACCESS***

8 TMJ was predicted to affect commercial and non-commercial marine area use and access
9 during construction and operations. During DFO fisheries openings, nets and other fishing
10 equipment in the navigation channels would have to be moved so as not to impede vessels
11 constrained by their draft. Construction-related vessels and LNG carriers and bunker barges
12 underway could require smaller commercial vessels and recreational vessels to change course
13 and speed in accordance with the Collision Regulations. TJLP compared TMJ-related vessels and
14 large vessel traffic (that is, cargo and tanker traffic) as they would present a similar effect to
15 marine users use and access. In the Application, TJLP predicted (based on 2018 projections) that
16 operational LNG carrier and barge vessels for TMJ could comprise an estimated 6.5 percent of
17 all large vessel traffic transiting the Southern Arm of the Fraser River up to the TMJ site¹¹⁰. TJLP
18 concluded that potential effects would be limited by the small number of marine construction
19 vessel movements and operational LNG carrier vessel movements of three times per week, the
20 small size of the TMJ footprint and marine safety exclusion zone relative to the commercial and
21 non-commercial use areas nearby, and the generally low usage of the area for sustained
22 commercial and non-commercial recreational marine uses.

23 Access to and use of nearby land resources, including tenured areas, was not anticipated in the
24 Application to be affected by the marine TMJ area nor the marine safety exclusion zone.

¹¹⁰ In April 2022, TJLP updated predicted increases in vessel traffic due to TMJ, using 2018 baseline levels estimated near the TMJ site at Gravesend Reach and based on the BVS and more recent information about the size of the bunker vessels. The difference between the vessel traffic predictions in the Application and for the BVS is due to TJLP no longer counting bunker vessels as “large” vessels based on their smaller size. The updated predictions for the Application scenario of 137 vessel calls annually, is a 4.1% increase in large vessels and 1.2% increase for bunker vessel-size ships (comparable to size of a tug). For the BVS of 365 vessel calls annually, TJLP predicted a 3.5% increase in large vessels and 5.2% increase for bunker vessel-sized ships.

1 **BUNKER VESSEL SCENARIO**

2 In the BVSA, TJLP noted that the specifications of the LNG carriers did not change from what
3 was assessed in the Application. However, new information about bunker vessels in
4 development in the Port of Vancouver suggests that smaller bunker vessels are emerging as
5 front-runner providers. Unlike the LNG barges, the bunker vessels assessed in the BVSA Report
6 are not expected to require tug assist. Due to the size and maneuverability of the bunker
7 vessels, bunker vessels are not expected to undergo large turns in the navigation channel and
8 the durations of berthing/deberthing would be less. The cargo transfer operation process is
9 expected to remain the same.

10 TJLP concluded that while there would be more bunker vessels calling at the jetty, the increased
11 number of smaller bunker vessels would not restrict movement in shipping lanes to the same
12 extent as the larger LNG carriers assessed in the Application. Similarly, all TMJ-related vessels
13 would be required to conduct all operational marine shipping in accordance with the
14 requirements of the *Canada Shipping Act* and other relevant navigation regulation and would
15 be piloted by local pilots as required. TJLP stated that the potential interaction is consistent
16 with what was assessed in the Application and did not conduct further assessment on
17 navigation use and navigability.

18 In the BVSA, TJLP assessed the interaction between vessel berthing and deberthing with general
19 commercial and non-commercial marine access and use, and between operational marine
20 shipping from the TMJ site and Sand Heads and commercial salmon harvesting access and area
21 use.

22 TJLP stated that while there would be more frequent bunker vessel calls under the BVS than
23 what was assessed in the Application, individual bunker vessels would interact with other
24 marine users accessing areas adjacent to the TMJ area for a shorter period of time. For the BVS,
25 TJLP predicted a 3.5% increase in large vessels and 5.2% increase for bunker vessel-sized ships
26 compared to baseline forecasts. The bunker vessels would be self-propelled and maneuverable
27 enough to approach and berth or deberth without stopping to reposition, making the process
28 quicker than for LNG carriers, resulting in less time for bunker vessels to potentially physically
29 interact with other marine users accessing the areas adjacent to the TMJ site. TJLP concluded
30 that the BVS is expected to be consistent with the findings of the Application and that no
31 further assessment of the effects of berthing/deberthing of TMJ-related vessels on commercial
32 and non-commercial marine use and access is required.

33 During commercial salmon openings, nets on commercial fishing vessels dropped within the
34 navigational channels would need to be removed from the navigation channels (per regulatory
35 requirements) so as not to impede other vessel traffic. These interactions would occur more
36 frequently, up to twice a day, compared to twice every three days assessed in the Application.

1 TJLP noted that while this increases the likelihood of a commercial salmon harvester being
2 required to move their nets to allow for TMJ-related LNG carrier or bunker vessel to transit
3 through the shipping lane, this would only occur during commercial salmon harvesting
4 openings. Commercial salmon harvesters are used to, and required to under the federal
5 Collision Regulations, give way to vessels transiting in the shipping lanes. TJLP concluded that
6 the findings of the BVSA are consistent with the Application.

7 **MARINE SHIPPING ASSESSMENT**

8 The MSA assessed potential interactions between marine shipping components and marine
9 resource use activities. TJLP stated that all TMJ-related vessels would be piloted by local,
10 experienced, professional pilots to minimize change in navigability as a result of TMJ. TJLP also
11 anticipated that the vessel traffic associated with TMJ would only represent an increase of 0.5
12 percent in Segment A, a 0.2 percent increase in Segment B, and a 1.1 percent increase in
13 Segments C and D of the total vessel movements relative to existing conditions. Given this
14 minimal increase in TMJ-related vessel traffic and the temporary nature of any displacement of
15 other smaller marine vessels that TMJ-related vessels would be anticipated to interact with,
16 TJLP found negligible effects for all interactions assessed.

17 **8.2.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

18 TMJ Project Design mitigations include implementing any TC recommendations from the
19 Navigation Study review, implementing navigational lighting and navigational aid requirements,
20 and timing for in river construction to avoid commercial fishery openings.

21 The Application proposed the following mitigation measures:

- 22 • Timing construction activities to avoid commercial salmon fishery openings;
- 23 • Marine access and transportation management plan which would include a description
24 of the activities and procedures to reduce effects to commercial and non-commercial
25 vessel navigational passage and provide consultation opportunities for key marine user
26 groups (for example, Indigenous Groups and commercial marine transport operators);
27 and
- 28 • Marine Communication Plan, developed in consultation with Indigenous Groups, and
29 include measures to reduce effects to marine navigation, marine access/ use, and
30 commercial and recreational Indigenous fishers as well as traditional use activities, that
31 include fishing for FSC or domestic purposes.

32 No additional mitigation measures were proposed by TJLP as part of the BVSA.

33 The MSA noted that required compliance with national and international maritime regulations
34 is anticipated to be highly effective in addressing potential effects to navigation. Due to

1 negligible effects predicted to the Marine Resource Use VC (MSA), there were no additional
2 mitigation measures proposed in the MSA.

3 **8.2.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 4 **IDENTIFIED DURING APPLICATION REVIEW**

5 The following key issues related to the assessment of Land and Marine Resource Use for TMJ
6 were identified during Application review and based on feedback from the Working Group.

7 ***MARINE ACCESS AND THE MARINE SAFETY EXCLUSION ZONE***

8 Musqueam Indian Band, Tsleil-Waututh Nation and Tsawwassen First Nation raised concerns
9 about the proposed “marine safety exclusion zone” and the importance of maintaining access
10 for marine users for traditional (assessed in Current Use, [Section 11.4](#)) and economic purposes.
11 Concerns were also raised that the cumulative effects of increased shipping in the Salish Sea
12 and the Fraser River are affecting their ability to access and harvest resources. The EAO also
13 heard similar concerns from Pacheedaht First Nation, Ditidaht First Nation, and Maa-nulth
14 Treaty Society regarding the cumulative effects of increased shipping traffic within the MSA
15 through both direct engagement on TMJ and as part of the RBT2 Panel report.

16 TC, and VFPA raised concerns about potential effects of the proposed marine safety exclusion
17 zone to navigation and BC OGC, TC, and VFPA requested additional details on the marine safety
18 exclusion zone protocols during LNG carrier transit, berthing, and loading of LNG. TC, BC OGC,
19 VFPA, CCG, Musqueam Indian Band and Cowichan Nation Alliance inquired whether the
20 berthing of LNG carriers and the related marine safety exclusion zone could affect navigation
21 and marine user access.

22 In the Application, TJLP proposed a marine safety exclusion zone for public safety, that
23 would be approximately 20 ha in size and extend up to 300 m from the jetty structure.
24 In response to VFPA and TC concerns raised during Application review about the
25 potential effect of the marine safety zone exclusion on navigability, TJLP proposed a
26 revised, protocol-based approach to provide for public safety and reduce the potential
27 for interference with navigation. Instead of a zone, TJLP proposed a Marine Safety
28 Protocol¹¹¹ to come into effect during construction (once the FTBB is in operation) and
29 remain in place for the life of TMJ for the purpose of public safety. TJLP would post

¹¹¹ TJLP Marine Safety Protocol v. 3.1, dated April 28, 2021

(https://www.projects.eao.gov.bc.ca/api/public/document/60a562697429e10022397830/download/20210428_TMJ%20Marine%20Safety%20Protocol.pdf).

1 signage along the jetty notifying river users of the presence of hazardous substances
2 and to exercise caution in the vicinity of the TMJ, and would work with the VFPA, the
3 Pilotage Authority and the MCTS to communicate the presence of an LNG ship at the
4 berth for the information of other vessels on the river. TJLP proposes varying levels of
5 site-specific operational measures to implement. Measures range from observing
6 passing vessels, to announcing to the vessels that they are in the vicinity of LNG
7 operation and that for safety reasons the vessel should take proper precautions, to
8 suspension of LNG loading operations.

9 Upon review of the proposed Marine Safety Protocol, the OGC, TC, and VFPA were
10 satisfied with the operational protocols to reduce public safety risk, and that the
11 proposed protocols would not obstruct navigation and were consistent with applicable
12 laws and regulations.

13 To reduce potential shipping-related effects to fishers (recreational, commercial, and
14 Indigenous) during DFO fisheries openings, those construction activities that are
15 associated with a higher number of vessel movements and delivery of materials by
16 marine transportation would be timed to avoid commercial fishery openings. TJLP noted
17 that their marine communication plan would set out the protocols to communicate
18 TMJ-related shipping with the marine users and Indigenous Groups and the marine
19 access and transportation management plan would describe of the activities and
20 procedures to maintain commercial and non-commercial vessel navigational passage to
21 Sand Heads.

22 Based on the description of the Marine Safety Protocol provided by TJLP during Application
23 review, the EAO understands that mariners may enter or pass through the marine terminal area
24 and TJLP have operational measures in place for public safety. For the purpose of the EA, the
25 EAO has taken a conservative approach in the effects assessment and has assumed that
26 mariners would avoid entering and remaining in the marine terminal area due to the warning
27 signs and notifications regarding elevated public risk, in particular during TMJ-related vessels
28 berthing, loading and de-berthing activities (on average, daily in the BVS) at full capacity.

29 The EAO recommends KMMS under CEAA 2012, for a Marine Access and Transportation Plan
30 for the Fraser River and a Marine Communication Plan. The Marine Access and Transportation
31 Plan requires identification of marine use and navigation from the TMJ site to Sand Heads,
32 including commercial and non-commercial routes and use areas, and any associated timing
33 windows. The plan must describe how TJLP would coordinate activities and communicate with
34 other marine users and regulators, mitigations to reduce disruptions for commercial and non-
35 commercial marine use, and measures to maintain navigation and safety. The Marine
36 Communication Plan would identify procedures to notify Indigenous Groups and other marine

1 users of planned activities associated with TMJ, including the type of information to be
2 communicated, such as anticipated traffic schedules and timing of distribution of information.
3 The plan would include procedures for Indigenous Groups and other marine users to provide
4 feedback to TJLP on adverse effects on navigation and for TJLP to document and respond to
5 issues raised.

6 **8.2.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

7 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
8 on the Land and Marine Resource Use VC and Marine Resource Use VC (MSA).

9 The EAO evaluated potential effects by considering construction, operations and
10 decommissioning activities that could affect the Land and Marine Resource Use VC and the
11 Marine Resource Use VC (MSA) by a change in navigation, commercial and non-commercial
12 marine resource use (including outdoor recreation), and commercial and non-commercial land
13 resource use.

14 **Key Mitigation Measures (CEAA 2012)**

15 Based on mitigations proposed in the Application and issues raised during Application review,
16 the EAO recommends the following KMMs under CEAA 2012:

- 17 • Marine Access and Transportation Plan (jetty to Sand Heads) - to identify methods to
18 coordinate activities and communicate with other marine users and regulators and
19 mitigation to reduce disruptions caused by construction and operations for commercial
20 and non-commercial marine use (KMM); and
- 21 • Marine Communications Plan (jetty to 12 nm limit) - to identify procedures to notify
22 marine users of planned activities associated with TMJ (from the, including the type of
23 information to be communicated, such as anticipated traffic schedules and timing of
24 distribution of information, and procedures for marine users to provide feedback and
25 for TJLP to document and respond to issues raised (KMM).

26 **Residual Effects:** After considering the proposed mitigation measures, the EAO predicts that
27 TMJ would result in residual effects to commercial and non-commercial marine users from the
28 proposed jetty to Sand Heads for the Application scenario and BVS. The EAO predicts effects as
29 a result of construction and operational marine vessel movement and interference with
30 commercial and recreational marine users transiting the TMJ site.

31 The EAO's characterization of the expected residual effects of TMJ on the Land and Marine
32 Resource Use VC and Marine Resource Use VC (MSA) are summarized below, as well as the
33 EAO's level of confidence in the effects determination (including their likelihood and
34 significance).

1 **Table 28: Summary of residual effects to commercial and non-commercial marine users.**

Criteria	Assessment Rating	Rationale
Context	Moderate to High resilience	Along the established shipping routes and the Fraser River area, which is highly industrialized, marine users are commonly required to accommodate temporary interferences, such as disturbances related to transiting and berthing, as well as shipping/ transiting activities. Indigenous Groups have raised concerns that increased shipping in the Fraser River and Salish Sea is affecting their ability to access and harvest resources.
Magnitude	Negligible (MAA) to low	<p>Transiting, turning, berthing, and deberthing of LNG carriers (and their support vessels) and bunker vessels have the potential to result in short term disruption. Occasionally, commercial harvesters, tourism and recreational users may be required to reduce speed or direction to yield to larger TMJ-related vessels and/ or remove commercial fishing nets while vessels are navigating through. Mariners may enter or pass through the marine terminal area; however, the EAO has conservatively assumed that mariners and Indigenous Groups are predicted to avoid entering and remaining in the marine terminal area due to the warning signs and notifications regarding elevated safety risk in the terminal area due to LNG berthing, loading and de-berthing activities (approximately one vessel call per day, on average, in the BVS). At the scale of the LAA and RAA this would amount to a low magnitude effect to access at the TMJ site. The overall increase in construction and operational marine vessels in the Marine Use LAA is low relative to the overall number of vessel movements that occur in this part of the Fraser River. In the Application scenario, operational LNG carriers would increase large vessel traffic by 4.1% and bunker barges would increase similar sized vessel traffic by 1.2%¹¹². For the BVS, LNG carriers are predicted to increase large vessel traffic by 3.5%, and bunker vessel-sized traffic by 5.2%. For all vessels, the Application and BVS are predicted to increase vessel traffic by 1.5% and 4%, respectively. Residual effects in the Marine Use LAA are predicted to be low magnitude.</p> <p>In the MAA, the anticipated vessel traffic associated with TMJ would be up to 236 ship movements per year, representing an increase of 0.5 percent in Segments A, 0.2 percent in Segments B, and 1.1 percent in Segments C and D of the total vessel movements relative to existing conditions. Residual effects to commercial fishing, including commercial harvesting areas of the First Nations of the Maa-nulth Treaty Society in Segment D that overlap the shipping lanes, are predicted. For all other Indigenous Groups, the EAO is of the view that 236 TMJ-related vessel movements per year would not affect commercial fishing</p>

¹¹² In 2022, TJLP predicted the increase in vessel traffic due to TMJ, based on 2018 baseline levels estimated near the TMJ site at Gravesend Reach. For the Application scenario of 137 vessel calls annually, TJLP predicted a 4.1% increase in large vessels and 1.2% increase for bunker vessel-size ships (comparable to size of a tug). For the BVS of 365 vessel calls annually, TJLP predicted a 3.5% increase in large vessels and 5.2% increase for bunker vessel-sized ships.

Criteria	Assessment Rating	Rationale
		ventures taking place in the MSA. Residual effects to the experience of commercial and non-commercial marine users conducting their activities are expected to diminish with increased distance from TMJ vessels in transit (see extent below) and are predicted to be negligible in magnitude.
Extent	Regional	Effects to commercial and non-commercial marine users are expected to be regional, with various vessels transiting throughout the region.
Duration	Long-term	The residual effect is long-term, spanning construction and operations. Construction-related vessels transporting materials, decommissioned infrastructure and equipment to and from the TMJ site would transit in the Marine Use LAA. During operations, operational LNG carriers and barges, tugs and security monitoring patrol boats would transit the Southern Arm of the Fraser River to Sand Heads and out to the 12 nm limit.
Frequency	Frequent to Continuous	The residual effect would be intermittent and limited by the small number of marine construction vessel movements during construction and frequent due to operational LNG carrier and barge vessel movements (an average of one vessel call to the jetty or two vessel movements each day for the BVS). The EAO has conservatively assumed that mariners and Indigenous Groups are predicted to avoid entering and remaining in the marine terminal area during operations; therefore, the residual effect would be continuous. Given the number of transits of the Salish Sea and the short time period to transit from the 12nm limit of Canada's territorial sea to the TMJ jetty, residual effects on commercial and non-commercial marine users from vessels in transit are predicted to be frequent.
Reversibility	Reversible	The residual effect to commercial and non-commercial marine users would be reversible after TMJ operations ceases.
Likelihood	The EAO considers the likelihood of residual effects on commercial and non-commercial marine users from the jetty to Sand Heads due to TMJ-related vessels to be high.	
Significance	In consideration of the above analysis and the recommended the KMMs under CEAA 2012 for Marine Access and Transportation Plan and Marine Communication Plan, the EAO is satisfied that TMJ would not have significant adverse residual effects on commercial and non-commercial marine users.	
Confidence	The EAO has a moderate to high level of confidence in the effects assessment considering the availability of information regarding existing commercial and recreational marine use activities and uses, the predicted effectiveness of mitigation measures and BMPs that have been applied to LNG jetty and terminal projects, and compliance with national and international maritime regulations. However, the EAO also recommends KMMs under CEAA 2012 for a Marine Access and Transportation Plan and Marine Communication Plan to mitigate potential effects.	

1 *Note: Criteria and assessment ratings are defined in Appendix 5: Residual Effects Characterization Definitions.*

1 8.2.5 CUMULATIVE EFFECTS ASSESSMENT

2 Residual effects predicted for the Land and Marine Resource Use VC related to commercial and
3 non-commercial marine users were carried forward for the cumulative effects assessment.

4 For the Application scenario, TJLP predicted the increase in vessel traffic (over 2018 conditions)
5 as a result of TMJ to be ~1.5% (increase of ~4.1% in large vessel traffic and ~1.2% in bunker/tug
6 -sized vessel traffic). For the BVS, TJLP predicted the increase in vessel traffic (over 2018
7 conditions) to be ~4% (increase of ~3.5% in large vessel traffic and ~5.2% in bunker/tug-sized
8 vessel traffic. Based on a 2016 VFPA analysis¹¹³, vessel traffic along the Fraser River peaked in
9 the early 2000's and has since experienced a notable decline. Adding projected vessel calls
10 associated with projects that have been permitted or may be permitted to the current vessel
11 numbers, Fraser River vessel traffic is forecast to recover to levels similar to those attained in
12 the early 2000's.

13 The effects of other existing projects and activities that have already been implemented
14 (construction and operation) are considered as part of the existing conditions for the Land and
15 Marine Resource Use VC. The EAO considered the following reasonably foreseeable future
16 projects and activities that could potentially interact cumulatively with TMJ. The VAFFC will
17 barge fuel once every two weeks and receive a Panamax class vessel delivery once a month
18 within the Marine Use RAA. PBRP will have a maximum of three vessel trips per week through
19 the South Arm of the Fraser River during construction (six years) and a higher number of barges
20 and tugboats will be required over the 15-day period when the existing bridge is removed.
21 Delta Grinding would comprise around 30 Panamax class vessel movements a year. FortisBC
22 Tilbury Phase 2 LNG Plant Expansion is expected to increase marine shipping traffic during
23 construction (up to 3 years) as part of the temporary construction jetty and delivery of project
24 equipment modules. Although details were not available for the Seaspan Ferries Tilbury
25 Terminal Expansion, Fraser River Tunnel Project, and Deas Island BC Hydro Transmission Line,
26 there may be potential cumulative interaction with commercial and recreational marine access
27 due to additional vessels.

28 Smaller commercial and non-commercial recreation vessels using the channel at the same time
29 as vessels associated with TMJ, and the projects listed above may experience minor transit
30 delays. Removal of commercial fishing vessel nets dropped in the navigational channels would

¹¹³ Vancouver Fraser Port Authority. 2016. Backgrounder: The Fraser River and future trade.
<https://www.portvancouver.com/wp-content/uploads/2017/05/2017-05-25-Backgrounder-Future-of-the-Fraser-River.pdf>

1 be required (regulatory requirement) to avoid impeding TMJ-related marine vessel traffic.
2 Additionally, commercial and recreational vessels may have temporary restricted area use and
3 access in the navigational channels from barges and Panamax vessels associated with the
4 VAFFC and Delta Grinding Facility or vessels associated with FortisBC Tilbury Phase 2 LNG Plant
5 Expansion or Seaspan Ferries Tilbury Terminal Expansion during the berthing and deberthing
6 period.

7 TJLP assumed that these other projects would apply mitigation measures similar to those of
8 TMJ to address effects on commercial and non-commercial marine area use and access. The
9 EAO notes that the RBT2 Panel Report recommended several mitigation measures that are
10 considered beyond the scope of the TMJ EA to implement, for example exploring options for
11 the relocation of the shipping lanes and regional assessment EAs for both the Fraser River and
12 Salish Sea). The residual cumulative effects on commercial and non-commercial marine area
13 use and access would be temporary and would not compromise the ability for Indigenous
14 domestic and commercial fisheries, commercial, recreational and tourism marine activity to
15 continue. For the Application scenario and BVS, the EAO concludes that any cumulative effect
16 would be low in magnitude and not significant for marine use.

17 A cumulative effects assessment on Marine Resource Use in the MSA was not conducted as
18 TMJ-related vessel movements are predicted to have a negligible residual effect on the Marine
19 Resource Use VC (MSA). The anticipated vessel traffic associated with TMJ would not represent
20 a substantive increase in the total vessel movements relative to existing conditions in the MSA.

21 **8.2.6 CONCLUSIONS**

22 Considering the analysis above and the conditions identified in the CPD and TOC (which would
23 become legally binding if an EAC is issued), and recommended KMMs under CEAA 2012 for a
24 Marine Access and Transportation Plan and Marine Communication Plan (Appendix 1), the EAO
25 is satisfied that TMJ would not have significant adverse residual effects or cumulative effects on
26 the Land and Marine Resource Use VC or Marine Use Resource VC (MSA).

27 **8.3 VISUAL QUALITY EFFECTS**

28 **8.3.1 BACKGROUND**

29 Visual Quality was assessed as a VC because TMJ has the potential to alter aesthetic aspects of
30 the landscape related to public enjoyment of scenic views and because of its regulatory and
31 social importance, as well as importance to Indigenous Groups. The visual quality effects
32 assessment is supported by the Vegetation ([Section 5.8](#)), Socio-Community ([Section 8.1](#)), Land

1 and Marine Resource Use ([Section 8.2](#)), Health and Socio-Economic Conditions of Indigenous
2 Peoples ([Section 11.3](#)) and Current Use ([Section 11.4](#)) VCs which are considered pathways to
3 the Visual Quality VC.

4 In the MSA, TJLP presented the potential effects of marine shipping associated with TMJ on the
5 Visual Quality VC for the area beyond the RAA.

6 **8.3.1.1 REGULATORY CONTEXT**

7 The following key regulatory requirements, guidelines, standards and BMPs informed the scope
8 and methods of the visual quality effects assessment for TMJ:

- 9 • *Canadian Environmental Assessment Act, 2012* (CEAA 2012);
- 10 • *BC Oil and Gas Activities Act*, (BC OGC, 2015); and
- 11 • Vancouver Fraser Port Authority Project and Environmental Review Guidelines for View;
12 Shade, and Lighting (VFPA, 2015b).

13 **8.3.1.2 BOUNDARIES**

14 The LAA for the Visual Quality VC includes the TMJ site boundary plus a five km area, a distance
15 that allows viewers to observe a reasonable level of visual detail. A one km buffer was included
16 in the LAA along the shipping route from the TMJ site boundary to Sand Heads to assess
17 potential effects on sensitive receptors along the shipping route (Figure 15).

18 The RAA includes all areas within 10 km on the TMJ site boundary with an additional 1.5 km
19 buffer along the shipping route, ending at Sand Heads. This represents the farthest reasonable
20 distance TMJ's components could be visible. The 1.5 km viewing buffer provides a regional
21 context for the visual quality assessment along the shipping route in the Fraser River.

22 The MSA LAA for the Visual Quality VC is composed of a collection of key viewpoints and
23 receptors from locations representing a range of viewing opportunities within the Gulf Islands,
24 and along the shoreline of Greater Victoria and Juan de Fuca Strait. The spatial boundary of the
25 MSA RAA is comprised of all areas within 15 km of the MSA shipping lanes. Both the MSA LAA
26 and RAA extend from Sand Heads to the 12-nautical miles limit of Canada's territorial sea at the
27 mouth of the Strait of Juan de Fuca.

1 8.3.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE 2 APPLICATION

3 8.3.2.1 BASELINE INFORMATION

4 The LAA was described in the Application as a suburban residential, industrial, recreational,
5 marine and natural land-use setting with locations of importance and interest to Indigenous
6 Groups including cultural heritage sites and potential viewing opportunities.

7 Based on the observations for the landscape character, the Application described various
8 viewpoints and assigned Landscape Ratings¹¹⁴ (Table 29). Viewpoints were used throughout the
9 Application to describe and assess the Visual Quality VC.

10 **Table 29: Viewpoints and Landscape Ratings**

Viewpoint	Location	Landscape Rating
Viewpoint 1 (VP1)	Riverport Flats: Residential and recreational area	High
Viewpoint 2 (VP2)	Dyke Road (area of a former Indigenous Village site)	Low
Viewpoint 3 (VP3)	Fraser River (Upstream): Marine-based view in the Fraser River	Low
Viewpoint 4 (VP4)	Fraser River (Downstream): Marine-based view in the Fraser River	Moderate
Viewpoint 5 (VP5)	Tilbury Industrial Park: Commercial and Industrial area	Low
Viewpoint 6 (VP6)	Deas Island Regional Park: Park and recreation area	Moderate
Viewpoint 7 (VP7)	Garry Point Park: Park and recreation area	High

11
12 The LAA identified three key nighttime viewpoints (VP1, VP2, and VP6) as having low level of
13 brightness relating to light trespass. The remaining key nighttime viewpoint, VP5, had a high
14 district brightness for light trespass. All four viewpoints had a high level of ambient light,
15 described as sky glow. The closest prominent light source to TMJ and highest environmental
16 light zone classification¹¹⁵ of the four key nighttime viewpoint is VP5, attributed to the
17 surrounding industrial facilities. The high ambient lighting levels at VP5, and most evident in the
18 LAA, is associated with the regional urban areas of Metro Vancouver.

¹¹⁴ The Landscape Rating combines qualitative values assessing scenic quality, viewer sensitivity and viewing distance. Landscape ratings of High, Moderate and Low were used to classify the overall value of the landscape's existing visual quality.

¹¹⁵ Environmental lighting zones for classifying light levels were determined through field observations, analysis of baseline photographs, and measurements of average illuminance levels and sky glow levels.

1 **MARINE SHIPPING ASSESSMENT**

2 The MSA assessed two potential interactions to the Visual Quality VC: vessel transit increasing
3 the visibility of industrial shipping activity within the existing daytime viewing conditions for
4 residents, tourists; and increased visibility of light emissions within the existing nighttime
5 viewing conditions along the marine shipping corridor.

6 The MSA stated that existing conditions were determined using on-site observations, spatial
7 analyses and supporting assessments of TMJ-related shipping activity along the marine shipping
8 corridor. This included Indigenous input through the engagement process, public documents,
9 academic reports and material submitted by Indigenous Groups including traditional use and
10 TEK studies.

11 For existing daytime viewing, the MSA used shoreline mapping data, and photographic field
12 surveys from public viewpoints captured during daytime viewing conditions to develop a
13 seascape character analysis along the marine shipping corridor:

- Viewpoint 1 (VP1) – Galiano Island
- Viewpoint 2 (VP2) – East Point Park
- Viewpoint 3 (VP3) – Sidney Spit
- Viewpoint 4 (VP4) – Mount Douglas Park
- Viewpoint 5 (VP5) – Clover Point Park
- Viewpoint 6 (VP6) – East Sooke Park
- Viewpoint 7 (VP7) – Botanical Beach

14

15 For existing nighttime viewing, the MSA measured light trespass (measured in lux) and skyglow
16 at the seven viewpoints listed above. Light trespass for all viewpoint locations were classified as
17 areas having low ambient brightness.

18 **8.3.2.2 POTENTIAL PROJECT EFFECTS**

19 The potential effects to the Visual Quality VC would result from TMJ components that alter the
20 appearance and character of the existing landscape setting during daytime viewing, while TMJ
21 lighting would affect nighttime viewing. These effects are anticipated to occur during all TMJ
22 phases, most prominently during operations.

23 **TEMPORARY VISIBILITY OF CONSTRUCTION-RELATED EQUIPMENT, LIGHTING, VESSELS, AND** 24 **ACTIVITIES DURING CONSTRUCTION AND DECOMMISSIONING ACTIVITIES**

25 A temporary increase in visibility of construction-related structures, vessels, equipment and
26 activities would alter the daytime viewing conditions. The Application states that the majority
27 of construction activities and equipment would be visible only to the viewers adjacent to the
28 work sites within the three-year construction period.

1 The FTBB facility would also be visible during construction of the permanent jetty structure and
2 would be decommissioned once the permanent jetty is fully operational. Decommissioning-
3 related visual effects are expected to be comparable to those associated with construction as
4 these activities are expected to include similar equipment and activities.

5 During construction and decommissioning, visible light sources and light levels are expected to
6 increase temporarily for up to three years and are expected to occur up to 24 hours per day.
7 This is due to the requirement for lighting systems such as flood lights and navigational lights
8 during nighttime hours for worker safety, site security and navigation.

9 ***PRESENCE OF VISIBLE PROJECT COMPONENTS AND TEMPORARY VISIBILITY OF MARINE*** 10 ***VESSEL MOVEMENTS DURING OPERATIONS***

11 TMJ onshore and offshore facilities would reach their full extent at the beginning of operations
12 and are predicted to present the largest and most persistent contribution of adverse visual
13 effects on the existing landscape. As the FTBB is decommissioned, the presence of visible TMJ
14 components and temporary visibility of marine vessel movements is anticipated to increase the
15 visibility of the marine industrial infrastructure and activity along the Fraser River. The
16 assessment considered onshore and offshore facilities, LNG carriers/ bunkering vessels and tug
17 assists, as well as an access road.

18 TMJ would be visible from most viewing locations and is predicted to have a generally low level
19 of contrast with the existing environment. The Landscape Rating was compared to the contrast
20 rating to identify the level of visual effect.

21 Fixed lighting on-site for both onshore and offshore facilities during nighttime operations
22 activities is expected to introduce additional perceivable light sources to the baseline conditions
23 in the LAA. Navigation lighting from marine shipping vessels would also contribute to additional
24 perceivable light sources in the LAA as well as along the shipping route to Sand Heads. Lighting
25 effect ratings from key nighttime viewpoints assessed VP1, VP2 and VP6 at a low lighting effect
26 rating and VP5 as negligible, indicating that the perceivable light sources would not increase the
27 existing level of brightness locally or regionally.

28 ***BUNKER VESSEL SCENARIO***

29 The Application identified two TMJ operational activities associated with marine shipping in the
30 LAA that could affect daytime and nighttime viewing: 1) Temporary visibility of marine vessel
31 movements during operations (daytime viewing); and 2) Visibility of lighting related to site
32 safety and navigation during operation (nighttime viewing). In the Application, potential visual
33 quality effects associated with these activities were predicted by TJLP based on the LNG carrier
34 vessels, which are more visually prominent than the smaller bunker vessels. The frequency of
35 the residual effects were characterized as “continuous” for daytime viewing and “frequent” for

1 nighttime viewing and the visual effect was expected to occur as long as TMJ is operational. In
2 the BVSA, TJLP stated that the analysis in the Application was based on a larger vessel size with
3 greater potential for visual impacts, and that the reduced frequency of LNG carriers combined
4 with the increased frequency of bunkering vessels is not anticipated to result changes to the
5 assessment of Visual Quality compared to what was originally assessed in the Application.

6 ***VISIBILITY OF VESSELS AND LIGHTING IN THE MARINE SHIPPING ASSESSMENT***

7 Vessel viewing distances ranged from 1 km to 10 km. Frequency of the vessel movements for
8 TMJ would be expected to be regular with five vessel movements per week, visible from each
9 viewpoint. The viewing duration of the vessel movements would average 24 minutes at each
10 viewing location. Overall, TMJ-related shipping activity would be visually evident, and viewers
11 would be exposed to it for a regular but relatively brief period with vessels appearing small in
12 scale and indistinct within the broader seascape context.

13 In the MSA, the VP2 (East Point Park) viewing location represented the highest predicted
14 change in illuminance and sky glow levels resulting from TMJ-related shipping. All other viewing
15 locations had no increase in predicted illuminance and had predicted sky glow increases ranging
16 from 0.00 percent to 0.56 percent brightness above natural background levels. The predicted
17 increase in light emissions from TMJ-related vessel movements is described as temporary and
18 limited to LNG carrier transits through the viewing locations. The classification for light trespass
19 and sky glow are predicted to remain within the levels described under existing conditions for
20 all viewing locations except for VP2 (East Point Park) in the MSA. Sky glow levels at VP2 (East
21 Point Park) would temporarily increase its environmental lighting classification more closely to
22 that of a suburban residential area compared to an area of low district brightness or suburban
23 residential, respectively, under the existing conditions.

24

25

1

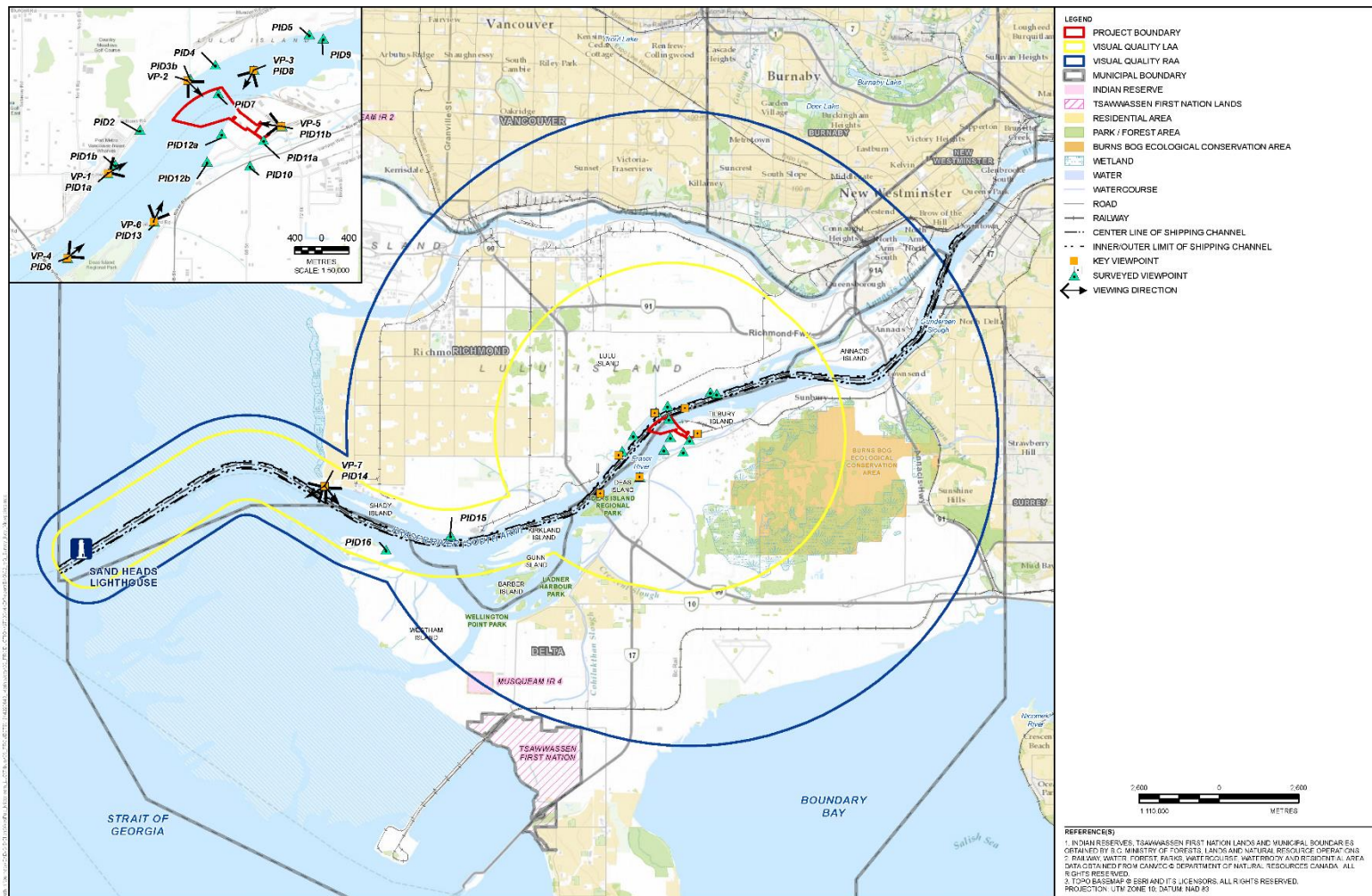


Figure 15: Visual Quality Baseline depicting LAA and RAA for the Original Application Area (jetty to Sand Heads).

1 **8.3.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

2 The Application proposed the following mitigation measures and practices to reduce or
3 eliminate an adverse effect, or enhance a positive effect to Visual Quality, including in the
4 Marine Shipping Assessment:

- 5 • Project Design Mitigation:
 - 6 ○ Remove remaining and or existing abandoned marine infrastructure to a suitably
7 permitted off-site facility during construction;
 - 8 ○ Conduct construction activities primarily during daylight hours;
 - 9 ○ Remove construction and decommissioning equipment after phase completion;
10 and
 - 11 ○ Replant vegetation during decommissioning;
 - 12 ○ Finish external surfaces and built structures with low glare coatings and
13 appropriate colours to reduce contrast with the qualities of the surrounding
14 landscape. Maintain or refinish the external surfaces to preserve the
15 effectiveness of the surface treatments.
 - 16 ○ Use directional lighting fixtures, and consideration of height of lighting, shielding
17 and low lumen fixtures; and
 - 18 ○ Dismantle offshore and onshore facilities during decommissioning and replanting
19 vegetation;
- 20 • Management Plans: Implementing management plans based on BMPs which include
21 Construction Environmental Management Plan and Operations Environmental
22 Management Plan and Decommissioning Environmental Management Plan to manage
23 lighting.

24 No additional mitigation measures were proposed by TJLP as part of the BVSA.

25 **8.3.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 26 **IDENTIFIED DURING APPLICATION REVIEW**

27 The following key issues related to the assessment of Visual Quality for TMJ were identified
28 during Application review and based on feedback from the Working Group:

- 29 • Residential daytime and nighttime scenic quality of re-established lands; and
- 30 • Cumulative effects.

31 ***RESIDENTIAL DAYTIME AND NIGHTTIME SCENIC QUALITY OF RE-ESTABLISHED LANDS***

32 Quw'utsun Nation member Indigenous Groups intend to re-establish lands for residential use in
33 the location classified as VP2 (Dyke Road (area of a former Indigenous Village site). A concern
34 was raised that their intention to re-establish the area with a residential function was not
35 captured appropriately in the Visual Impact Rating or the Visual Quality Baseline. Cowichan
36 Nation Alliance requested that TMJ provide a mitigation plan that considers the revised Visual

1 Impact Rating from low to moderate for the VP2. Tsleil-Waututh Nation and Musqueam
2 Indian Band also expressed a concern on the effects to Indigenous communities in the LAA from
3 changes to Visual Quality and the development of industrial marine activity.

4 TJLP responded that the viewer characterization is based on current understanding and
5 use, existing use and value viewers place on the viewpoint. TJLP also identified that that
6 the level of visual impact may increase if permanent residences were located at VP2 as
7 they would have increased visual exposure to TMJ than current users. TJLP considers that
8 visual effects to future intended use would need specific and sufficient information
9 relating to the use and development of the re-established site that identifies activities to
10 assess viewer sensitivity. TJLP acknowledged that the landscape could change over time
11 due to factors such as industrial development and this could have adverse effects to
12 Indigenous Groups' use of lands and resources through changes to visual quality.

13 **CUMULATIVE EFFECTS**

14 Tsawwassen First Nation raised concerns about the EAO's reliance on the "existing visual
15 landscape character" as part of the significance determination of residual effects, as rationale
16 for additional industrial activity in an already saturated area on the basis that the area is
17 currently being used for these purposes.

18 The EAO notes that the residual effects assessment evaluates the incremental effects of a
19 project based on current conditions, including any available information on natural or human
20 caused trends. The EAO does not conduct an assessment based on an historic baseline. Effects
21 from past activities that affect the existing conditions are included in the context of the
22 assessment of visual quality. Please refer to the Current Use for Lands and Resources for
23 Traditional Purposes ([Section 11.4](#)) and Part C (Assessment of Rights) sections of this Report for
24 the EAO's consideration of visual quality with respect to these assessments.

25 **8.3.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

26 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ
27 on the Visual Quality VC. The EAO evaluated the potential effects to visual quality by
28 considering construction, operations and decommissioning activities that could affect Visual
29 Quality from increased visibility and lighting levels due to increased marine construction,
30 marine vessel traffic, and vessel berthing, loading and departing.

31 **Proposed Provincial Conditions:** Based on mitigations proposed in the Application and issues
32 raised during Application review, the EAO proposes the following provincial conditions, both of
33 which would include lighting management components:

- 34 • Condition 10: Construction Environmental Management Plan; and
- 35 • Condition 11: Operations Environmental Management Plan.

1 **Residual Effects:** After considering the proposed mitigation measures, the EAO concludes that
 2 TMJ would result in the following residual adverse effects below to the Visual Quality VC during
 3 operations for the Application scenario and BVS:

- 4 • Increase in daytime visibility of TMJ's components at the TMJ site and marine vessel
 5 movements; and
- 6 • Increase in nighttime visibility of TMJ's lighting at the TMJ site required for safety and
 7 navigational lighting of vessels during operations.

8 The EAO's characterization of the expected residual effects of TMJ on Visual Quality during
 9 operations are summarized below in the table and reflect the EAO's level of confidence in the
 10 effects determination (including their likelihood and confidence).

11 **Table 30: Summary of residual effects for daytime and nighttime viewing during Operations.**

Criteria	Assessment Rating	Rationale
Context	All: Moderate Resilience	Landscape has a history of marine industrial use and is moderately resilient to visually absorb a degree of additional infrastructure development and related lighting sources without substantially altering its visual quality. MSA: TMJ would use established and existing marine shipping routes which have a history of marine industrial use. The seascape and international shipping routes are moderately resilient to visually absorb a degree of additional marine traffic without significantly altering its visual quality.
Magnitude	Daytime viewing: Negligible – Low Nighttime viewing: Negligible MSA: Negligible	Daytime viewing: TMJ components are predicted to be visible from all key viewpoints during operations, appearing as faint to prominent features from key viewpoint locations, but would represent a negligible to low visual effect to the existing visual landscape character. Nighttime viewing: A perceptible increase in nighttime lighting conditions is predicted as a result of operational and navigational lighting sources associated with TMJ. With the implementation of mitigation measures, the increase from baseline conditions is expected to be negligible. MSA: TMJ-related marine traffic is predicted to be visible from all key viewpoints during operations, appearing as inconspicuous to obvious features on the seascape from all the viewpoint locations. Vessel movements would represent a generally small temporary visual change to the existing visual quality as vessel transit time from each of the viewpoints would range from 7 to 52 minutes, and residual effects are predicted to be negligible.
Extent	All: Local	Effects are expected to be discernable only in the Visual Quality LAA and MSA LAA.
Duration	All: Long-term	Residual effects on daytime and nighttime viewing are predicted to begin during construction and continue through operations.
Frequency	Frequent to Continuous	Residual effects on daytime and nighttime viewing are expected to remain continuously at the TMJ site for as long as TMJ is operational,

Criteria	Assessment Rating	Rationale
		and frequent for vessels transiting from the TMJ site to Sand Heads (on average, one vessel call to the jetty or two movements a day for the BVS). MSA - Frequent: Vessel transit time from each of the viewpoints would range from 7 to 52 minutes and would occur during five vessel movements per week.
Reversibility	All: Reversible	It is expected that visual quality would return to its existing conditions following the closure and decommissioning of TMJ.
Likelihood	There is a high likelihood of residual daytime and nighttime viewing visual effects as a result of TMJ.	
Confidence	<p>The EAO's confidence in the effects assessment is high, based on the use of reliable data sources for visual effects assessment and best practices for mitigation measures. The EAO acknowledges that the level of visual impact may increase if permanent residences were located at VP2. The lighting design at the marine terminal area is based on established design criteria and regulatory requirements which the EAO is confident would minimize adverse lighting effects. The EAO is satisfied that the effectiveness of most mitigation measures is well known as they are based on established BMPs and established minimum lighting requirements for health and safety and marine navigation.</p> <p>International marine shipping is present along TMJ's marine shipping route. TMJ would comply with Maritime Regulations and Legislation including those required for navigational lighting. Based on regulatory requirements and proposed mitigation measures, the EAO is confident TMJ would minimize adverse visual effects. The EAO is satisfied that the effectiveness of the mitigation measures is well known as they are based on established Marine Regulations and Legislation for health and safety and marine navigation.</p>	
Significance	In consideration of the conditions identified in the TOC the EAO concludes that TMJ would not have significant adverse residual effects on the Visual Quality VC.	

1 *Note: Criteria and assessment ratings are defined in [Appendix 5: Residual Effects Characterization Definitions](#).*

2

3

4 **8.3.5 CUMULATIVE EFFECTS ASSESSMENT**

5 The Application considered past, present and reasonably foreseeable future projects in the
6 cumulative effects assessment. Fraser Surrey Docks Direct Transfer Coal Facility, PBRP, RBT2,
7 FortisBC's Tilbury Phase 1 LNG Expansion Project, the VAFFC, Fraser River Tunnel Project, the
8 Vancouver Fraser Port Authority Habitat Enhancement Program, Seaspan Ferries Tilbury
9 Terminal Expansion, TMX, and Deas Island BC Hydro Transmission Line were all considered in
10 the cumulative effects assessment. The Application determined that these projects did not have
11 any potential interaction with TMJ due to either the distance to TMJ or no spatial overlap of
12 effects on noise.

13 The EAO has also considered the proposed Delta Grinding Facility on Tilbury Island and
14 concluded that there would be no overlap between the construction phases of TMJ and this
15 project as Delta Grinding is at an earlier phase in the EA process. Tilbury Phase 2 LNG Expansion

1 Project was also considered in the cumulative effects assessment, which was not included in
2 TJLP's Application. The EAO does not have specific predictions for the Tilbury Phase 2 LNG
3 Expansion Project; however, it is reasonable to assume that the projects could interact
4 cumulatively if there is a temporal overlap with during construction. The EAO also notes that
5 Tilbury Phase 2 LNG Expansion Project is subject to an EA and potential effects would be
6 assessed in that EA process.

7 TJLP did not conduct a cumulative effects assessment on the residual effects from visual quality
8 from vessels transiting the MSA LAA as it did not expect any measurable effects that would
9 interact cumulatively with other projects. The EAO agrees with this conclusion.

10 The Application identified Delta Link Business Park and VAFFC to have the potential to act
11 cumulatively with TMJ's residual effects for the Visual Quality VC.

12 The Delta Link Business Park involves 1.5 million square feet of industrial facilities located
13 approximately 1.3 km upstream of TMJ. The lighting and visibility of the Delta Link Business
14 Park-related infrastructure is expected to be negligible as landforms and vegetation fully or
15 partially screen buildings and related lighting fixtures. Potential cumulative residual effects on
16 visual quality to visibility and lighting are not expected to occur or be negligible as a result of
17 the Delta Link Business Park and TMJ projects. Cumulative residual effects during operations
18 has a high likelihood of occurring resulting from an increase in visibility and lighting from
19 industrial infrastructure. The residual cumulative effects significance for visibility and lighting
20 from industrial infrastructure is not predicted to be significant, as it is not expected to cause a
21 noticeable and distinct change to daytime and/ or nighttime viewing that adversely,
22 permanently, and irreversibly alters the existing visual character of the landscape.

23 The VAFFC project involves the construction of a marine terminal and fueling facility with
24 barges delivering fuel once every two weeks and a Panamax class vessel once a month. It is
25 expected to temporally overlap with TMJ, increasing lighting and visibility of construction
26 materials and activities during construction and decommissioning; however, the cumulative
27 residual effect's characterization for this project during construction and decommissioning was
28 negligible and no cumulative residual effect is expected. Effects on visual quality are expected
29 to increase during operations for the Application scenario and BVS. The Application
30 characterized the VAFFC's cumulative residual effect during operations as having a moderate to
31 low magnitude for visibility and lighting, respectively, as the visual quality is noticeable and
32 distinct and not uncharacteristic of the existing character in the LAA. The EAO concludes that
33 the duration and frequency of the visibility and lighting cumulative residual effect for the
34 Application scenario and BVS is long-term to continuous and long-term to frequent that is
35 reversible and moderately resilient.

1 8.3.6 CONCLUSIONS

2 Considering the above analysis and having regard to the mitigation measures identified in the
3 TOC including Condition 10: Construction Environmental Management Plan and Condition 11:
4 Operations Environmental Management Plan (which would become legally binding if an EAC is
5 issued), the EAO is satisfied that TMJ would not have significant adverse residual effects or
6 cumulative effects on the Visual Quality VC.

7 8.4 ECONOMY

8 This chapter assesses the potential adverse effects to the Economy VC. The Economy VC
9 included the following subcomponents:

- 10 • Labour market;
- 11 • Regional economic development; and
- 12 • Local government finances.

13 The Economy assessment informed the assessments of Socio-Community ([Section 8.1](#)), Effects
14 on the Health and Socio-Economic Conditions of Indigenous Peoples Related to CEAA 2012
15 Section 5(1)I(i) ([Section 11.3](#)), Current Use ([Section 11.4](#)), and Aboriginal Interests in Part C of
16 the EAO's Report. Refer to Part A ([Section 2.3](#)) of this Report, for a summary of estimated
17 economic benefits of TMJ during construction, operations and decommissioning, as reported in
18 the Application.

19 TJLP would hire locally for construction and operations. Housing and/ or accommodation for
20 construction or operations is not included as part of TMJ, because TMJ is expected to draw on
21 the local labour work force.

22 8.4.1 BACKGROUND

23 The economy of Metro Vancouver is considered mature and diversified with the third largest
24 labour market in Canada and the largest in British Columbia (B.C.)¹¹⁶. Recent years of economic
25 growth in Metro Vancouver have resulted in a 'balanced labour market' in which
26 unemployment hovers between 5 percent and 8 percent. Delta, where the TMJ would be
27 located, has a level of economic diversity that is consistent with its neighbouring cities and
28 includes key sectors such as construction, manufacturing, transportation and warehousing,
29 science and technology, education, and healthcare. Delta's unemployment rate was 5.3 percent

¹¹⁶ BC Ministry of Finance 2017 British Columbia Financial and Economic Review, 77th Edition, for April 2016 - March 2017. Available at: <https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/government-finances/financial-economic-review/financial-economic-review-2017.pdf?bcgovtm=buffer>.

1 in 2016 with a slightly higher median income of \$37,000 compared with Metro Vancouver's
2 \$33,000 median income.

3 In 2016, Indigenous workers accounted for 2.3 percent of the total labour force in
4 Metro Vancouver. Unemployment rates for Indigenous people were 9.6 percent, which is
5 approximately 3.8 percent higher than the region's overall rate.

6 The current B.C. economy is mature and diversified with growth in 2017 estimated between
7 3.1 percent and 3.5 percent. The Application noted this level of growth is anticipated to decline
8 due to weakening in the residential real estate market; however, these declines would be
9 tempered by consumer spending and slowly rising export growth, such that growth of between
10 2.3 percent to 2.5 percent is anticipated through 2020.

11 To promote economic development and support local business capabilities and capacity,
12 Metro Vancouver and member municipalities have established economic commissions,
13 economic development departments and agencies and other external groups such as regional
14 boards of trade and tourism and chambers of commerce.

15 Municipal revenues to support business development initiatives, and for operating costs in
16 general, are generated mainly through property taxes and sale of services/ utilities (levies and
17 user fees for garbage, recycling, water and sewer).

18 **BOUNDARIES**

19 The LAA for the Labour Market and Regional Economic Development subcomponents includes
20 the boundaries of Metro Vancouver, while the RAA and cumulative effects assessment areas for
21 these subcomponents includes the Province of B.C. The LAA for Local Government Finances
22 includes Metro Vancouver, with a focus on Delta, while the RAA and cumulative effects
23 assessment areas for this subcomponent includes Metro Vancouver.

24 **8.4.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 25 **APPLICATION**

26 Anticipated positive economic effects identified in the Application are summarized in Part A
27 ([Section 2.3](#)) of this Report. The section below summarizes the potential economic effects, as
28 reported in the Application.

29 **LABOUR MARKET**

30 TJLP assessed the labour market subcomponent through an evaluation of change in:

- 31 • Employment due to TMJ labour demand; and
- 32 • Employment income due to TMJ-associated hiring.

1 The Application noted that change in employment due to TMJ labour demand could result from
2 direct employment, direct supplier employment, indirect employment, and induced
3 employment during construction. The direct labour requirements for TMJ would be
4 approximately 218 full time construction jobs over four years in the LAA (or 276 FTEs or
5 276 person years of employment). Direct employment was estimated to be highest (126 FTEs)
6 in the first year of construction of the jetty and temporary bunker berth. According to the
7 Application, TMJ would generate an additional 407 FTEs (or 366 jobs) through construction-
8 related direct supplier employment; 271 FTEs (or 271 jobs) through indirect construction-
9 related employment; and 129 FTEs (or 142 jobs) through induced construction-related
10 employment. TMJ would require seven FTEs throughout operations; however, these positions
11 would be filled by existing employees at the Tilbury LNG Plant. As a result, TMJ would not
12 create new direct employment opportunities during operations and therefore would not result
13 in change in income.

14 The Application noted that change in employment due to TMJ labour demand for the general
15 and Indigenous populations in the LAA would be a benefit to the community and adverse
16 effects from TMJ employment on the local labour market were not anticipated.

17 The Application evaluated potential change in employment income due to TMJ-associated
18 hiring, noting the positive effects of TMJ construction on employment income, in relation to
19 expected annual average labour income is possible during construction only and that it would
20 result in a benefit to the community and neighbouring communities. Adverse effects from TMJ
21 employment income on the local labour market were not anticipated.

22 TJLP concluded that a change in labour market balance is not anticipated as there would be
23 capacity in the local labour force to meet TMJ labour demand while maintaining a balanced rate
24 of employment.

25 **REGIONAL ECONOMIC DEVELOPMENT**

26 The regional economic development subcomponent was assessed through changes in business
27 opportunities during construction and operations due to:

- 28 • TMJ spending on materials, goods and services; and
- 29 • Household spending of TMJ-associated income.

30 The Application notes that TMJ-induced output in B.C. related to TMJ spending on materials,
31 goods, and services is estimated to be \$132.8 million during the four-year construction.
32 Businesses in the LAA are expected to realize \$122 million in direct and indirect revenues during
33 construction. Qualifying Indigenous businesses would experience a beneficial effect due to TMJ
34 spending during construction; however, the Application notes that historical, social, and
35 systemic barriers could limit the realization of opportunities. TMJ-associated induced output in
36 B.C. related to household spending of TMJ-associated income earned over the four-year
37 construction is expected to be \$24.2 million. Of which \$15.5 million is expected to be generated

1 in various businesses in the LAA, rooted in household spending of TMJ-associated direct and
2 indirect employment and labour incomes. The industries that are likely to account for most of
3 the induced output are finance, insurance, and real estate; retail trade; accommodation and
4 food services; and manufacturing.

5 The Application notes that operations expenditures would range from \$3.5 to \$6.5 million
6 annually during operations and would accrue to local and regional businesses in a similar
7 fashion as construction. Indigenous businesses, similar to during construction, could secure
8 direct or indirect contracts that would benefit them. The Application noted that during
9 operations, household spending of TMJ-associated income is predicted to flow to businesses
10 located in the communities in the LAA, including Indigenous businesses. The location of
11 consumer spending of wages and salaries related to TMJ would vary according to the
12 permanent residence of direct and indirect employees and would be influenced by whether
13 local businesses have capacity to meet the consumer spending objectives of direct employees
14 and supplier industry (indirect) employees.

15 The Application noted that potential regional economic development effects would be
16 beneficial during construction and operations and were not carried forward for assessment of
17 potential adverse effects.

18 **LOCAL GOVERNMENT FINANCES**

19 TJLP assessed the potential effects to local government finances through change in:

- 20 • Local government taxation revenue due to payment of TMJ property taxes; and
- 21 • Taxation revenue due to TMJ-associated direct, indirect, and induced employment and
22 procurement of goods and services.

23 The Application noted that direct TMJ effects on the economy are not expected to occur if
24 taxation revenue due to TMJ are sufficient to address increased local government expenditures
25 associated with TMJ's use of municipal services and infrastructure. TJLP estimated property tax
26 and fee payments for building permits to be approximately \$1.3 million to \$1.7 million over the
27 four-year construction, while annual fee payments during operations would range between
28 \$209,000 and \$387,000. TJLP's assessment of changes in demand for municipal services and use
29 of community infrastructure showed no change from current conditions; therefore, their
30 analysis focused on the beneficial effects of increased taxation revenue.

31 The Application notes that municipal, provincial, and federal levels of government would
32 benefit from increases in income, corporate, and product (for example, PST) tax revenue as a
33 result of employment and procurement activities. Refer to Part A ([Section 2.3](#)) for a summary of
34 local, provincial and federal tax revenues.

1 **BUNKER VESSEL SCENARIO**

2 In the BVSA, TJLP concluded that the increase in annual bunker vessel traffic would not interact
3 with the Economy VC; therefore, did TJLP not conduct additional analysis.

4 **8.4.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION**

5 The Application noted that, although TMJ is anticipated to have positive effects to the Economy
6 VC, it is committed to instituting policies that support maximization of the anticipated
7 employment and taxation benefits. TJLP proposed a requirement for the TMJ contractor to
8 have formal local and Indigenous hiring and procurement policies in place throughout
9 construction, with annual reporting requirements, that would:

- 10 • Support Indigenous workers in accessing employment and contracting benefits
11 associated with TMJ;
- 12 • Outline Indigenous employment and contract targets with key indicators to measure
13 progress; and
- 14 • Describe annual reporting on the recruitment, retention, and uptake of local and
15 Indigenous hires to determine success and address challenges. Annual reports would be
16 reviewed by an independent third party to verify the results, monitor progress, and
17 provide recommendations to support local and Indigenous employment.

18 Following the implementation of mitigation measures noted above, the Application stated that
19 there would be negligible residual effects to the Economy VC.

20 **8.4.4 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 21 **IDENTIFIED DURING APPLICATION REVIEW**

22 The following key issues related to the assessment of Economy for TMJ were identified during
23 Application review and based on feedback from the Working Group.

24 During the Application review, Musqueam Indian Band noted that there was no socio-economic
25 baseline information specific to Musqueam Indian Band or other Indigenous Groups used in the
26 Application.

27 TJLP responded that they prepared the assessment using information available to them,
28 including Indigenous employment data from census data and information provided by
29 each Indigenous Group. They remain open to receiving any additional information from
30 groups and sought input in the development of the proposed employment and
31 procurement plan.

32 Musqueam Indian Band and Tsleil-Waututh Nation requested further detail on the proposed
33 local and Indigenous hiring and employment and procurement plan.

1 TJLP responded that the proposed mitigation measures outlined in the Application,
2 including requirements for the TMJ contractor to have formal local and Indigenous
3 hiring and procurement policies in place throughout construction, would aim to
4 maximize economic benefits to local and Indigenous communities, and that these
5 policies would be developed in consultation with Indigenous Groups.

6 The EAO proposes Condition 16: Indigenous Training, Employment and Procurement Plan,
7 developed in consultation with Indigenous Groups which would include measures to support
8 the procurement of goods and services from businesses owned by Indigenous Groups and to
9 provide training opportunities for Indigenous monitors and enhance the hiring and retention of
10 Indigenous Groups and their members. The EAO also proposes Condition 9: Indigenous
11 Monitors and recommends a KMM under CEAA 2012 for Indigenous Monitors, to provide
12 opportunities for the participation of Indigenous Groups in monitoring activities during
13 construction and operations.

14 The EAO is of the view that the issues discussed are resolved for the purpose of the EA.

15 **8.4.5 CONCLUSIONS**

16 Considering the above analysis and the conditions identified in the CPD and TOC, including
17 Condition 16: Indigenous Training, Employment and Procurement Plan and Condition 9:
18 Indigenous Monitors (which would become legally binding if an EAC is issued), and
19 recommended KMM under CEAA 2012, the EAO is satisfied that TMJ would have negligible
20 adverse effects on the Economy VC.

21 **9 ACCIDENTS AND MALFUNCTIONS**

22 **9.1 BACKGROUND**

23 During Construction, Operations and Decommissioning TMJ, unplanned events associated with
24 TMJ activities or environmental events or processes could arise resulting in potential effects to
25 economic, environmental, health, heritage or social values.

26 TJLP used three types of models for the assessment: 1) a project risk matrix to assess effects to
27 VCs which provide definitions of likelihood and consequence; 2) location specific individual risk
28 (LSIR) to estimate risk to public safety using an approach that predicts individual risk; and 3)
29 societal risk to estimate risk to public safety using an approach that predicts the risk of multiple
30 fatalities which is suitable for highly populated urban areas. Each model is further described
31 below.

32 Potential unplanned events were assessed in the Application using a risk-based approach,
33 where the likelihood and consequences of an event informed the level of potential risk (see

1 Figure 9-1, Risk Matrix). The possible scenarios were risk-ranked, ranging from low (green),
2 moderate (yellow), high (orange), to highest (red), based on the combination of the likelihood
3 of the scenario arising and the potential severity of its consequence. TJLP has noted that the
4 risk matrix shown in Figure 16 is based on a commonly accepted approach rooted in
5 professional judgement and used in the industry for project planning, including EAs, to evaluate
6 the risk of potential serious or catastrophic incidents.

7 *Public Safety – Individual Risk*

8 In the Application and MSA, TJLP assessed the risk to public safety for LNG release scenarios at
9 the jetty and from marine transit by evaluating the LSIR, which is the cumulative risk from all
10 modelled scenarios to an individual at a specific location who remains there continuously. For
11 both the jetty and marine transit, TJLP categorized location specific individual risk into three
12 levels based on the likelihood of an individual fatality: Broadly Acceptable (less than once in
13 1,000,000 years), Tolerable if demonstrated measures are in place to reduce risks to “As Low As
14 Reasonably Practicable” (ALARP; once in 10,000 to 1,000,000 years) and Intolerable (greater
15 than once in 10,000 years). These criteria are consistent with Canadian standards¹¹⁷ and British
16 Columbia Oil and Gas Commission (BC OGC).¹¹⁸ The Application explained that risks in the
17 ALARP region should be supported by a demonstration that industry standard practices are in
18 place to mitigate the risk. The predicted individual risk is cumulative of all public safety hazards
19 associated with TMJ. Note that the above information and details of the risk criteria are only
20 applicable to LSIR. For a discussion of the potential risks related to multiple fatalities (“societal
21 risk”) please see [Section 9.3](#) below.

22

23

¹¹⁷ Canadian Standards Association (CSA) CSA-Z276.

¹¹⁸ TMJ did not go through a formal, federal *Technical Review Process of Marine Terminal Systems and Transshipment Sites* (TERMPOL) process, but the Application notes that the TERMPOL guidelines do provide risk criterion to evaluate risk results.

		CONSEQUENCE SEVERITY				
Category		Very Low	Low	Moderate	High	Very High
Environment ^(a)		Negligible, barely detectable effects	Local effects, reversible within 1 year	Regional effects, reversible within 10 years	Regional effects, reversible in more than 10 years	Irreversible regional effects
Public Safety		Medical treatment not required	Reversible disability or injury requiring hospitalization	Irreversible moderate disability to 1 or more people	Single fatality, single irreversible severe disability	Multiple fatalities, multiple irreversible severe health effects

Likelihood						
Index	Events per Year					
Probable	>1	Yellow	Orange	Red	Red	Red
Likely	1–1/10	Green	Yellow	Orange	Red	Red
Possible	1/10–1/100	Green	Yellow	Orange	Red	Red
Unlikely	1/100–1/1,000	Green	Green	Yellow	Orange	Red
Rare	1/1,000–1/10,000	Green	Green	Yellow	Orange	Red
Very Rare	1/10,000–1/100,000	Green	Green	Green	Yellow	Orange

1 a) The “Environment” consequence category includes potential effects on all environmental, economic, social and health effects
 2 valued components.

Risk Level	Management Action
Highest	Action required. More detailed risk analysis may be required.
High	Assess risk mitigation options and reduce risk before closure, where practical. Prioritize resources to manage these risks before Moderate or Low ranked risks. More detailed risk analysis may be required.
Moderate	Assess risk mitigation options and reduce risk before closure, where practical.
Low	Assess risk (and monitor).

3 **Figure 16: Risk Matrix**

4 Table 87 (Appendix 7) provides the residual effects of various accidents and malfunctions to VCs
 5 predicted by TJLP following implementation of the mitigation measures, considering the
 6 Application scenario and BVS.

7 TJLP considered the scenarios below in the Application and MSA (where indicated) as potential
 8 accidents or malfunctions that could occur during Construction, Operations and
 9 Decommissioning:

- 10 • Hazardous material spills ([Section 9.2.1](#));
- 11 • Loss of LNG containment ([Section 9.2.2](#));

- 1 • Fire or explosion ([Section 9.2.3](#));
- 2 • Unplanned disturbance of ecologically sensitive areas by equipment operations ([Section](#)
- 3 [9.2.4](#));
- 4 • Failure of sediment containment ([Section 9.2.5](#)); and
- 5 • Allision, grounding, or collision of vessels navigating to and from the TMJ and in the MSA
- 6 ([Section 9.2.6](#)).

7 **BUNKER VESSEL SCENARIO**

8 In the BVSA, TJLP considered environmental effects, as represented by the VCs identified in the
9 Application (see Table 38 in Appendix 7 of this Report), using the same methods as the
10 Application (see above). TJLP considered risks to public safety in a comparative quantitative risk
11 analysis, which compared the risks associated with operation of the TMJ and marine vessel
12 incidents for the BVS and for the scenarios presented in the Application. The methods used by
13 TJLP to assess the BVS on the risk of an accident or malfunction are largely consistent with the
14 methods presented in the Application. However, the risk criteria have been updated by TJLP to
15 incorporate comments received during the Application review and are consistent with the
16 methods presented in this Report (see above).

17 Of the scenarios listed above, TJLP identified that marine vessel allision, grounding, or collision
18 involving a TMJ-related vessel while docking or at-berth at the TMJ facility or during transit in
19 the Fraser River could be affected by the change in bunker vessel traffic between the
20 Application scenario and the BVS. See Section 9.2.7 for further details on the BVS assessment.

21 **9.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN**

22 **THE APPLICATION**

23 **9.2.1 HAZARDOUS MATERIAL SPILLS**

24 Hazardous material spill scenarios described in the Application include spills on land and those
25 affecting the estuarine environment in the Fraser River (vessel fuel and LNG spills are discussed
26 in [Section 9.2.6](#)). The most likely spills onshore are small-scale releases from fuel or hydraulic
27 line leaks or ruptures, or other accidents involving mobile equipment which can be quickly
28 contained. Larger onshore spills occurring near the Fraser River may enter the estuarine
29 environment, if containment on land does not take place. Hazardous material releases to the
30 Fraser River may also occur from fuel or hydraulic line leaks or ruptures, or other accidents
31 involving on-water equipment, such as dredging equipment, supply barges, or other marine
32 vessels. Spills to water would be contained according to the Spill Contingency and Emergency
33 Response Plans for the TMJ marine terminal area.

34 In addition to designing, operating, and managing TMJ to reduce the potential for hazardous
35 material spills, TJLP identified mitigation measures in the Application to address spills including
36 the following:

- 1 • Develop and implement Construction and Operations Environmental Management Plans
2 that incorporate safe handling and storage procedures for hazardous materials and spill
3 contingency measures according to requirements of the *Transportation of Dangerous*
4 *Goods Act*;
- 5 • Use equipment in or adjacent to the waterbody that is clean and free of external grease,
6 oil or other fluids of a hazardous nature;
- 7 • Store hazardous materials in containment designed according to the B.C. Fire Code and
8 applicable material safety data sheet guidelines;
- 9 • Collect stormwater runoff in a drainage system developed as part of TMJ's
10 environmental management plan for Construction and Operations;
- 11 • Marine vessels would adhere to Annex I of the International Convention for the
12 Prevention of Pollution from Ships (Convention for Prevention of Marine Pollution
13 [MARPOL] 73/78). This would include contractually requiring marine vessels only
14 discharge bilge water at port for treatment or at sea following treatment through an oil-
15 water separator, as per regulation; and
- 16 • Develop a Spill Contingency Plan as part of the TMJ Emergency Response Plan in the
17 marine terminal area.

18 TJLP concluded that a hazardous material spill on land or affecting the estuarine environment is
19 considered likely to occur; however, with the implementation of mitigation measures, the
20 severity of effects would be low. As such, TJLP concluded that the risk to the environment to be
21 moderate. TJLP concluded that no risk to public safety is anticipated.

22 9.2.2 LNG TRANSFER SYSTEM LOSS OF LNG CONTAINMENT

23 Potential loss of LNG containment along TMJ's LNG transfer system without ignition is
24 considered in this section. During normal operations, LNG would be transferred by the system
25 from the adjacent FortisBC Tilbury LNG storage tank to an LNG vessel and return boil-off gas
26 (that is, LNG vapour) from the vessel to the storage tank. Loss of LNG from the transfer system
27 due to leaks or ruptures could occur from the onshore portion of the transfer system or
28 offshore portion.

29 As LNG is an extremely cold liquid that is much lighter than water, any liquid loss from the
30 sealed and pressurized system would likely spread on the surface of water or land and rapidly
31 or immediately change physical state and vaporize. TJLP would include mitigation measures to
32 limit ignition sources. Ignition and associated mitigation measures are considered in [Section](#)
33 [9.2.3](#) below. A potential LNG release to the water is not expected to result in toxic effects as
34 LNG does not persist in the environment and is non-toxic to marine life. As such, no cleanup
35 actions are anticipated to be necessary due to an LNG spill.

36 TJLP identified mitigation measures in the Application, including mitigation by design to reduce
37 the likelihood and consequence severity if a loss of containment occurs, including the following:

- 38 • Design the LNG transfer system and spill prevention system according to Canadian

- 1 Standards Association (CSA) CSA-Z276, and include leak, flammable gas, and fire
2 detection systems and an emergency shutdown and notification system;
- 3 • Use drainage and spill containment systems to limit the spread of potential LNG pool;
 - 4 • Use drybreak couplings and powered emergency release couplings that would shut off
5 LNG flow during disconnect from the vessel including any sudden disconnect;
 - 6 • Use an emergency release system that would disconnect LNG transfer system from the
7 vessel's manifold in cases of the ship moving in a way that threatens the structural
8 integrity of the connected loading arms;
 - 9 • Implement a Marine Safety Protocol for the purpose of public safety, including signage
10 notifying of the presence of hazardous substances, communication of the presence of
11 an LNG ship at the berth to other vessels, and varying levels of site-specific operational
12 measures ranging from observing passing vessels, to announcing to the vessels that they
13 are in the vicinity of LNG operation, to suspension of LNG loading operations.

14 With the implementation of mitigation measures, TJLP concluded that the risk of LNG
15 containment loss, assuming no ignition, would be low for the environment given the low
16 magnitude of the consequence and rare likelihood. TJLP concluded that an LNG release without
17 ignition would not affect public safety because a Marine Safety Protocol around TMJ offshore
18 facilities would be in effect during loading operations.

19 9.2.3 FIRE OR EXPLOSION

20 TJLP does not consider explosion of natural gas to be a credible scenario as the natural gas
21 would only be in a confined environment as LNG. In an unconfined space, natural gas will not
22 explode. Combustion of natural gas in an unconfined space would rapidly burn back to the
23 source until the source was eliminated or the fire extinguished.

24 Fire was a primary risk concern because a fire could potentially ignite an LNG vapour should
25 there be an LNG release to the environment. Fire originating from, or spreading to, the Tilbury
26 LNG Plant is unlikely to affect TMJ or the Tilbury LNG Plant because of detection and shutdown
27 systems at the plant, and active safety mechanisms such as check valves, and isolation valves
28 along the LNG line connecting the two. A fire could start on an LNG vessel with various
29 scenarios; however, several measures would be in place to control the fire and prevent the
30 spread to the TMJ facilities.

31 In addition to constructing TMJ to applicable codes and standards and including design features
32 to mitigate the risk of fire and loss of LNG containment, TJLP identified mitigation measures in
33 the Application that would reduce the likelihood or consequence severity of a fire, including:

- 34 • Consider hazard distances when locating TMJ structures and equipment;
- 35 • Transfer LNG from the FortisBC Tilbury LNG facility storage tank to vessels under closed
36 loading conditions using vessel vapour collection systems such that no flammable
37 vapours would be emitted;
- 38 • Equip TMJ facilities, LNG vessels, and assist tugs with firefighting equipment;

- 1 • Implement a Marine Safety Protocol for the purpose of public safety, including signage
- 2 notifying of the presence of hazardous substances, communication of the presence of
- 3 an LNG ship at the berth to other vessels, and varying levels of site-specific operational
- 4 measures ranging from observing passing vessels, to announcing to the vessels that they
- 5 are in the vicinity of LNG operation, to suspension of LNG loading operations; and
- 6 • Develop emergency response plan for the marine terminal area¹¹⁹.

7 TJLP concluded that the likelihood of fire or explosion due to ignition of an LNG spill at TMJ
8 facilities or from fire originating from the Tilbury LNG Plant would be very rare. The LSIR for the
9 cumulative risk of all modelled cases associated with cargo loading at the jetty, including the
10 risk from ignition of an LNG spill, is one fatality every 10,000 to 100,000 years within an
11 approximately 300-meter radius of the jetty. The area within a 750-meter radius of the jetty
12 would be within the Tolerable if ALARP range (one fatality every 10,000 to 1,000,000 years).
13 Beyond this area, the LSIR would be in the Broadly Acceptable range (one fatality in greater
14 than 1,000,000 years). For a discussion of the potential risks related to multiple fatalities
15 (“societal risk”) please see [Section 9.3](#) below. With the implementation of mitigation measures,
16 TJLP concluded that the risk of environmental effects from a fire or explosion is low.

17 **9.2.4 UNPLANNED DISTURBANCE OF ECOLOGICALLY SENSITIVE AREAS BY** 18 **EQUIPMENT OPERATIONS**

19 Unplanned disturbances of ecologically sensitive areas by equipment operations are more likely
20 to occur during construction and decommissioning. Such disturbances could be caused by
21 clearing or other human errors due to lack of awareness.

22 Without mitigation measures, unplanned disturbance of ecologically sensitive areas by
23 equipment operations during construction or decommissioning could affect water quality,
24 vegetation, wildlife and wildlife habitat, fish and fish habitat. In the Application, TJLP noted
25 design and mitigation measures to prevent unplanned disturbances include:

- 26 • Conducting mandatory environmental training for contractors and operators including
- 27 educating workers on the location of sensitive areas; and
- 28 • Identifying boundaries of sensitive areas at the TMJ site with highly visible materials.

29 Any unplanned disturbances would be revegetated and restored, in consultation with
30 applicable regulatory agencies.

31 With the implementation of mitigation measures, TJLP concluded that the risk from an

¹¹⁹ For further details, refer to the Tilbury Marine Jetty Emergency Response Framework, dated April 23, 2021
(https://www.projects.eao.gov.bc.ca/api/public/document/60a562067429e10022397823/download/20210423_TilburyMarineJetty_EmergencyResponseFramework.pdf).

1 unplanned disturbance of ecologically sensitive areas would be low.

2 **9.2.5 FAILURE OF SEDIMENT CONTAINMENT**

3 Erosion and sediment release for the onshore portion of the TMJ site would be controlled by a
4 stormwater drainage system. Failure of the containment could be caused by inadequate
5 discharge of sediment-laden water into the aquatic environment during all TMJ phases.
6 Without mitigation measures, sediment containment failure could affect water quality,
7 vegetation, wildlife and wildlife habitat, fish and fish habitat. As outlined in the Application,
8 TJLP's Environmental Management Plan would address erosion and sediment control, including:
9 having the drainage system be designed by a QP; requiring that a construction quality control
10 process is in place; installing measures to control erosion of exposed soils; and designing and
11 installing physical controls such as sediment fencing.

12 With the implementation of mitigation measures, the magnitude of increased sedimentation is
13 low, as the extent is expected to be local, short-term and reversible with restoration. TJLP
14 concluded that there is no residual risk to public safety.

15 **9.2.6 ALLISION, GROUNDING, OR COLLISION OF VESSELS**

16 Allision (that is, a vessel striking a stationary structure), grounding, or collision could occur
17 during Construction and Operations. Such incidents could result from human error, mechanical
18 malfunction, or coincidental timing. An allision, or vessel strike, by either the LNG vessel or a
19 passing vessel against the jetty or against a stationary LNG vessel at berth could also damage
20 the LNG transfer system and cause an offshore release, which is assessed in [Section 9.2.2](#) (LNG
21 Transfer System Loss of LNG Containment without ignition) and [Section 9.2.3](#) (Fire or
22 Explosion).

23 *Allision:* Potential allision could occur between a TMJ-related vessel striking the TMJ facility
24 during berthing and unberthing manoeuvres. Allision would be at slow speed during berthing
25 and unberthing and low impact. Under these conditions, TJLP reports that the vessel's fuel or
26 LNG containment tank would not be damaged, and thus would not affect the environment or
27 public safety. Similarly, a low-impact vessel-to-vessel allision involving a berthing/ unberthing
28 bunker vessel and a stationary LNG vessel (or vice versa) would not result in a loss of
29 containment from the vessels. However, a low-impact allision could lead to damage to TMJ's
30 Offshore Facilities, including the LNG line and loading arm. Damage to the LNG line or loading
31 arm (leak or rupture) could lead to the loss of LNG containment and potential fire at the TMJ
32 facility, which is addressed in [Section 9.2.2](#) and [Section 9.2.3](#). Potential allision could also occur
33 between a passing vessel either striking the jetty or a TMJ-related vessel at berth, which has
34 been considered in the LSIR for all modelled risk cases associated with cargo loading at the jetty
35 (see risk LSIR information presented in [Section 9.2.3](#) above).

36 *Grounding:* Potential grounding of a vessel (that is, vessel striking sea- or river-bed) could occur
37 as a TMJ-related vessel transits through the Fraser River, Haro Strait, Boundary Pass, and Juan

1 de Fuca Strait. TJLP reports that grounding could result in damage to the ship hull, but that not
2 all grounding events would have sufficient energy to lead to the loss of containment. A drift
3 grounding incident (i.e., in the event of a vessel losing power or steering failure) would have a
4 low-energy impact, whereas a powered grounding would have a greater potential to cause
5 substantial damage to a vessel. Presence of rocky sediment substrate where grounding occurs
6 is the primary factor that influences the risk of a loss of containment. TJLP reported the
7 probability for encountering a rocky shoreline in the Fraser River as being less than 10%,
8 reducing the likelihood for a grounding event that would result in loss of containment.

9 *Collision:* Potential collision (that is, strike involving two moving vessels or object) could include
10 a TMJ-related vessel and another vessel. A collision could occur due to mechanical issues or
11 navigational errors, especially in the presence of extreme environmental events such as strong
12 wind and wave conditions and low visibility. A collision could penetrate the fuel containment
13 tank (for any vessel) or the LNG containment tank (for an LNG vessel), resulting in fuel or LNG
14 release. A collision with a small vessel (e.g., used for traditional or recreational purposes) could
15 result in damage to the vessel, property, or gear, or injury or fatality. The MSA noted that
16 collisions with smaller vessels could also have effects to commercial marine use and current use
17 of lands and resources for traditional purposes, the extent of which would be dependant on
18 factors such as the degree of damage to the vessel. TJLP reported that the potential likelihood
19 for injury or fatality in the event of collisions with smaller vessels is very rare.

20 TJLP reported that, while groundings and collisions involving LNG vessels have never resulted in
21 penetration of the double-hull containment, a high-impact collision with sufficient energy could
22 result in the release of LNG above the waterline. In the event of an LNG release, the outflowing
23 LNG above the waterline could ignite due to friction, heat, and sparks from the tearing steel of
24 the vessels involved, creating a localized pool fire. As the gas combusts, the pool would shrink
25 until the LNG is depleted. A flash fire due to delayed ignition is also possible.

26 *Bunker fuel release:* Similar to grounding, a collision could penetrate the fuel containment tank
27 of vessels involved in the collision. TJLP reported that most TMJ-related vessels would use LNG
28 for fuel, but bunker fuel release in a collision involving an LNG-powered vessel could occur from
29 the damage to the other vessel in the event of a collision. TJLP noted that the majority of LNG
30 vessels expected at the TMJ site only carry a small volume of bunker fuel and use it as the pilot
31 fuel, with LNG used as the primary fuel. As there is a reduced volume of bunker fuel carried on
32 these vessels there is a corresponding reduction in risk of release. In the event of a bunker fuel
33 release, only limited evaporation would occur, thereby requiring additional mitigation
34 measures such as containment or recovery. According to the Application, the frequency of
35 bunker fuel release from grounding of a TMJ-related vessel (considering the presence of rock
36 substrate in some of the water bodies) or damage of the other vessel in a collision is very rare.

37 TJLP identified the following mitigation measures in the Application and MSA related to an
38 allision, grounding and collision:

- 39 • LNG transport vessels will be required to conform with applicable codes and standards
40 for vessel design, construction, LNG storage, and transport, including *Canada Shipping*

- 1 Act, 2001 and associated regulations, MARPOL, and the International Code for the
2 Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC) under Safety
3 of Life at Sea (SOLAS);
- 4 • Safe navigation by:
 - 5 ○ Navigation in the Fraser River by experienced master mariner (captain) and a
6 Fraser River pilot;
 - 7 ○ Port of Vancouver Traffic Control requirements (TCZ-4);
 - 8 ○ Navigation through Haro Strait and Boundary Pass and Strait of Georgia by B.C.
9 Coast Pilot; and
 - 10 ○ Tethered tug escorts for Haro Strait, Boundary Pass, and Fraser River transit and
11 berthing operations; tethered escort tugs required for LNG export vessels.
 - 12 • Implement a Marine Safety Protocol for the purpose of public safety, including signage
13 notifying of the presence of hazardous substances, communication of the presence of
14 an LNG ship at the berth to other vessels, and varying levels of site-specific operational
15 measures ranging from observing passing vessels, to announcing to the vessels that they
16 are in the vicinity of LNG operation, to suspension of LNG loading operations;
 - 17 • Install berthing aid systems including obstruction marking, radar reflectors and lighting
18 to indicate the presence of obstructions of interest to the LNG vessel and pilots;
 - 19 • Install environmental monitoring systems to measure wind, currents, waves and other
20 factors;
 - 21 • Develop emergency response plan for the marine terminal area;
 - 22 • Cooperate in the development of emergency response plans with the CCG and TC for
23 marine shipping;
 - 24 • Mechanical recovery and shoreline protection for bunker fuel; and
 - 25 • Communication equipment and established communication procedures in the Fraser
26 River, and loudhailers (e.g., megaphone) to communicate with small vessels if
27 necessary.

28
29 *Risk to public safety:* Based on a quantitative risk analysis, TJLP reported that the potential
30 release of LNG as a result of grounding of TMJ-related vessel or collision between vessels is
31 rare. The likelihood of an individual public fatality due to an LNG fire is very rare or less,
32 depending on the location of the spill and whether public is present. TJLP estimated the LSIR
33 from all modelled risk scenarios for marine transit in the waters and along the shorelines of the
34 Fraser River, and along the shorelines near Port Renfrew and parts of Haro Strait and the
35 Boundary Pass to be within the Tolerable if ALARP range (see figures 8-2 and 8-3 in [Appendix
36 1.0-1 of the Application](#)). Away from the shorelines of the Fraser River and along most of the
37 marine shipping route, the individual risk of fatality is in the Broadly Acceptable range.

38 *Risk to marine use and current use:* The highest risks from allision, grounding or collision, are
39 located within the Haro Strait along the shorelines of Discovery Island and southeast of Sidney
40 Island and the Fraser River. The MSA concluded that the likelihood for a collision with a small
41 vessel would be rare and the overall risk to marine use and current use of land and resources
42 for traditional purposes would be moderate.

1 *Risk to environment:* TJLP concluded that the residual risk from allision, grounding, or collision
2 to the environment would be low to moderate, given the rare to very rare likelihood of the
3 event but moderate to high consequence severity to the environment. The MSA assessed that
4 the residual risk of an LNG release causing SRKW fatality or irreversible damage to heritage
5 resources would be moderate, given the extremely rare likelihood but very high severity of
6 consequences if it were to occur.

7 **9.2.7 BUNKER VESSEL SCENARIO**

8 TJLP stated that the risk of a loss of LNG containment during loading operations for the BVS is
9 similar to that assessed in the Application and that the largest contributor to the risk is the
10 potential allision involving a passing third-party vessel striking the TMJ facility. For the BVS, TJLP
11 conducted a comparative quantitative risk assessment, focused on the risk of LNG release due
12 to marine vessel allision, grounding, and collision. TJLP concluded that the while the likelihood
13 of a loss of containment (i.e., LNG cargo release) from an LNG vessel is higher for the BVS, the
14 higher likelihood is driven by the potential smaller releases (i.e., higher likelihood of lower
15 consequence events). With the increase in bunker vessel traffic, there is an increased likelihood
16 of releases from the smaller 7,500 m³ LNG bunker vessels (maximum cargo tank size of 3,400
17 m³). However, the BVS also involves a reduction in LNG carriers, which reduces the likelihood of
18 a release from the larger 100,000 m³ LNG carriers (maximum cargo tank size of 29,000 m³).
19 Overall based on the quantitative risk assessment modeling results, TJLP concluded that the risk
20 to the VCs for the BVS would remain moderate.

21 In terms of a bunker fuel release (as described in Section 9.2.6 above), TJLP stated that a TMJ-
22 related marine vessel incident could also result in the release of bunker fuel. Noting that the
23 risk of TMJ-related bunker fuel release is driven primarily by potential accidents involving
24 bunker-fuel-powered construction vessels, supply vessels, or a third-party vessel involved in a
25 collision with a TMJ-related vessel. TJLP stated that TMJ-related LNG vessels are expected to be
26 predominantly LNG-powered. Further, the number of diesel-powered tugs would be reduced
27 for the BVS. TJLP concluded that the change in bunker vessel traffic would have negligible effect
28 on the risk of a TMJ-related marine vessel incident resulting in bunker-fuel release assessed in
29 the Application.

30 For public safety, TJLP concluded that the LSIR for both the public areas around the TMJ site
31 and along the Fraser River shipping route would remain within Broadly Acceptable and
32 Tolerable if ALARP with the BVS. The societal risk, accounting for potential of multiple fatalities,
33 TJLP concluded that the risk also remains within Broadly Acceptable and Tolerable if ALARP with
34 the BVS. Refer to Appendix G of TJLP's BVSA for more details on the risk analysis.

35 **9.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 36 **IDENTIFIED DURING APPLICATION REVIEW**

37 The following key issues related to the assessment of Accidents and Malfunctions for TMJ were
38 identified during Application review and based on feedback from the Working Group:

- 1 • Societal risk assessment and data interpretation;
- 2 • Marine Safety Protocol;
- 3 • Emergency response;
- 4 • Potential effects from spills and spill response;
- 5 • Compensation for spill damage; and
- 6 • Bunker Vessel Scenario.

8 **SOCIETAL RISK ASSESSMENT AND DATA INTERPRETATION**

9 During Application Review, the BC OGC and Cowichan Nation Alliance and provided comments
10 related to the risk assessment in the Fraser River and the interpretation of the data provided in
11 the Navigation Study (Risk Assessment – [Appendix 1.0-1 of the Application](#)). The BC OGC
12 requested that the navigation segments and the terminal risk be assessed against a set of
13 comprehensive risk criteria, including a multiple fatality scenario for public safety at the TMJ
14 site and along the Fraser River given the location and number of people in regular proximity to
15 TMJ. The Cowichan Nation Alliance provided comments on the Navigational Study, in particular,
16 requesting more details for the consequences analysis that was performed for each of the LNG
17 release scenarios and maps to show the potentially affected areas.

18 Over the course of the EA a variety of memos and technical information was exchanged on the
19 topic of societal risk¹²⁰ and navigational safety, including analyses by TJLP¹²¹ and reviews by BC
20 OGC¹²². TJLP's documents evaluated societal risk from operations at the jetty and marine transit
21 and included information on marine simulations relevant to navigational safety of TMJ-related
22 vessels. TJLP also provided additional consequence analysis that showed the maximum
23 consequence distance that a hazard could extend following the release of LNG.

24 The BC OGC has specific risk criteria for societal risks to people “offsite” of an LNG facility. The
25 societal risk criteria (i.e., Broadly acceptable, Tolerable if ALARP and Intolerable) are dependent

¹²⁰ Societal risk is the collective risk to all exposed individuals which is presented as an “FN curve” to show the relationship between the cumulative frequency of risk events (F) versus the number of human fatalities (N).

¹²¹ TJLP TERMPOL Societal Risk Memo dated November 28, 2019

(https://www.projects.eao.gov.bc.ca/api/public/document/60a493aa93b50500223b90c6/download/20191128_CNA_TERMPOL%20Societal%20Risk.pdf); TJLP Public Safety Risk memo, dated November 20, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a558d2148b4a0023306fff/download/20201020_Attachment%20A%20-%20DENV-GL%20Response%20to%20EAO%20IR_R2.pdf); TJLP response to BC OGC comments, dated December 17, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a561a47429e10022397818/download/20201217_EAC_OGC-55.pdf); TJLP memo response to BC OGC comments, dated November 30, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a560c77429e100223977dd/download/20201130_OGC-51_54_56.pdf); and TJLP memo response to VFPA comments, dated October 9, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a55f3c7429e100223977bb/download/20201020_Attachment%20E%20-%20Lantec%20Marine%20Response%20to%20VFPA%20IR.pdf).

¹²² BC OGC's letter and BakerRisk Engineering and Risk Consultants's Wespac Tilbury LNG Termopol Review Memo, dated June 24, 2020

(https://nrm.sp.gov.bc.ca/sites/EAO/project435/Shared%20Documents/Application%20Review/WG_Comments/OGC_20200828_BakerRiskMemo_OGC-CoverLetter.pdf)

1 on both the cumulative frequency of an event and the number of fatalities. The OGC criteria
2 would apply to the cargo loading component of TMJ at the jetty. TC and VFPA clarified that
3 neither party has quantitative risk criteria they use to consider risk tolerability for marine
4 navigation. TJLP used UK Health and Safety Executive (HSE) criteria for the societal risk marine
5 transit assessment based on professional opinion. The TMJ risk matrix (Figure 16) should not be
6 used to interpret the societal risk results because the risk matrix considers individual events
7 while the societal risk method considers all (cumulative) TMJ risk events¹²³.

8 *Marine Transit:* TJLP's societal risk memo¹²⁴ included societal risk (FN curve) estimates for the
9 marine navigation. The analysis showed that that highest marine transit risk would be in the
10 Tolerable if ALARP range adopted by the UK HSE. Within this range, it showed a likelihood of up
11 to approximately 10 fatalities once in approximately 7,000 to 10,000 years for all vessel types
12 along the entire shipping route and a lower likelihood for higher than 10 fatalities (see Figure
13 5.1 in TJLP's societal risk memo). The analysis also demonstrated that of all the vessel types and
14 portions of the shipping route assessed, the highest risk was for LNG carriers transiting in the
15 lower Fraser River. This scenario considers a low probability event where up to 500 fatalities
16 occur, which is in the Tolerable if ALARP range (i.e., likelihood of up to 500 fatalities less than
17 once in 1,000,000 years, see Figure 5.2 in TJLP's societal risk memo). The risk for LNG carriers in
18 the lower Fraser River is driven mostly by grounding (for details on grounding please see
19 [Section 9.2.6](#) above). TC noted that the assessment of probability and proposed mitigation
20 measures in the Application and supplemental information appeared reasonable, considering
21 the redundant layers of safety that make up Canada's marine safety system. In response to
22 VFPA's questions, TJLP provided additional information regarding the navigational safety of
23 TMJ-related vessels and supplementary information on marine simulation in supplemental
24 memos¹²⁵. VFPA reviewed the responses and materials provided by TJLP and found them

¹²³ TJLP explained that the societal risk assessment FN curve can be directly compared to the criteria FN curve adopted by BC OGC for the marine terminal area and the FN curve adopted by the UK HSE may be used for comparison purposes for shipping aspects of the marine transit risk.

¹²⁴ TJLP TERMPOL Societal Risk memo dated November 28, 2019
(https://www.projects.eao.gov.bc.ca/api/public/document/60a493aa93b50500223b90c6/download/20191128_CNA_TERMPOL%20Societal%20Risk.pdf);

¹²⁵ TJLP response to EAO Information Requests related to Societal Risk, dated October 14, 2020
(https://www.projects.eao.gov.bc.ca/api/public/document/60a5601f7429e100223977ce/download/20201020_Tilbury%20Jett%20Limited%20Partnership_TerminalRisk_EAO-IR%20Response%20EAO-02%2C%20EAO-03%2C%20EAO-04%20and%20VFPA-10.pdf); and Attachment A:
(https://www.projects.eao.gov.bc.ca/api/public/document/60a558d2148b4a0023306fff/download/20201020_Attachment%20A%20-%20DNV-GL%20Response%20to%20EAO%20IR_R2.pdf); Attachment B:
(https://www.projects.eao.gov.bc.ca/api/public/document/60a559417429e1002239774b/download/20201020_Attachment%20B%20-%20DNV-GL%20Tilbury%20LNG%20Loading%20Update%20Memo_R2.pdf); Attachment C:
(https://www.projects.eao.gov.bc.ca/api/public/document/60a55aa47429e1002239775a/download/20201020_Attachment%20C%20-%20Quest%20Consultants%20DNV%20Risk%20Model%20Review.pdf); Attachment D:
(https://www.projects.eao.gov.bc.ca/api/public/document/60a55e157429e10022397796/download/20201020_Attachment%20D%20-%20Ausenco%20possible%20mitigations%20table.pdf); and Attachment E:
(https://www.projects.eao.gov.bc.ca/api/public/document/60a55f3c7429e100223977bb/download/20201020_Attachment%20E%20-%20Lantec%20Marine%20Response%20to%20VFPA%20IR.pdf).

- 1 satisfactory for the EA.
- 2 *Cargo loading at the jetty:* The various risk analyses showed that the “off-site” societal risk is
3 dominated by a passing vessel striking the jetty structure and/ or striking the LNG carrier
4 berthed at the jetty. TJLP’s updated societal risk memo¹²⁶ presented a model which used
5 population data that was more reflective of the worker and residential population density in
6 the vicinity of TMJ compared to previous analyses in the EA. The memo also identified several
7 potential additional mitigation measures each with a technical rationale, pros and cons. The use
8 of more realistic population data inputs resulted in an offsite societal risk for the TMJ cargo
9 loading operation (including a berthed LNG vessel) for which the highest risk would be
10 considered Tolerable if ALARP. Within the Tolerable if ALARP range, it showed a likelihood of
11 one fatality less than once in 100,000 years and a lower likelihood for more than one fatality.
12 When only loading and standby scenarios are considered, the societal risk falls within BC OGC’s
13 Broadly Acceptable societal risk criteria.
- 14 *Maximum consequence analysis:* TJLP’s submitted memos¹²⁷ describing maximum consequence
15 distances¹²⁸ for worst-case scenarios. For a scenario of a full LNG transfer system rupture during
16 LNG loading, the maximum consequence distance from the jetty for a fire/ radiation is 520 m
17 and for a flammable dispersion (i.e., flammable vapour cloud) is 1,502 m. TJLP concluded that
18 few events have consequences that could reach substantial distances, such as the modeled
19 scenario of flammable dispersion of approximately 2,717 m from a passing vessel striking a LNG
20 carrier loading at the jetty resulting in a loss of LNG containment. TJLP noted that worst-case
21 consequences are usually associated with a large release size from a vessel, calm winds, and no
22 ignition of the cloud until it is as far from the source as a flammable cloud can disperse while
23 remaining in the flammable range. These worst-case scenarios were included in both the LSIR
24 and societal risk assessments, where the risk of fatality is less than once in 100,000 years.
- 25 TJLP modeled maximum consequence results for collision and grounding scenarios for LNG
26 carriers and bunker vessels in transit, also summarized in the memo response to OGC
27 comments. For an LNG carrier, the maximum consequence distance for a collision or grounding
28 is 572 m for a fire and 2,717 m for a flammable dispersion. For a bunker vessel, the maximum
29 consequence distance for a collision or grounding is 440 for a fire, and 694 m for a flammable

¹²⁶ Attachment A to TJLP response to EAO, dated October 20, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a558d2148b4a0023306fff/download/20201020_Attachment%20A%20-%20DNV-GL%20Response%20to%20EAO%20IR_R2.pdf);

¹²⁷ TJLP’s Response to OGC Comments, dated November 30, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a560c77429e100223977dd/download/20201130_OGC-51_54_56.pdf) and December 17, 2020

(https://www.projects.eao.gov.bc.ca/api/public/document/60a561a47429e10022397818/download/20201217_EAC_OGC-55.pdf)

¹²⁸ TJLP noted that the maximum distances indicate the farthest point that the hazard zone extends at any time while a release of LNG is occurring; however, the actual flammable volume that reaches this distance may be very low. Similarly, for radiation zones the area covered by the hazard zone at the greatest distance may be small in comparison to the rest of the hazard zone.

1 dispersion.

2 In terms of cargo loading operations at the jetty, the EAO has considered that the highest
3 predicted societal risk levels are in the Tolerable if ALRAP range using the OGC criteria. Public
4 safety risk would be discussed further following additional analysis and review of potential
5 mitigations during the OGC permitting process (should an EAC be issued). In terms of marine
6 navigation, the EAO engaged with parties that have expertise and jurisdiction in navigation and
7 safety. TC noted that the risk assessment was conducted using international best practices, and
8 the proposed mitigation measures appeared reasonable, considering the redundant layers of
9 safety that make up Canada's marine safety system. The EAO is satisfied with the information
10 provided for the purposes of the EA for both the Application scenario and BVS.

11 The EAO understands it is important to understand the scale of maximum consequences to
12 appropriately plan for emergency response. The EAO is recommending KMMs under CEAA 2012
13 for an Emergency Response Plan and Marine Shipping Emergency Response Outreach Program.
14 The Emergency Response Plan, in the marine terminal area, would describe potential accidents
15 and malfunctions, operating procedures to prevent them and the measures to mitigate adverse
16 effects. The plan would outline, emergency response training TJLP would provide for their
17 personnel, and integrated response planning between TJLP and government agencies, local
18 government, and emergency response departments. Spill response, including the
19 implementation of exercises in cooperation with relevant authorities, and incorporation of
20 learnings from the exercises into the plan. The Marine Shipping Emergency Response Outreach
21 Program must identify the equipment that TJLP could provide to assist with marine shipping
22 spill or emergency response associated with TMJ-related vessels, delivery or arrangement by
23 TJLP for LNG safety related courses for CCG, Indigenous Groups, government personnel,
24 industry sector, and community responders, and participation in CCG marine shipping incident
25 response coordination and exercises.

26 **MARINE SAFETY PROTOCOL**

27 In the Application, TJLP proposed a marine safety exclusion zone or marine security zone in the
28 area of elevated public risk¹²⁹, that would be approximately 20 ha in size and extend up to 300
29 m from the jetty structure to maintain public safety and protect the security of TMJ operations.
30 The zone was proposed to be enforced during berthing, de-berthing and LNG loading
31 operations, during which time only TMJ-related and authorized vessel traffic would be
32 permitted to enter the zone. During Application Review, TC and VFPA raised concerns about
33 potential effects of the proposed zone to navigation and OGC, TC and VFPA requested
34 additional details on TJLP's proposed safety protocols during LNG carrier transit, berthing, and

¹²⁹ The area of elevated public risk is in reference to the Location-Specific Individual Risk (LSIR) contour of 1×10^{-5} fatalities/ year, as calculated by TJLP. This area is approximately 20 ha in size and extends approximately 300 m from the jetty structure, south of the outer limit of the navigation channel. In addition to a portion of the Fraser River, the area of elevated public risk includes a section of the onshore TMJ site and a portion of the onshore neighbouring facility to the south of the jetty.

1 loading of LNG.

2 In response to concerns raised about navigability, TJLP proposed a revised, protocol-based
3 approach to provide for public safety and reduce the potential for interference with navigation
4 adjacent to the TMJ site during Operations, and no longer proposed a spatially defined zone.
5 TJLP has proposed a Marine Safety Protocol to come into effect during Construction (once the
6 FTBB is in operation) and remain in place for the life of TMJ for the purpose of public safety.
7 TJLP's Marine Safety Protocol includes proactive information sharing with mariners, notification
8 to mariners and safety protocols that are consistent with industry standards and best practices.
9 TJLP would post signage along the jetty notifying river users of the presence of hazardous
10 substances and to exercise caution in the vicinity of the TMJ site. TJLP would work with the
11 VFPA, the Pacific Pilotage Authority, Fraser River Pilotage Authority (FRPA) and the Marine
12 Communications and Traffic Services (MCTS) (a division of the CCG) to communicate the arrival/
13 departure times and presence of an LNG vessel at the TMJ for the information of other vessels
14 on the river. TJLP proposed varying levels of site-specific operational measures to implement.
15 Measures range from observing passing vessels, to announcing to the vessels that they are in
16 the vicinity of LNG operation, to suspension of TJLP's LNG loading operations.

17 Upon review of the proposed Marine Safety Protocol, the OGC, TC, and VFPA were satisfied
18 with the operational protocols to reduce public safety risk, and that the proposed protocols
19 would not obstruct navigation and were consistent with applicable laws and regulations. The
20 EAO understands that public safety risk and mitigation would be discussed further during the
21 OGC permitting process, should TMJ receive an EAC. The EAO recommends a KMM under CEAA
22 2012 for a Marine Access and Transportation Plan that requires TMJ to identify marine uses and
23 navigation in the TMJ area, and methods to coordinate activities and communicate with other
24 marine users and regulators. As part of the Marine Access and Transportation Plan, TJLP would
25 be required to develop marine safety protocol(s) and their implementation procedures to
26 maintain navigation and safety, and describe procedures, safety training for Indigenous Groups
27 and other measures to address the safety of marine users, fishers and construction personnel
28 and to minimize the likelihood of vessel collisions during construction and operations.

29 **EMERGENCY RESPONSE**

30 During Application Review, many Working Group members raised questions about emergency
31 response and sought clarification from the EAO, including Maa-nulth Treaty Society, Malahat
32 First Nation, Tsleil-Waututh Nation, the BC OGC and Delta. Questions were raised about how a
33 spill response would be coordinated, whether the CCG has the capacity and training to respond
34 to an LNG spill, and further details were requested to clarify specific responsibilities and
35 capabilities of the CCG with respect to an LNG spill. The EAO worked with various agencies and
36 TJLP to better clarify the process for Working Group members.

37 In response to questions raised during the EA, TJLP prepared an Emergency Response

1 Framework¹³⁰ that describes key agencies and organizations that would be involved in
2 emergency response planning, response preparedness, and fundamental response actions and
3 activities in the event of an incident related to the operation of the Tilbury Marine Jetty or to
4 the operation of an LNG vessel during transit. The Emergency Response Framework was shared
5 with the Working Group during Application Review.

6 In the event of an incident on water, CCG forms the “unified command” (i.e., organizes the
7 different agencies and establishes priorities) and CCG pollution response personnel would
8 conduct an assessment of what is the threat (type, quantity, discharge) and risk (what is being
9 damaged – wildlife, water, cultural) and if required, set up incident command post (to address
10 any long term effects and mitigation measures). Post-incident recovery efforts would likely
11 involve ECCO and other partners, including CCG.

12 Initial Response measures would depend on Standard Operating Procedures of facility or ship
13 that have details on initial strategies to manage a spill. It is the responsibility of the polluter to
14 report and address marine pollution incidents, it is CCG’s mandate to ensure an appropriate
15 response. The ship operator/ owner ultimately is responsible for having (or contracting) the
16 correct equipment and personnel to manage an accident involving a vessel. Ship employees
17 may manage initial response, if needed specialist teams (e.g., Western Canada Marine
18 Response Corporation) or other contractors may be brought in to assist with mitigation
19 measures. The role of Western Canada Spill Response is to respond to the unlikely event of a
20 bunker oil-related spill.

21 CCG has developed and maintains a Greater Vancouver Integrated Response Plan (GVIRP) for
22 marine incidents which provides the structure within which it and other agencies coordinate
23 their response to a marine pollution or spill incident. GVIRP is the overarching framework for
24 marine pollution incident response, including the TMJ site and a portion of the MSA. If there
25 was a vessel incident, coordination of federal, provincial, and municipal emergency
26 management partners would ensue. Presently, LNG fire response is not considered in the
27 GVIRP. Spill response is outward to 200 nm – includes all Canadian waters, where the *Canada*
28 *Shipping Act, 2001* applies. There is a cross-border spill plan (CANUSPAC) with the USA that
29 would apply to LNG carriers. CANUSPAC is a regional bilateral plan with the US Coast Guard that
30 covers pollution response in transboundary waters. It is not specific to LNG response but would
31 apply if Canada requires assistance in a response.

32 The EAO recommends a condition for emergency response and spill prevention in the marine
33 terminal area as part of the Construction and Operational Environmental Management Plans.
34 The plans would include the emergency response and spill prevention mitigation measures that
35 would be implemented if a spill (as defined by the BC *Environmental Management Act*) occurs,

¹³⁰ TJLP Tilbury Marine Jetty Emergency Response Framework, dated April 23, 2021
(https://www.projects.eao.gov.bc.ca/api/public/document/60a562067429e10022397823/download/20210423_TilburyMarineJetty_EmergencyResponseFramework.pdf).

1 and procedures to notify Indigenous Groups, City of Delta, Metro Vancouver, and the City of
2 Richmond of emergencies or spills. The EAO also recommends a KMM under CEAA 2012 for an
3 Emergency Response Plan in the marine terminal area. The Emergency Response Plan would
4 describe integrated response planning in the marine terminal area, including roles and
5 responsibilities, and equipment requirements, between TJLP and government agencies/ local
6 government/ emergency response departments. The EAO also recommends a KMM under
7 CEAA 2012 for a Marine Shipping Emergency Response Program to facilitate the integration of
8 plans for responding to incidents in transit into existing emergency response systems, primarily
9 the CCG's Incident Integrated Response Plans.

10 **POTENTIAL EFFECTS FROM SPILLS AND SPILL RESPONSE**

11 Musqueam Indian Band raised concern that the accidents and malfunctions assessment
12 included only one potential failure mode that could lead to effects on Current Use; thereby not
13 accounting for other potential effects. These potential effects could include adverse "place-
14 based stigma", contamination concerns, as well as navigation constraints and exclusion zones
15 as response to unanticipated product releases. Tsawwassen First Nation indicated to the EAO
16 that a grounding or collision event resulting in an LNG spill would be potentially devastating to
17 Tsawwassen First Nation and would likely affect use and harvesting in their traditional
18 territories.

19 TJLP responded that the only risk scenario that might affect areas beyond the immediate
20 vicinity of the TMJ site (and thereby Current Use) would be the release of bunker fuel or LNG
21 due to marine vessel grounding or collision. TJLP explained that the spill of oil or LNG could
22 result in navigation and fishing restrictions which were considered in the accidents and
23 malfunctions risk assessment.

24 ECCC requested clarification regarding the effects of LNG spills on colonial nesting marine birds.
25 In particular, the effects of spills during breeding season.

26 TJLP agreed that there would be an increased risk to marine birds during nesting season
27 although the risk for potential spills would be significantly reduced due to many of the
28 mitigation measures that would be put in place. Should LNG be released into the water, it is not
29 expected that the LNG spill would extend into the terrestrial environment (where nests may be
30 located). In the worst-case scenario, select species could be affected by the LNG spill.

31 Tsawwassen First Nation raised concerns regarding the time period that potential effects of
32 bunker fuel spills would be fully reversible for all fish and fish habitats.

33 With respect to effects on fish, TJLP noted that species that access the surface to breathe (e.g.,
34 marine mammals and marine birds) are more vulnerable to bunker fuel exposure than pelagic
35 fish which are expected to have minimal interaction with spilled bunker fuel. The greatest
36 exposure to fish habitat would occur in the intertidal zone, affecting non-motile invertebrate
37 species (e.g., mollusks, clams, oysters, etc.) which are unable to avoid the spill and their
38 habitats. TJLP referenced historic cases of oil spills and estimated that the effects of this

1 scenario would be fully reversible within 10 years and would therefore be in the moderate
2 consequence severity level (see Figure 16 above).

3 Tsawwassen First Nation raised concerns about the risk of grounding or collision and disagreed
4 that the risk of a grounding or collision resulting in an LNG release would be low and that it
5 would fall within the tolerable criteria. Tsawwassen First Nation noted that an LNG spill could
6 affect Tsawwassen First Nation use, harvesting and cultural practices in Tsawwassen First
7 Nation traditional territories. Further, TJLP and the EAO have inadequately considered how
8 risks for collision or grounding may be magnified due to cumulative effects and climate change.

9 With respect release of LNG release, TJLP noted that the risk has been assessed to be "low" as
10 release from grounding or collision of a double-hulled LNG vessel has never happened. Based
11 on the short timeframe that is associated with presence of LNG (rapid vapourization or burning)
12 following potential spill, that such an outcome of collision would have minimal effect on
13 harvesting.

14 Pauquachin First Nation, Scia'new First Nation and Maa-nulth First Nations expressed concern
15 that the potential effects of a bunker fuel release were not adequately assessed. They
16 requested rationale for limiting the assessment scenario to a release of only half (1,250 cubic
17 metres [m³]) of the largest tank of bunker fuel allowable under MARPOL, as well as the spill
18 only being considered at one location (Boundary Passage) at one time of year (spring).

19 TJLP explained that the assessment of potential bunker fuel release in the MSA was based on
20 previous modelling results in the same geographic area, namely the TMX project for an 8,000
21 m³ spill and RBT2 project for a 7,500 m³ spill scenario. They noted that the effects of TMJ would
22 be much less as the largest TMJ tank would be 2,500 m³. TJLP also stated that while using TMX
23 and RBT2 modelling results, the residual effects assessment for the MSA expanded the analysis
24 to address spills anywhere in the MSA area, as well as effects of seasonal variation.

25 Tseil-Waututh Nation requested that TJLP develop mitigations for the protection of a potential
26 fish weir that was identified at an archaeological site on the opposite bank of the Fraser River
27 from the TMJ site in the event of a hazardous material spill.

28 TJLP responded that this site, amongst other archaeological and ecologically sensitive sites,
29 would be specifically identified in a detailed Emergency Response Plan and Spill Prevention Plan
30 in the Fraser River.

31 The EAO proposes a condition requiring the development of a CEMP and OEMP, which would
32 include the requirement for emergency response and spill prevention in the marine terminal
33 area, in consultation with Indigenous Groups and agencies. These plans would require a list of
34 the cultural, socio-economic, ecological and biological resources that may be affected by a spill
35 in the marine terminal area and the emergency response and spill prevention mitigation
36 measures that will be implemented. The EAO also recommends KMMs under CEAA 2012
37 (Appendix 1) for an Emergency Response Plan for the marine terminal area, that includes a Spill
38 Response Component Plan that would describe spill response procedures, and coordination

1 with relevant agencies and response organizations. This plan would include a communication
2 plan to notify Indigenous Groups and marine users about effects to access, including Indigenous
3 use (for example, duration and extent of exclusion zones for fishing if an accident occurs).

4 **COMPENSATION FOR SPILL DAMAGE**

5 The Cowichan Nation Alliance, Malahat First Nation and Maa-nulth Treaty Society requested
6 additional information regarding compensation in the event of damage to interests or property
7 from a vessel related spill and/ or collision of TMJ-related vessels with property such as fishing
8 gear. Cowichan Nation Alliance, Tsawwassen First Nation and Tseil-Waututh Nation also raised
9 concerns that current regime would not compensate for non-economic losses due to an
10 incident (i.e., loss to cultural value).

11 TC has confirmed that Canada has comprehensive liability and compensation regimes covering
12 different types of marine risks involving ships, including oil pollution, the release of hazardous
13 and noxious substances (HNS), collisions and wreck removal.

14 Specific to oil pollution, polluters are financially responsible, even if an incident is accidental.
15 Shipowners are liable (responsible), up to a limit based on the size of their ship, for eligible
16 claims of loss or damage, whether the pollution was caused by oil carried as cargo or used in
17 the operation of the ship¹³¹. Shipowners are required to have insurance for all of their vessels
18 that are 1,000 gross tonnes or larger in case of oil pollution damage caused by the oil they use
19 as fuel or in the operations of the vessel. Tanker owners are required to have insurance if they
20 carry 2,000 tonnes or more of persistent oil as cargo. If the costs of a persistent oil spill caused
21 by an oil tanker were more than the tanker owner's limit of liability, additional compensation
22 could be paid by international funds financed by industry and distributed by the International
23 Oil Pollution Compensation Funds (IOPC Funds). Canada's domestic fund, the Ship-source Oil
24 Pollution Fund (SOPF) is also available. The SOPF provides compensation for oil pollution
25 damage caused by any type of oil from any type of vessel, even when the source of the spill is
26 not known. There's no limit to the amount of compensation available from the SOPF for eligible
27 claims¹³².

28 Under the *Marine Liability Act* pollution damage means loss or damage outside of the ship
29 caused by contamination resulting from the discharge of a pollutant from the ship. Thus, there
30 is broader coverage provided than that specific to oil pollution. Currently, the compensation
31 program has an economic focus. As part of the ongoing federal review of the *Marine Liability*
32 *Act*, TC is looking at non-economic losses (e.g., inability to use certain sites, fish in certain areas

¹³¹ Eligible claims include: pollution prevention measures; clean-up costs; property damage; fisheries losses; subsistence losses; tourism losses; and environmental remediation. For more information on compensation visit: <https://tc.canada.ca/en/marine-transportation/marine-safety/marine-liability-compensation-oil-spills>

¹³² Ibid.

1 or access culturally significant harvests).

2 Canada has ratified the 2010 Hazardous and Noxious Substances Protocol¹³³ that aims to
3 ensure prompt and effective compensation for HNS incidents. The HNS Convention will add to
4 the oil regime by covering more substances (including LNG) and additional damage (including
5 for heavy oils), such as loss of life and personal injury, related to HNS incidents. Under the
6 protocol, the shipowner is first and foremost strictly liable, up to a limit based on the size of
7 their ship (up to ~200 million CDN), even if they are not at fault. They will be required to
8 maintain insurance to cover up to their limits of liability. Shipowner liability will be
9 complemented by an HNS Fund financed by contributions from industries that receive and
10 import HNS. Once the Protocol enters into force, the HNS Fund will be created and
11 approximately \$500 million will be available per incident to cover eligible claims¹³⁴.

12 In Canadian waters, vessel owners are liable for the costs of removing wrecks that affect safe
13 navigation or the environment. Vessels of 300 gross tons or more must carry mandatory
14 insurance to cover the costs of locating, marking, and removing a wreck in case there is an
15 incident. Insurance would also cover any losses that need to be claimed because of the wreck,
16 like the removal of debris from the vessel. The amount of insurance a vessel needs depends on
17 its size, as set out under the *Marine Liability Act*.

18 Regarding potential damage to property via collision, TC confirmed that vessel owners may be
19 liable for damage to property as the result of a collision through a civil claim in the courts. The
20 liability of a vessel owner would depend on the circumstances under which the fishing gear was
21 damaged and therefore whether a vessel is deemed to be at fault. The *Marine Liability Act* sets
22 out the vessel owner's limits of liability.

23 **BUNKER VESSEL SCENARIO**

24 During the review of TJLP's BVSA Report, Working Group members raised concerns related to
25 potential increased risks for spills, or accidents and malfunctions due to the increased
26 frequency of vessel traffic associated with the BVS. Richmond noted concerns about bunker
27 vessels without tug escort, and that the increased number of loading operations associated
28 with the BVS could increase the risk of spills and fugitive emissions. Tsawwassen First Nation
29 noted that TJLP's BVSA Report lacked information on risks of potential spills related to filling
30 bunkering vessels under the BVS. Snuneymuxw First Nation identified that the release of LNG in
31 a collision-related accident is of great concern, and that Snuneymuxw First Nation is equally
32 concerned with the likelihood of a vessel-to-vessel collision, regardless of LNG release. Tsleil-

¹³³ The Protocol is not yet in force. The Protocol will enter into force 18 months after the Convention is ratified by twelve countries with major ports and industries receiving HNS. To date, five countries, including Canada, have ratified the 2010 Protocol.

¹³⁴ Eligible claims for HNS damage include: loss of life or personal injury; loss of damage to property outside of the ship; economic losses to the fishing and tourism industries; costs of preventive measures; and costs of reasonable environmental reinstatement.

1 Waututh Nation requested more details on how accidents and malfunctions remain unchanged
2 under the BVS.

3 TJLP responded that the LNG shipping industry has a long record of safe operation, due to the
4 safe and robust design and construction of LNG vessels, their specialized cargo containment
5 systems, comprehensive operational procedures, crew training, equipment maintenance
6 planning, continuous technological improvements, effective industry standards, and regulatory
7 oversight by government.

8 TJLP noted that bunker vessels that call to TMJ are anticipated to be 'purpose built' bunker
9 vessels. The updated information of likely bunker vessels confirms that designs of these bunker
10 vessels have incorporated exceptional maneuverability and station holding capability and
11 redundancy so as not to require the assistance of tugs; however, that determination would
12 ultimately be made by the Port of Vancouver Harbour Master under its rules and criteria.

13 TJLP stated that likelihood of a collision or grounding incident involving a TMJ-related vessel
14 was evaluated in Appendix G of the BVSA Report. In addition to an LNG release, a collision or
15 grounding incident could result in the release of bunker fuel from the TMJ-related vessel or
16 third-party vessel involved in the case of a collision, as discussed in the Application. While the
17 likelihood of a collision or grounding increases with the increase in volume of bunker vessel
18 traffic, the risk of a LNG release affecting a VC is expected to be similar to the scenario assessed
19 in the Application, considering the smaller size and greater maneuverability of the bunker
20 vessels relative to the larger LNG carriers. Thus, the increase in bunker vessel traffic is not
21 expected to alter the conclusions of the Application, with respect to the potential risk of an LNG
22 release due to collision or grounding. TJLP clarified that the risk of a loss of LNG containment
23 during loading operations is similar under the BVS to what was originally assessed in the
24 Application scenario, that the largest contributor to the risk is the potential collision involving a
25 passing third-party vessel striking the TMJ facility. TJLP also identified that the likelihood of an
26 LNG release due to failure of ensuring closed connections is very low considering the TMJ
27 design and with the implementation of TMJ operations and maintenance procedures and that
28 the loss of product through failure to close valves is a small contributor to the overall risk of
29 LNG release at the TMJ facility.

30 The EAO is of the view that marine shipping associated with TMJ would be required to meet the
31 international standards and Canadian regulations set out by Canada's compliance-based marine
32 safety and security system, which is designed to protect life, property, and the marine
33 environment. The EAO is satisfied that the potential accidents and malfunctions associated with
34 TMJ, including release of LNG in a collision-related accident, or vessel-to-vessel collisions, have
35 been adequately identified and assessed for this EA, for both the Application scenario and BVS.

36 **9.4 CONCLUSIONS**

37 Potential interactions between TMJ and other past, present, and reasonably foreseeable
38 projects were evaluated in the Application and reported in this chapter as part of the

1 assessment of potential accidents and malfunctions, including potential interactions with the
2 Tilbury LNG Plant and current and forecasted vessel traffic in the Fraser River and MSA Area.
3 Other potential accidents and malfunctions are not expected to have temporal and spatial
4 overlap with the residual effects of other past, present, and reasonably foreseeable projects.

5 The EAO has considered the TMJ design, mitigation measures, Canada's marine safety system,
6 requirements for shipowner/ operators to have emergency response plans, and the following
7 conditions identified in the TOC (which would become legally binding as a condition of an EAC),
8 and recommended KMMs under CEAA 2012:

- 9 • Emergency response and spill prevention in the marine terminal area, as part of the
10 Construction and Operational Environmental Management Plans (provincial conditions);
- 11 • Emergency Response Plan, in the marine terminal area (KMM);
- 12 • Marine Shipping Emergency Response Outreach Program (KMM); and
- 13 • Marine Access and Transportation Plan (KMM).

14
15 The EAO understands that public safety risk from activities at the jetty site would be discussed
16 further following additional design, analysis and review of potential mitigations during the OGC
17 permitting process (should an EAC be issued). TC noted that the assessment of probability and
18 proposed mitigation measures in the Application and supplemental information appeared
19 reasonable for the marine transit risk, considering the redundant layers of safety that make up
20 Canada's marine safety system.

21 The EAO acknowledges that there is a high level of public, government and Indigenous concern
22 regarding public safety risks associated with LNG activities. While the consequences for public
23 safety due the loss of containment of LNG and ignition could reach substantial distances and be
24 very high, after mitigation, the EAO notes that the likelihood of such an event is very rare,
25 based on TJLP's definitions used in the quantitative risk analysis. The risk analyses conducted
26 during the TMJ EA show the LSIR and societal risk fall into the Broadly Acceptable or Tolerable if
27 ALARP ranges, for both the Application scenario and BVS. There is potential for extremely rare
28 likelihood but very high severity of consequences of accidents and malfunctions causing a
29 SRKW fatality or irreversible damage to heritage resources, for which the residual risk is
30 moderate, based on TJLP's definitions in the risk matrix. For potential effects of accidents and
31 malfunctions on other environmental VCs, no significant effects are predicted effects and the
32 residual risk level is low to moderate.

33 The EAO is satisfied that the potential accidents and malfunctions associated with TMJ have
34 been adequately identified and assessed for this EA.

1 **10 EFFECTS OF THE ENVIRONMENT ON THE PROJECT**

2 **10.1 BACKGROUND**

3 The Application assessed the likelihood of the effects of environmental factors may have on
4 TMJ and their consequences on relevant VC/ PCs. The following environmental effects and
5 processes have the potential to affect TMJ and result in changes or effects to the VC/ PCs
6 assessed in the Application:

- 7 • Climate change, including temperature, precipitation and sea level rise;
- 8 • Extreme weather-related events including wind, heavy rain, extreme temperatures,
9 lightning, drought and fog;
- 10 • Flood risk from extreme tides and peak river flows;
- 11 • Seismic events;
- 12 • Volcanic events; and
- 13 • Tsunami, river slope stability and mass wasting events.

14 **10.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 15 **IDENTIFIED IN THE APPLICATION**

16 *CLIMATE CHANGE*

17 The Application reported on the effects of climate change on TMJ, including potential for
18 changing global and regional temperatures, precipitation and sea levels over the 30-year
19 operations.

20 Since 1900, the average annual temperature in the southern coastal region of B.C. has
21 increased at a rate of 0.8°C per 100 years, similar to the global average warming rate. The
22 warming trend would affect all seasons, with the highest increase during the summer. The
23 effects that could be influenced as a result of this scenario are the same as those listed in
24 [Section 9.2.1](#) (Hazardous Material Spills), [Section 9.2.2](#) (Loss of LNG Containment), [Section 9.2.5](#)
25 (Failure of Sediment Containment) and [Section 9.2.6](#) (Allision, Grounding or Collision of
26 Vessels).

27 TJLP predicted that the rising sea level, superimposed on the periodic El Niño-Southern
28 Oscillation events, would likely result in increased frequency and severity of flooding, which
29 could affect TMJ. The effects that could result from this scenario are the same as those listed in
30 [Section 9.2.1](#) (Hazardous Material Spills) and [Section 9.2.5](#) (Failure of Sediment Containment).

31 The risks related to climate change (e.g., increased flooding) is discussed below.

32 *EXTREME WEATHER-RELATED EVENTS*

33 Potential effects of extreme weather assessed for TMJ include extreme temperatures, heavy

1 precipitation (snow and rain), lightning, drought, fog (resulting in poor visibility) and high winds.

2 Over the life of TMJ, occasional extreme temperatures have the potential to interrupt
3 operations temporarily due to safety concerns for TMJ personnel. To mitigate the potential
4 safety risks to workers, the operational Health and Safety Plan would include precautions and
5 preparation for extreme temperatures. TMJ would also be designed for extreme temperatures
6 to mitigate potential structural effects to facilities and infrastructure including the pipeline rack
7 and marine terminal to accommodate the forces and effects of thermal expansion and
8 contraction. The LNG transfer system would be insulated to protect against ambient
9 temperature fluctuations and freezing. TMJ infrastructure and systems would be inspected
10 throughout Operations to ensure the design criteria are adequate.

11 Heavy precipitation may temporarily suspend some construction activities, and if accompanied
12 by poor visibility may hinder navigation or berthing operations. TJLP predicted that extreme
13 precipitation is unlikely to affect the LNG transfer system and unloading activities with the
14 exception of excessive ice on the loading arm and other key equipment which may need to be
15 removed before unloading operations. Effects that could result from heavy precipitation are
16 listed in [Section 9.2.1](#) (Hazardous Material Spills) and [Section 9.2.5](#) (Failure of Sediment
17 Containment). TMJ infrastructure would be designed to withstand 1:50-year rain and snow load
18 in accordance to the National Building Code of Canada. TJLP has committed to review this
19 design criteria during detailed design to ensure they meet long-term trends affected by climate
20 change. TJLP assessed the increased risk for hazardous material spills and loss of sediment
21 containment due to extreme precipitation and found that the risk to the environment is
22 moderate and low respectively with no risk to public safety.

23 There is a potential for lightning strikes to occur in the TMJ area during the life of TMJ. In
24 compliance with safe terminal operations, LNG loading operations would be suspended
25 whenever lightning is observed in the vicinity. Weather alerts would be actively monitored, TMJ
26 staff and ship crews would be trained to respond appropriately in case of lightning alerts.

27 TJLP assessed the potential effects of drought conditions on TMJ and concluded that because
28 TMJ has low water demand it would be relatively unaffected by a shortage in regional water
29 supply. It was also assessed that reduced water levels in the Fraser River would not result in
30 effects, as the Fraser River would remain navigable due to tidal assist at its lower flow range.
31 Therefore, it was concluded that drought conditions are not a material risk to TMJ.

32 Poor visibility could occur due to fog, heavy rain, or dust (for example, due to a volcanic event,
33 described below). TJLP reported that visibility data at YVR indicated that these poor visibility
34 conditions occur up to approximately 4 percent of the year. The effects that could result from
35 this scenario are the same as those listed in [Section 9.2.1](#) (Hazardous Material Spills), [Section](#)
36 [9.2.2](#) (Loss of LNG Containment) and [Section 9.2.6](#) (Allision, Grounding or Collision of Vessels).
37 To mitigate the potential effects of poor visibility and the resulting risk related to navigation of
38 LNG vessels, TJLP described the requirements for vessel navigation. These include the
39 Convention on the International Regulations for Preventing Collisions at Sea, which require that
40 every vessel proceed at a safe speed adapted to prevailing circumstances and restricted

1 visibility and the use of BC Coast Pilots and Fraser River Pilots which utilize a variety of
2 computerized and GPS-enabled navigation and communication tools to mitigate poor visibility
3 conditions. TJLP also confirmed that Fraser River pilots have full authority to choose the
4 appropriate transit, berthing, or disembarking window based on weather conditions.

5 Extreme wind could result in extreme waves and damage to TMJ infrastructure in addition to
6 creating navigational and worker safety hazards. The effects that could result from this scenario
7 are the same as those listed in [Section 9.2.1](#) (Hazardous Material Spills), [Section 9.2.2](#) (Loss of
8 LNG Containment) and [Section 9.2.6](#) (Allision, Grounding or Collision of Vessels). To mitigate
9 the effects of high winds on navigation, TJLP committed that LNG vessels would follow the Port
10 of Vancouver TCZ-4 guidelines including the restriction from transiting, berthing, and
11 disembarking on the Fraser River in winds exceeding 25 knots. To mitigate the potential
12 damage to infrastructure, structures would be designed for the 1:50-year wind and wave loads,
13 in accordance with the National Building Code of Canada. This design criteria for extreme wind
14 and waves would be confirmed during detailed design to ensure they meet long-term trends
15 and changes.

16 Given the relative stability in weather conditions on average in the TMJ area and the design and
17 construction requirements of TMJ as well as maintenance standards, the likelihood and
18 consequence of an extreme weather-related effect is low, therefore the risk is also considered
19 to be low.

20 **FLOOD EVENTS**

21 The TMJ site is vulnerable to flooding from spring freshet in the Fraser River and from storm
22 surge and high tide events due to its location in the lower Fraser River delta. The lower Fraser
23 River floodplain is at highest risk of flooding during the spring snowmelt (May to Mid-July). The
24 potential effects of an extreme flood event at TMJ include inundation of the onshore facilities
25 due to dike breach or overtopping which could result in worker safety risk, sedimentation
26 containment failure or structural damage.

27 TMJ facilities and infrastructure would be designed to reduce the likelihood and consequence
28 of flood effects at TMJ. The onshore facility would be protected by the Fraser River dike which
29 would accommodate the 1:200-year design flood. The FTBB would be a floating structure with
30 the ability to move vertically to accommodate river level fluctuations and the permanent jetty
31 is designed for an elevation above the extreme storm surge level.

32 The effects that could result from these scenarios are the same as those listed in [Section 9.2.1](#)
33 (Hazardous Material Spills) or [Section 9.2.5](#) (Failure of Sediment Containment).

34 It is possible that an extreme flood event would occur within the life-span of TMJ, therefore the
35 likelihood is considered to be moderate. Considering the mitigation measures to avoid or
36 reduce the adverse effects of flooding at TMJ and potential subsequent effects on VCs, the
37 consequence of an extreme flooding event is considered to be low. The overall risk during
38 Construction or operation is therefore also considered low.

1 SEISMIC EVENTS

2 The Application assessed the potential for adverse effects related to natural seismic events that
3 could result in associate hazards for TMJ, which may include ground motions on structures and
4 facilities, permanent vertical and horizontal ground deformations, liquefaction of soil and
5 seismically-induced slope failures. This could result in a loss of LNG containment onshore and
6 offshore, discussed in [Section 9.2.2](#) (Loss of LNG Containment), which could cause debris
7 entering the Fraser River affecting marine use, toxic substances entering watercourses effecting
8 fish and fish habitat, amphibians, marine mammals and wildlife.

9 To mitigate the potential risk of seismic events, TMJ would be designed to meet all applicable
10 seismic design standards, including CSA Z276 and the recommended practices in the American
11 National Fire Protection Association's NFP-59A standards for LNG facilities. TMJ facilities would
12 be designed to remain operable with little to no damage following an Operating Basis
13 Earthquake (1:475-year return period – with 10 percent probability of occurrence in 50 years).
14 TJLP stated that while a 1:2,475-year earthquake may damage facilities rendering them
15 inoperable, the facility would be designed to maintain the integrity of LNG containment (that is,
16 no loss of LNG containment) in the event of this magnitude earthquake which has a 2 percent
17 probability of occurring in 50 years. The Emergency Response and Spill Contingency Plan would
18 include guidelines related to emergency response and guidelines regarding stability and
19 integrity assessments following a seismic event.

20 Although TMJ would be located in a high-risk area for seismic activities, the likelihood of
21 damage to infrastructure components would be low to moderate depending on the size of the
22 earthquake (relatively small to large subduction).

23 The potential adverse effects of the seismic event would be mitigated through project design
24 which would protect public safety, emergency routes and access, and structure stability
25 compared to existing conditions. The corresponding overall risk to the TMJ and associated VC/
26 ICs is assessed as moderate for a large subduction event and low for a relatively small
27 earthquake.

28 VOLCANIC EVENTS

29 The Application considered the potential effects of volcanic events on TMJ. The nearest active
30 volcanos to the TMJ site are Mount Baker and Mount St. Helens in Washington State with
31 Mount Baker the closest at approximately 100 km southeast. The resulting effect of the
32 potential ash from a volcanic eruption is hinderance of navigation related to TMJ and this
33 scenario is addressed in [Section 9.2.6](#) (Allision, Grounding, or Collision of Vessels). A secondary
34 effect, with a lower likelihood, is for rock fragments to damage equipment and TMJ facilities
35 and this scenario is addressed throughout [Section 9](#) (Accidents and Malfunctions).

36 The potential adverse effects of a volcanic event on TMJ facilities and/ or navigation of TMJ-
37 related vessels would be mitigated through project design which would protect public safety,
38 emergency routes and access, and structure stability. The corresponding overall risk to TMJ and
39 associated VC/ ICs is assessed as low.

1 ***Tsunami AND MASS WASTING EVENTS***

2 The Application assessed the potential for tsunami and mass wasting that could affect TMJ.
3 Earthquake generated tsunamis are unlikely to result in adverse effects because the Vancouver
4 area is generally sheltered from Pacific Ocean tsunamis by Vancouver Island that would absorb
5 the effect and diminish tsunami generated waves to less than 1 m in the Strait of Georgia and
6 less than 0.5 m in the Fraser delta.

7 The Application also considered the risk of a landslide generated tsunami which could be
8 caused by a massive landslide at the foreslope of the Fraser River delta into the Strait of
9 Georgia. Although the likelihood of this type of tsunami is difficult to estimate, the
10 consequences would include large waves of 18 m reaching the gulf islands, 2 m in Tsawwassen
11 and less so at Tilbury Island.

12 The effects that could result from these scenarios are the same as those listed in [Section 9.2.1](#)
13 (Hazardous Material Spills) or [Section 9.2.5](#) (Failure of Sediment Containment).

14 The potential adverse effects of a tsunami or mass wasting event on TMJ facilities and/ or
15 navigation of TMJ-related vessels are unlikely to occur while the consequences are low due to
16 low magnitude wave amplitude. The corresponding overall risk to TMJ and associated VC/ ICs is
17 assessed as low.

18 ***BUNKER VESSEL SCENARIO ASSESSMENT***

19 In the BVSA, TJLP did not predict changes to the Effect of the Environment on the Project from
20 the increase in bunker vessel traffic. Environmental factors that could result in effects to vessel
21 movements are captured in the assessment above, and the potential for these events to result
22 in an accident is addressed under the Accidents and Malfunctions section.

23 **10.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS**

24 **IDENTIFIED DURING APPLICATION REVIEW**

25 The following key issues related to the assessment of Effects of the Environment on the Project
26 for TMJ were identified during Application review and based on feedback from the Working
27 Group.

28 Natural Resources Canada (NRCAN) requested additional information related to seismic events
29 and the potential for effects on TMJ from earthquakes. The requests included a desire for more
30 information on the types of earthquakes that could occur in the area, a seismic deaggregation
31 plot (showing distance and magnitude of predominant earthquake sources) and use of the most
32 recent earthquake hazard model in the assessment. In addition, NRCAN requested
33 supplementary information on active faults that may result in seismic events and confirmation
34 of what studies would be undertaken in support of detailed design to address seismic risk.

35 TJLP provided two technical memos in response to NRCAN, the first of which provides
36 additional description of the types of earthquakes that may occur in the TMJ area along

1 with a seismic deaggregation analysis. The results of this supplemental analysis indicate
2 that seismic conditions in the vicinity of the TMJ site are attributed to the offshore
3 subduction of the Juan de Fuca Plate beneath the North American Plate. This seismicity
4 could result in three earthquake types for the region each with varying magnitude,
5 duration and distance to fault rupture. These include shallow crustal earthquakes
6 occurring in the North American Plate, deep inslab earthquakes occurring in the
7 subducting Juan de Fuca Plate and interface earthquakes that would occur at the
8 boundary of the two plates.

9 Shallow crustal earthquakes have a rupture distance of 10-20 km, up to a 7.5 magnitude
10 with short duration and high frequency motions, and high peak ground accelerations
11 (expressed as acceleration of gravity [g]) of 0.2 to 0.5 g. Deep inslab earthquakes have a
12 larger rupture distance of 50-70 km, up to a M 7.5 magnitude with moderate duration
13 and high frequency motions with high peak ground accelerations of 0.2 to 0.5 g.
14 Interface subduction earthquakes have the largest rupture distance with magnitudes of
15 up to M 9, the longest durations of up to several minutes with low frequency motions
16 and moderate peak ground accelerations of 0.1 to 0.2 g.

17 TJLP also provided a technical memo in response to NRCan's request for additional fault
18 information. This memo provided a description of faults that has been included as an
19 earthquake source by the US Geological Survey and/ or is classified as having activity in
20 the last 15,000 years. This analysis indicates that there are 8 faults within approximately
21 100 km of the TMJ site. Review of these faults indicates that peak ground acceleration
22 values range from 0.04 g to 0.13 g which is about one-third of the 0.38 g estimated from
23 the 2015 National Building Code of Canada seismic hazard model for the Safe Shutdown
24 Earthquake (SSE) scenario (2,475-year return period). This analysis suggests that the
25 potential peak ground acceleration resulting from an earthquake from one of these
26 faults would be considerably less than the SSE earthquake event that has informed
27 design criteria.

28 Tsleil-Waututh Nation raised concerns about the proposed densification process proposed by
29 TJLP to mitigate the potential for liquefaction during a seismic event and the associated
30 consequences that include loss of load bearing support of foundations and ground
31 displacement in the vicinity of TMJ. Tsleil-Waututh Nation also requested information on the
32 densification methods and how these may affect cultural heritage resources.

33 TJLP responded that the likely means of densifying the soils underlying the site would be
34 via installation of vibro stone columns and/ or installation of timber compaction piles.
35 The vibro stone column technique was used successfully to improve the foundation soils
36 supporting the onshore components of the Tilbury LNG Plant constructed in 2014 and a
37 400 m segment of the earthen dike along the south shoreline of the Fraser River closest
38 to the TMJ site was successfully densified using the same techniques. TJLP committed to
39 conduct on land archaeological testing in the densification area, prior to construction
40 activities including densification, to assess the possible presence and likely depths of

1 potential archaeological deposits beneath the imported fill that would be void of
2 archaeological resources. TJLP also committed to providing a monitoring plan to
3 Indigenous Groups and to following applicable regulations including submission of an
4 application for a Section 14 permit per the HCA that would include consultation with
5 Indigenous Groups prior to issuance.

6 **10.4 CONCLUSIONS**

7 Considering the above analysis and the conditions identified in the CPD and TOC (which would
8 become legally binding if an EAC is issued), the EAO is satisfied that the likelihood of occurrence
9 of effects of the environment on TMJ are low, and the magnitude of potential adverse effects
10 after mitigation would likely be low.

11 **11 CEEA 2012 REQUIREMENTS**

12 **11.1 FEDERAL LANDS, OTHER PROVINCES, AND OUTSIDE CANADA**

13 An EA under the CEEA 2012 must take into account the environmental effects of the project as
14 described in Section 5 of CEEA 2012. Paragraph 5(1)(b) of CEEA 2012 refers to a change that
15 may be caused to the environment that would occur:

- 16 (i) On federal lands;
- 17 (ii) In a province other than the one in which the act or thing is done or where the physical
18 activity, the designated project or the project is being carried out; or
- 19 (iii) Outside Canada.

20 The potential effects of TMJ on these three types of lands is discussed in this section.

21 **11.1.1 FEDERAL LANDS**

22 TMJ is located in the province of B.C. and does not occur on federal lands. However, federal
23 lands are in the vicinity of TMJ in both the original Application area (Figure 17) and the MSA
24 (Figure 18). VCs on federal lands that could be affected by TMJ include Noise ([Section 6.2](#)),
25 Marine Mammals ([Section 5.7](#)) and Air Quality ([Section 5.1](#)). The TMJ local and regional
26 assessment areas (LAA and RAA) for these three VCs overlap federal lands. In addition, wildlife
27 on federal lands could also be affected via increased noise. Wildlife was not predicted to be
28 affected on federal lands via effects other than noise.

29 In the original Application area (that is, jetty to Sand Heads), 13 federal lands were identified
30 with the potential to be affected by residual effects from Air Quality, Noise or Marine
31 Mammals. For the MSA, approximately 100 federal lands have the potential for residual effects
32 from Air Quality and Marine Mammals. Federal lands in these two areas combined include

1 parks, protected areas and historic sites; federal buildings; ports; airports; military bases and
2 reserves, with reserves making up the majority.

3 **11.1.1.1 FEDERAL LANDS – AIR QUALITY**

4 TJLP identified that TMJ has the potential to increase concentrations of certain air
5 contaminants. Federal lands located in the original Application area for the Air Quality LAA
6 include: River Road – Deas Slough, the Portside Road Terminals, the Fraser Wharves, the
7 Colonel Sherman Armoury, the Alaksen National Wildlife Area, and Steveston (Figure 17).
8 Approximately 100 additional federal lands could be adversely affected by air quality effects in
9 the MSA area (Figure 18).

10 As detailed in the Air Quality chapter ([Section 5.1](#)) of this Report, increases in air quality
11 parameters in the original Application area are predicted as follows: annual NO₂ is predicted to
12 be low magnitude and annual CO is predicted to be moderate magnitude, increases in 24-hour
13 PM (both 2.5 and 10) are predicted to be of moderate magnitude and increases of one-hour
14 NO₂ would be of high magnitude. All residual air quality changes are predicted to be local in
15 extent, long-term (for the Normal Operations Scenario and Dredge Operations Scenario) or
16 medium-term (for construction), reversible, infrequent to frequent, and of high likelihood.

17 In the MSA area, increases in 1-hour NO₂ are predicted to be moderate, while all other air
18 quality parameter increases would be negligible. Effects would be long-term, reversible,
19 frequent (during normal operations) or infrequent (approximately 12 times per year when
20 diesel powered LNG vessels are used).

21 As described in [Section 5.1](#), the EAO concludes that residual effects on Air Quality in both the
22 original Application area (for the Application scenario and BVS) and the MSA area would not be
23 significant considering the conservative nature of the assessment methods and the
24 implementation of proposed provincial conditions and recommended KMM under CEAA 2012
25 (see Air Quality chapter of this report for details on proposed conditions and KMMs for air
26 quality).

27 The predicted changes in air quality parameters represent a worst-case scenario; therefore, the
28 actual changes would likely be less than those described above for many federal lands. The
29 proposed air quality mitigation measures would all target the source of air quality emissions;
30 therefore, they would result in the mitigation of adverse air quality effects on federal lands.
31 Because air quality changes are not significant with the implementation of mitigation measures,
32 the EAO concludes that air quality effects on federal lands would also not be significant.

33 **11.1.1.2 FEDERAL LANDS – ATMOSPHERIC NOISE**

34 TJLP identified that TMJ, for both the Application scenario and BVS), has the potential to
35 increase daytime and nighttime noise levels during construction and decommissioning. An
36 increase in noise during operations was not predicted to be a residual effect for either the

1 Application scenario or BVS. Federal lands in the original Application area for the Noise LAA,
2 including River Road – Deas Slough, Portside Road Terminals, the Fraser Wharves, the Alaksen
3 National Wildlife Area may experience elevated noise levels during construction and
4 decommissioning. Noise was not assessed in the MSA because the shoreline in the MSA area is
5 located one to 10 km from shipping lanes. Noise studies showed that noise levels within 220 m
6 of passing ships do not increase above baseline levels. There are no federal lands within 220 m
7 of shipping lanes in the MSA area; therefore, no federal lands would be affected by noise in the
8 MSA area.

9 The Noise effects assessment is a PC for Wildlife and Wildlife Habitat, Socio-community, Land
10 and Marine Resource Use, and Current Use of Lands and Resources for Traditional Purposes;
11 however, of these VCs, only Wildlife and Wildlife Habitat are part of the assessment of Section
12 5(1)(b) of CEAA 2012.

13 As identified in the Noise chapter ([Section 6.2](#)) of this Report, residual noise effects were
14 determined to be of negligible to low magnitude, local extent, short- to medium-term (limited
15 to construction and decommissioning) and reversible. Although an increase in noise is likely to
16 occur, the EAO does not predict that it would be significant. As identified in the Wildlife and
17 Wildlife Habitat chapter ([Section 5.9](#)) of this Report, noise effects on wildlife are predicted to be
18 of negligible to low magnitude. TMJ is located in an existing industrial area and wildlife are
19 likely adapted to the industrial activities. The EAO has proposed provincial conditions and
20 recommended KMMs under CEAA 2012 for noise management mitigation measures (see Noise
21 chapter of this Report for details on proposed conditions and KMMs for noise). With the
22 implementation of mitigations, the EAO concludes that sensory disturbance (including noise
23 and light) is not likely to cause significant adverse effects to Wildlife and Wildlife Habitat. The
24 EAO is, therefore, of the view that noise effects to federal lands would also be not significant.

25 **5.9.2.1. FEDERAL LANDS – MARINE MAMMALS**

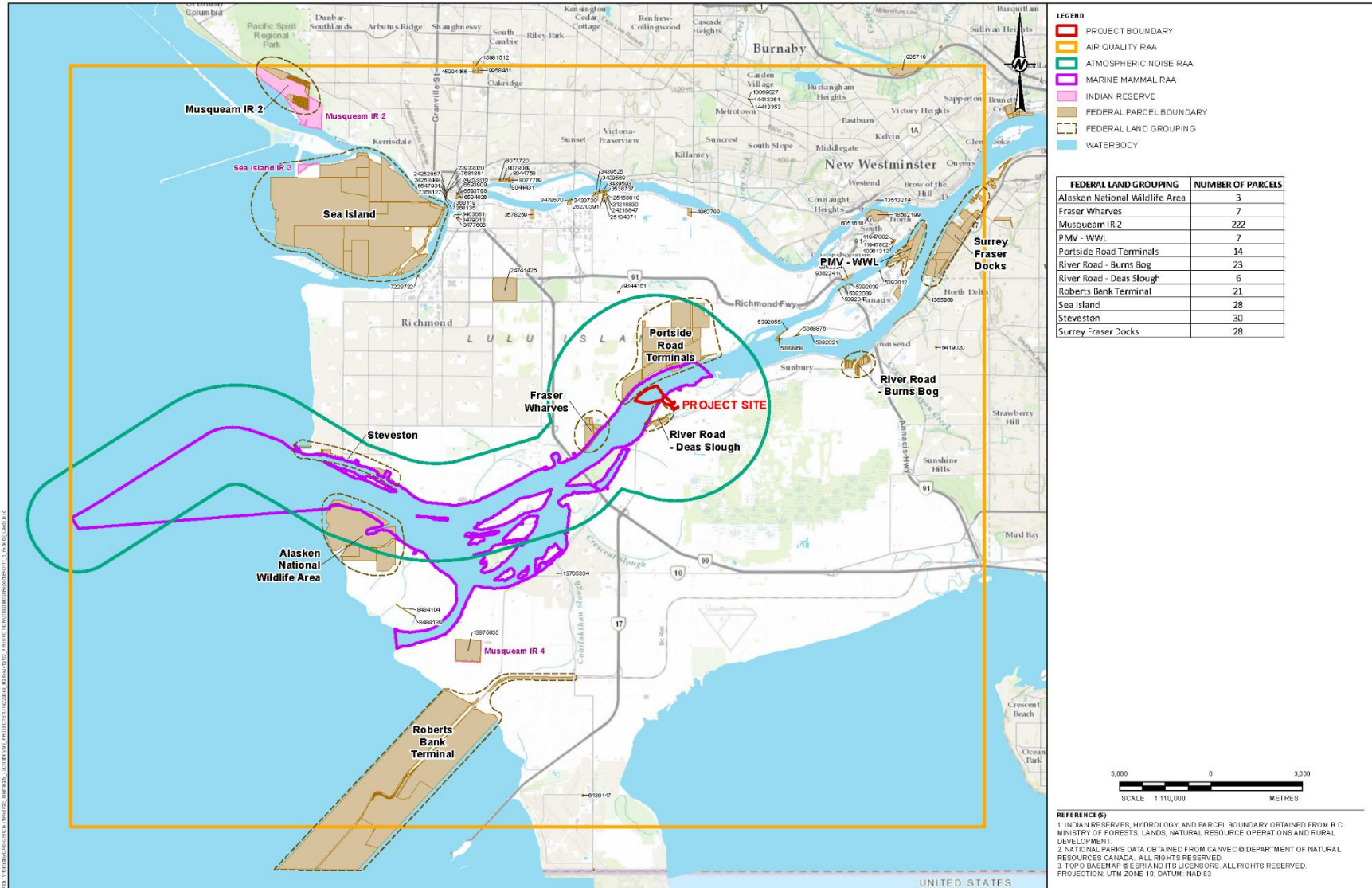
26 TJLP identified that effects of TMJ (for the Application scenario and BVS) on marine mammals
27 could include loss of habitat, changes to habitat quality, and changes in the abundance and
28 distribution of marine mammals, such as behavioural disturbance or injury due to TMJ-
29 generated underwater noise, and injury or mortality due to vessel strikes. In the original
30 Application area, the Alaksen National Wildlife Area overlaps with the Marine mammal LAA. In
31 addition, the Fraser Wharves and Steveston federal lands overlap with the Marine Mammal
32 RAA. In the MSA area, the Marine Mammals Marine Shipping Assessment Area overlaps with
33 approximately 20 federal lands.

34 As identified in the Marine Mammals section ([Section 5.7](#)) of this Report, residual effects from
35 TMJ (Application scenario and BVS) to marine mammals are expected to range from low to
36 moderate magnitude for behaviour disturbance due to underwater noise and up to high
37 magnitude for vessel strikes on federal listed species). Residual effects are also expected to be
38 infrequent to frequent (vessel noise) to infrequent (vessel strikes). To mitigate effects, the EAO

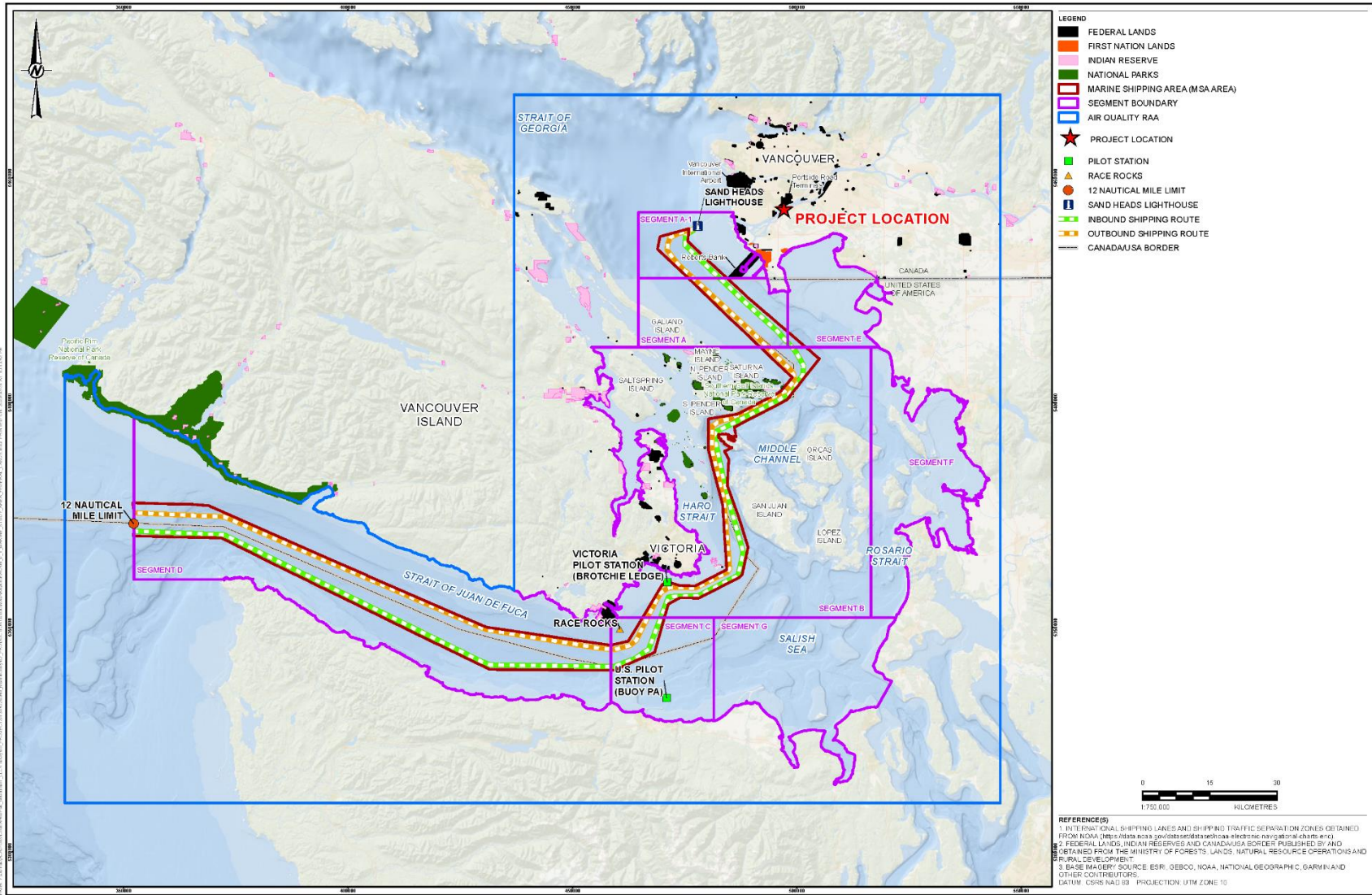
1 recommends KMMs under CEAA 2012 for a Marine Mammal Management Plan to mitigate
2 effects from activities at the TMJ site to marine mammals and a Vessel Traffic Management
3 Plan to reduce the likelihood of vessel strikes and reduce underwater noise from shipping (see
4 Marine Mammals, [Section 5.7](#) of this Report, for details on KMMs for marine mammals).

5 With the implementation of these mitigations, the EAO concludes that no significant residual
6 adverse effects to marine mammals are expected to occur from TMJ alone. Consequently, no
7 significant residual adverse effects to marine mammals on federal lands are predicted as a
8 result of TMJ alone.

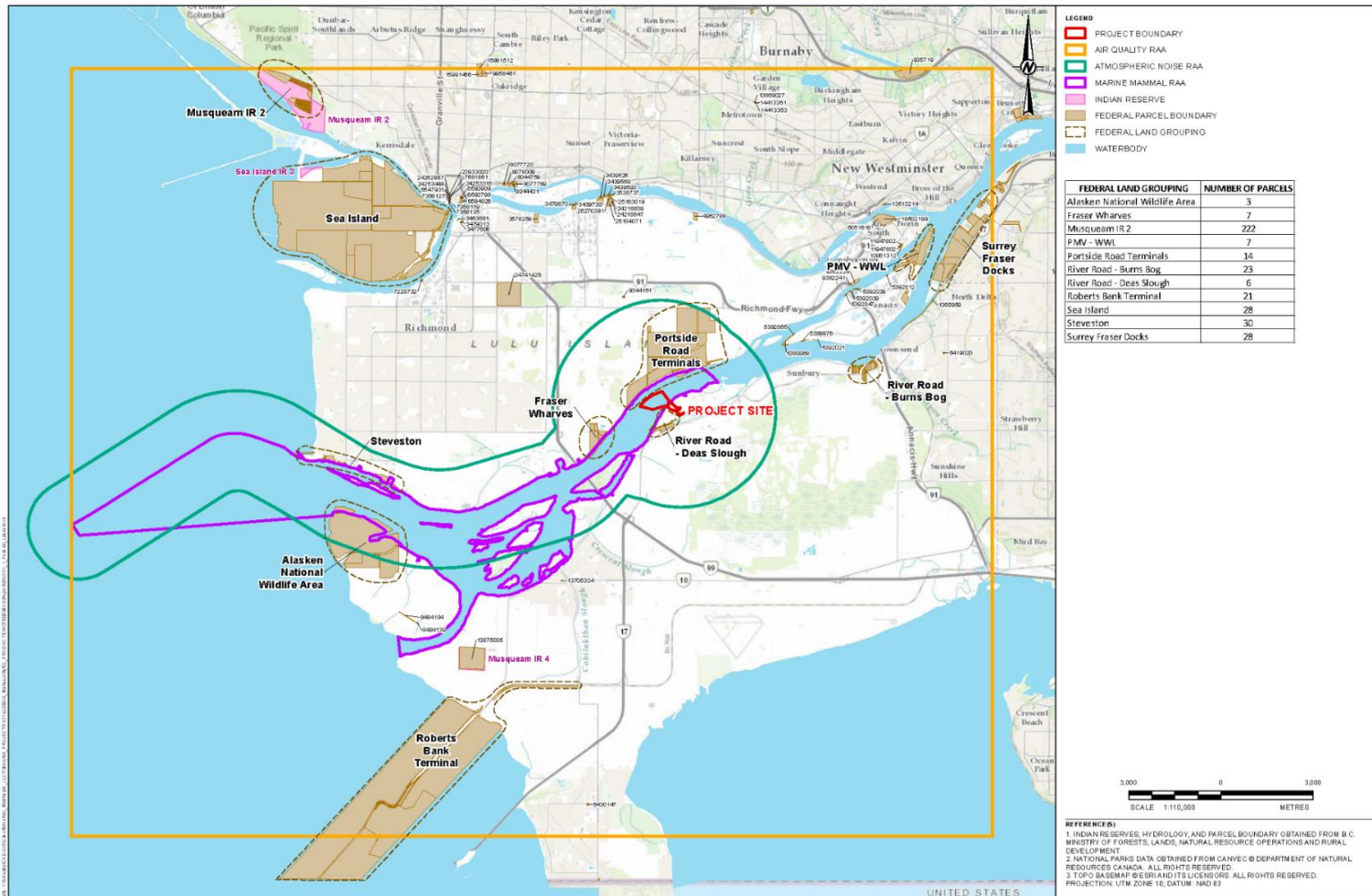
9 As noted in the Marine Mammals chapter, the EAO concludes that the predicted residual
10 effects from TMJ interacting with existing baseline conditions (which include existing threats to
11 the SRKW population), existing projects and other reasonably foreseeable future projects would
12 contribute to significant adverse cumulative effects on SRKW due to underwater noise for the
13 Application scenario and the BVS. Of the federal lands in the original Application area that
14 overlap with the Marine Mammal LAA or RAA (Alaksen National Wildlife Area, the Fraser
15 Wharves and Steveston), there is a small amount of overlap with of the Alaksen National
16 Wildlife Area and Steveston (DgRt-6) with the SRKW key foraging area (see Figure 7, [Section](#)
17 [5.8](#)) at the mouth of the Fraser River. There is no overlap with the Fraser Wharves and SRKW
18 critical habitat or sensitive areas. The extent of this overlap is limited because the Alaksen
19 National Wildlife Area and Steveston are primarily on land, with only a small piece of these
20 areas extending into the river and ocean along the shoreline. Similarly, for the 20 federal lands
21 that overlap the Marine Mammals Marine Shipping Assessment Area, the area of federal lands
22 that are underwater and where SRKW could visit and experience underwater noise is limited.
23 Therefore, the potential for cumulative underwater noise effects on SRKW on federal lands is
24 considered to be minimal.



1
2 **Figure 17: Federal Lands potentially affected by the Tilbury Marine Jetty in the original Application area (jetty to Sand Heads).**



1
2 **Figure 18: Federal Lands potentially affected by the Tilbury Marine Jetty Project in the Marine Shipping Assessment area.**



1
2 **Figure 19: Wildlife Area and Stevenson**

1 11.1.2 OTHER PROVINCES

2 TMJ is located approximately 600 km from the closest province, Alberta. This distance is beyond
3 the range where effects of TMJ would be expected to extend, with the exception of GHG.

4 As described in the Greenhouse Gas Management chapter ([Section 5.2](#)) of this Report,
5 maximum GHG emissions associated with TMJ-related vessels traveling from the TMJ site to the
6 12 nm limit may range from up to 29.22 to 31.64 kt CO₂e/yr, depending on the mix of domestic
7 and international vessels. TJLP estimates that total GHG emissions from TMJ-related domestic
8 vessels (in the original Application area and in the shipping corridor in the MSA) would equal
9 15.25 kt/year for the Application scenario and 17.91 kt CO₂e/year for the BVS. This total
10 represents 0.02 percent of B.C. (2019 levels) and 0.002 percent of Canada (2017) emissions. The
11 EAO considers this percentage to be a low magnitude effect. The EAO, therefore, does not
12 predict TMJ would result in a change to the environment in other provinces.

13 11.1.3 OUTSIDE CANADA

14 The TMJ site is located approximately 16 km north of the United States-Canada Exclusive
15 Economic Zone boundary and 25 km northwest of the Washington State Border. The United
16 States is not within the original Application area for TMJ and TMJ (as assessed in the original
17 Application) is not predicted to affect the environment of the United States except via GHG
18 emissions, which are discussed further below.

19 The MSA area is located within the international shipping lanes which follow the Canada-US
20 border. For the MSA area, TJLP noted that effects predicted for VCs along the Canadian side of
21 the border are expected to be similar on the US side of the border because the existing
22 conditions for VCs are similar on either side. The EAO predicted effects to VCs in the MSA area
23 include non-significant residual effects on Air Quality ([Section 5.1](#)), Marine Mammals ([Section](#)
24 [5.7](#)), Marine Birds ([Section 5.9](#)), Visual Quality ([Section 8.3](#)) and Current Use for Lands and
25 Resources for Traditional Purposes ([Section 11.4](#)). Refer to the VC-specific sections for further
26 details. The EAO has concluded that significant residual adverse effects are not expected in the
27 MSA area for any VC from TMJ alone. Effects on specific landmasses in the United States were
28 also considered. The western end of Stuart Island (the closest US landmass in the MSA area) is
29 within one km from TMJ shipping lanes and is the only United States landmass that intersected
30 the MSA Area. Effects from vessel wake on shoreline erosion on Stuart Island are not expected
31 at Stuart Island, even under calm conditions (increase of 0.0067 percent in wave energy).

1 As described in Section 11.1.2 above, maximum GHG emissions associated with TMJ-related
2 vessels may range from up to 29.22 to 31.64 kt CO₂e/yr, depending on the mix of domestic and
3 international vessels. Although GHG emissions are global in nature, the contributions from TMJ
4 are considered to be very small on a global scale. Please refer to the section on Greenhouse Gas
5 Management ([Section 5.2](#)) for additional information on predicted GHG emissions from TMJ
6 and an analysis on upstream GHGs.

7 In consideration of the above information, the EAO concludes that no significant adverse
8 changes to the environment outside of Canada are predicted as a result of TMJ.

9 **11.2 FEDERAL AUTHORITY**

10 **11.2.1 CEAA 2012 5(2)(A)**

11 Section 5(2)(a) of CEAA 2012 refers to changes to the environment, other than those referred
12 to in Section 5(1) of CEAA 2012, that are directly linked or necessarily incidental to the exercise
13 of a power, performance of duty or function, or decision of a federal authority. Based on this,
14 TMJ may be required to obtain permits and authorizations from DFO, TC, and ECCC.

15 If approved, TMJ is expected to require a *Fisheries Act* authorization for the HADD of fish
16 habitat, which may affect wetlands and require wetlands offsetting. A Fish Habitat Offset Plan
17 would be required to offset effects and maintain the ongoing productivity of commercial,
18 recreational and Indigenous fisheries, and potential effects of the authorization would be
19 considered as part of the DFO permitting process.

20 There would not be an environmental effect from approvals under the *Canadian Navigable*
21 *Waters Protection Act* that is distinct from the effects of the construction and operations of
22 TMJ. TMJ may result in effects on navigation of commercial and non-commercial vessels. See
23 [Section 8.2](#) (Land and Marine Resource Use) for further details.

24 As described in [Section 2.2.5](#), Alternative Means of Undertaking the Project, TJLP intends to
25 identify a land-based location for the commercial use and/ or disposal of dredge material, if
26 TMJ receives an EAC. If an on-land site cannot be established, TJLP has indicated that the
27 disposal of dredge material at sea may be alternatively pursued if deemed economically and
28 logistically viable. In this case, TJLP would require a DAS Permit under the
29 Canadian Environmental Protection Act for TMJ.

30 TJLP identified that disposal of dredge material at sea would have the following potential
31 effects:

- 1 • Increase in TSS and turbidity and increase in contaminants;
- 2 • Mortality to fish and benthic invertebrates;
- 3 • Disturbance or loss of fish habitat;
- 4 • Effects on marine mammals due to interactions with disposal at sea vessels (injury or
- 5 mortality of marine mammals due to vessel strikes, effects from underwater noise,
- 6 uptake of contaminants during disposal);
- 7 • Increase in combustion emissions including GHG emissions from vessels;
- 8 • Disturbance to aquatic birds; and
- 9 • Temporary effects on navigation of commercial and non-commercial marine vessels.

10 A summary of federal authorizations and potential effects to the environment is contained in
 11 Table 31 below.

12 **Table 31: Summary of Federal Authorizations for TMJ**

Authorization	Relevant Federal Agency	Description of Need for Authorization and Potential Effects on the Environment
Authorizations Concerning Fish and Fish Habitat Protection Regulations	DFO	Construction and operations of TMJ have the potential to adversely affect fish and fish habitat. As a result, TMJ is expected to require ministerial authorization as detailed in Section 35(2)(b) of the <i>Fisheries Act</i> , which may affect wetlands and require wetlands offsetting. Wetlands offsetting would be under the <i>Fisheries Act</i> and authorized by DFO. Potential effects to wetlands from TMJ have been discussed and assessed in the Vegetation chapter (Section 5.8 of this Report).
Section 15(3) Approval(s) under the <i>Canadian Navigable Waters Act</i>	Transport Canada	The proposed construction and operations of the marine jetty infrastructure, and ancillary activities (including but not limited to dredging and fish habitat offset works, FTBB) being located on the Fraser River have the potential to obstruct/ impede on navigation and may need approvals under the <i>Canadian Navigable Waters Act</i> . Potential effects to navigation from TMJ have been discussed and assessed in the Land and Marine Use chapter (Section 8.2 of this Report).
Disposal at Sea Permit	ECCC	TMJ is expected remove a considerable volume of dredge material during construction. Substances listed in Schedule 5 of the <i>Canadian Environmental Protection Act</i> , including dredge material, have the potential to significantly affect marine environments if released. TMJ would be required to obtain a DAS Permit, in the event of disposal in a marine environment. Please see Part A (Section 2.2.5) for a discussion of potential effects from the various alternatives for dredge disposal.

13

1 11.2.2 CEAA 2012 5(2)(B)

2 Section 5(2)(b) of CEAA 2012 refers to changes that result in an effect on health,
3 socio-economic conditions, any structure, site or thing of historical, archaeological,
4 paleontological or architectural significance, or other matters of physical or cultural heritage
5 not already considered under paragraph 5(1)(c) that results from a federal power, duty or
6 function. As described above, a potential DAS Permit is the only potentially relevant exercise of
7 power or performance of duty or function by federal authority relevant to Section 5(2)(b) for
8 TMJ.

9 Activities associated with a DAS Permit could affect socio-economic conditions due to potential
10 effects on marine recreation or non-Indigenous fishing. Marine vessel movements for transport
11 of dredged sediments may temporarily affect navigation, area access and area use by
12 commercial and non-commercial marine vessels, or change the distribution and abundance of
13 marine mammals, coastal birds, harvestable fish and seafood species that could affect
14 commercial and recreational fish harvesting and guided sport fishing and marine tourism.

15 TJLP noted in the Application that Sand Heads and Point Grey are the closest disposal at sea
16 sites near TMJ and are being considered for dredge disposal for TMJ; however, a disposal
17 site would be selected in consultation with ECCC, DFO, affected Indigenous Groups and key
18 stakeholders as part of the DAS Permitting Process. Sand Heads and Point Grey are existing
19 marine disposal sites; therefore, the EAO considers that the use of these sites by TMJ would
20 have limited effects on the factors under 5(2)(b) (See [Table 34](#) in Appendix 3 of this Report).
21 The EAO, therefore, does not predict that significant adverse effects under Section 5(2)(b) of
22 CEAA 2012 would result from TMJ for either the Application scenario or the BVS.

23 11.3 HEALTH AND SOCIO-ECONOMIC CONDITIONS OF INDIGENOUS 24 PEOPLES

25 11.3.1 BACKGROUND

26 As required under the CEAA 2012 subparagraph 5(1)(c)(i), the potential environmental effects
27 of the TMJ on the health and socio-economic conditions of Indigenous peoples were evaluated
28 by TJLP.

29 The Application assessed potential effects on Indigenous health and socio-economic conditions
30 through the following VCs: Land and Marine Resource Use (Section 6.2 of the Application),
31 Visual Quality (Section 6.4 of the Application), Socio-community (Section 6.1 of the Application)

1 and Human Health (Section 8.8 of the Application). The Application assessed potential
2 TMJ-induced changes to air quality, water quality, noise levels, visual quality, and changes
3 affecting quality and accessibility of terrestrial and aquatic resources for FSC purposes. These
4 potential changes in environmental quality were then evaluated for potential corollary effects
5 to the human health and socio-economic conditions experienced by Indigenous Groups.

6 **MARINE SHIPPING ASSESSMENT**

7 The MSA assessed potential effects on Indigenous health and socio-economic conditions
8 through the following VCs: Marine Resource Use (Section 4.1 of the MSA), Visual Quality
9 (Section 4.3 of the MSA) and Human Health (Section 4.5 of the MSA). The MSA assessed
10 potential TMJ-related changes to navigational use and navigability, resource availability (of
11 marine mammals), daytime and nighttime viewing conditions, and air quality. These potential
12 changes in environmental quality were then evaluated for potential corollary effects to the
13 human health and socio-economic conditions experienced by Indigenous Groups.

14 **11.3.1.1 REGULATORY CONTEXT**

15 The assessment of project effects on the environment that may affect the health and socio-
16 economic conditions of Indigenous peoples is required under Section 5 (1) (c) (i) of CEAA 2012.

17 **11.3.1.2 BOUNDARIES**

18 In the Application and MSA, specific boundaries were not attributed for the assessment of
19 environmental effects of TMJ on the health and socio-economic conditions of Indigenous
20 peoples. For the assessment, the EAO considered the overlap of contributing VCs (such as Land
21 and Marine Resource Use, Visual Quality, Socio-Community, and Human Health) with each
22 Schedule B, Schedule C and Schedule D Indigenous Group's area of use for traditional purposes.

23 **11.3.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS IN THE** 24 **APPLICATION**

25 The Application relied on the assessment of the VCs that could result in effects to health and
26 socio-economic conditions of local Indigenous peoples. For a summary of TJLP's assessment of
27 the PCs, please refer to VC-specific sections of this Report: Human Health ([Section 6.1](#)), Socio-
28 community ([Section 8.1](#)), Land and Marine Resource Use ([Section 8.2](#)), and Visual Quality
29 ([Section 8.3](#)). TJLP's assessment concluded that residual and cumulative effects to 5(1)(c)
30 components were assessed to be not significant.

1 See also the Bunker Vessel Scenario Assessment sections in this Report which summarize TJLP's
2 assessment for the VCs listed above.

3 **11.3.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 4 **IDENTIFIED DURING APPLICATION REVIEW**

5 The following key issues related to the assessment of Health and Socio-economic Conditions of
6 Indigenous Peoples were identified during Application review.

7 During Application review, Cowichan Nation Alliance, Tsawwassen First Nation, Tsleil-Waututh
8 Nation raised concerns regarding VCs and pathways of effects associated with Indigenous
9 health and socio-economic conditions. The concerns are described in the assessments on
10 relevant PCs in this Report (as above in Section 11.3.2). The EAO received comments and
11 additional information from Indigenous Groups on the assessment of Indigenous health and
12 socio-economic conditions primarily during the Working Group review of the EAO's draft
13 Assessment Report. These comments have been summarized below.

14 Cowichan Nation Alliance raised concerns that Cowichan Nation Alliance community members
15 would experience heightened stress and an increase in anxiety as a result of fears associated
16 with the safety risk at the former Indigenous village site across the river from the TMJ site.
17 Cowichan Nation Alliance noted negative effects on the health and well-being of community
18 members due to uncertainty of potential accidents and safety and that the predicted likelihood
19 of accidents and malfunctions in TJLP's Application is not directly related to on the heightened
20 feeling of stress by affected community members.

21 During Application review, in response to Working Group comments, TJLP conducted
22 further detailed societal risk analyses to evaluate potential public safety risks from the
23 LNG loading operations and marine transit components of TMJ. Please refer to
24 Accidents and Malfunctions, [Section 9](#) of this Report, for more details about the risk
25 analyses conducted and TJLP's conclusions.

26 In the assessment of Accidents and Malfunction, the EAO considered the TMJ design, mitigation
27 measures, and Canada's marine safety system, requirements for shipowner/ operators to have
28 emergency response plans. The EAO proposes Condition 10: Construction Environmental
29 Management Plan and Condition 11: Operations Environmental Management Plan requiring
30 emergency and spill response mitigation, the EAO recommends KMMS under CEAA 2012 for an
31 Emergency Response Plan, Marine Shipping Emergency Response Outreach Program and
32 Marine Access and Transportation Plan. For more details on the EAO's conclusions on the risk of
33 potential accidents and malfunction, refer to [Section 9](#) of this Report. The EAO acknowledges

1 there is uncertainty about how community members may respond to the real and/ or perceived
2 uncertainty related to potential accidents or malfunctions and the feelings of stress by affected
3 community members and have considered this in the analysis in [Section 11.3.4](#).

4 Tsawwassen First Nation raised concerns that effects to Tsawwassen First Nation's ability to
5 practice their Treaty right to harvest and practice their stewardship would negatively affect
6 members' health and socio-economic conditions. In particular, Tsawwassen First Nation noted
7 that a reduction in access to traditional foods and medicines through a reduction in harvesting
8 access could result in effects to member's health and socio-economic conditions, including
9 those that are important to Tsawwassen's Indigenous economy. Tsawwassen First Nation also
10 noted that effects to harvesting also compromise knowledge transmission and cultural
11 continuity, which in turn harms both the health and socio-economic conditions of members.
12 Esquimalt First Nation, Pacheedaht First Nation, and Maa-nulth First Nations expressed
13 concerns about the cumulative effects of the marine shipping industry on their well-being.
14 Esquimalt First Nation stated that the signs of an already declining marine ecosystem and a
15 shifting economy on the West Coast are concerning for Esquimalt First Nation. Maa-nulth First
16 Nations stated that they are already experiencing stress from marine shipping projects and
17 view any further increase in large vessel traffic through the Maa-nulth Domestic Fishing Area as
18 significant.

19 TJLP reported that there would be no change to access of plant harvesting due to TMJ,
20 given that the TMJ site has been an industrially modified site for many years with low
21 availability of traditionally used plant species and limited access. TMJ confirmed that to
22 reduce potential shipping-related effects to Indigenous fishers during DFO fisheries
23 openings, TJLP would try to avoid FSC fishery openings and noted that the marine
24 communication plan would set out the protocols to communicate TMJ-related shipping
25 schedules. TJLP proposed a marine access and transportation plan at the site to
26 maintain commercial and non-commercial vessel navigation. TJLP also committed to
27 additional, on-going consultation with Indigenous Groups to minimize conflicts with
28 fishing windows and better identify methods of reducing effects from marine vessel
29 traffic.

30 The EAO notes that access to fishing, hunting, trapping and gathering practices, including from
31 marine vessel traffic, are assessed in Current Use of Lands and Resources for Traditional
32 Purposes ([Section 11.4](#)) and effects to Indigenous Groups are assessed in Part C of this Report.
33 To mitigate effects to access, the EAO recommends KMMs under CEAA 2012 for a Marine
34 Communication Plan and Marine Access and Transportation Plan. The EAO acknowledges
35 uncertainty related effects of TMJ on knowledge transmission and cultural continuity, and

1 views of Indigenous Groups on the potential for effects on the health and socio-economic
2 conditions of their members.

3 Tsawwassen First Nation also raised concerns regarding effects to the health of members and
4 their ability to exercise their Treaty rights in their traditional territory due to TMJ effects on air
5 quality, noise, and visual quality of the landscape and seascape in the area, and the potential
6 contamination of country foods such as berries. Tsawwassen First Nation's noted the
7 importance of the Indigenous perspective and experiences with respect to impediments to
8 harvesting practices and ability to transmit Tsawwassen First Nation's culture when faced with
9 industrial noise and perceptions of health risks.

10 TJLP concluded that adverse health effects are anticipated due to TMJ effects on air
11 quality under specific modeled conditions, and not expected due to TMJ effects on noise
12 and visual quality. TJLP did not identify constituents of potential concern in the baseline
13 soil data or the predicted soil quality (which include potential deposits from the air due
14 to TMJ). TJLP did not identify exposure pathways to humans through the ingestion of
15 berries, water or fish. TJLP also noted that TMJ would provide LNG for bunkering as fuel
16 for shipping in the region displacing oil-based fuels which has the potential of reducing
17 harmful emissions from existing shipping.

18 To mitigate effects to human health and the quality of experience of current use and cultural
19 heritage activities, the EAO proposes Condition 17: Indigenous Cultural Awareness, Recognition
20 and Mitigation, Condition 10: Construction Environmental Management Plan and Condition 11:
21 Operations Environmental Management Plan with noise and lighting management components,
22 and Condition 19: Air Quality Management Plan. The EAO also recommends KMM under CEAA
23 2012 for an Air Quality Management Plan. The EAO acknowledges Tsawwassen First Nation's
24 perspective and perceptions of contamination and health concerns.

25 Tsleil-Waututh Nation raised concerns that conventional HHRAs do not account for differences
26 in Indigenous and non-Indigenous consumption rates, and do not reflect the link between the
27 consumption of traditional foods such as shellfish, salmon and berries and Indigenous culture.
28 Tsleil-Waututh noted that eating lower amounts of fish and shellfish rather than the
29 subsistence amounts is a health risk and an emotional and spiritual loss related to traditional
30 activities, ceremonies and a sense of place and collective identity. Tsleil-Waututh Nation
31 explained that the lack of access to traditional food resources due to contamination, regulatory
32 restrictions or stock availability is detrimental to Tsleil-Waututh Nation's health.

33 TJLP did not identify exposure pathways through incidental soil ingestion or contact with
34 soil, or ingestion of berries or game. Considering mitigations, TJLP did not predict

1 residual effects to water quality; therefore, potential changes to fish quality resulting
2 from potential changes to water quality was not considered a primary pathway. TJLP
3 indicated that it is expected that mitigation measures to address potential effects on
4 instream access for FSC fish harvesting would be effective in addressing effects to
5 Indigenous Groups engaging in traditional activities within the LAA.

6 The EAO acknowledges that HHRAs do not capture certain aspects of Indigenous cultural
7 health, and do not assess the emotional and spiritual loss that Tsleil-Waututh members may
8 experience due to changes to access to traditional food resources and Indigenous perceptions
9 related to contamination of traditional foods.

10 **11.3.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

11 In undertaking the analysis of and drawing conclusions on CEAA 2012 5(1)(c)(i) requirements,
12 the EAO considered the information provided in the Application, MSA and BVSA, the comments
13 from Indigenous Groups and TJLP's responses, and additional information such as available
14 traditional use studies of Indigenous Groups. The EAO evaluated effects to socio-economic
15 components and effects to human health components as a result of TMJ-induced changes to
16 environmental quality. The EAO's conclusions apply to all Indigenous Groups listed on
17 Schedule B, C, and D of the Section 11 Order.

18 **Key Effects and Mitigations for Socio-Economic Components**

19 The EAO evaluated key potential effects to socio-economic components, including Socio-
20 Community ([Section 8.1](#)), Land and Marine Resource Use ([Section 8.2](#)), and Visual Quality
21 ([Section 8.3](#)) VCs, because of TMJ-induced changes to the environment. The EAO acknowledges
22 the potential for some Indigenous Groups and/ or individuals to be adversely affected by
23 incremental changes to the environment caused by intermittent transiting of TMJ-related
24 vessels and the support vessels (tugs) for LNG carriers for the Application scenario and BVS.
25 TMJ-related vessel traffic has the potential to interrupt Indigenous Group's access and
26 enjoyment of the marine environment ([Section 8.2](#), Land and Marine Resource Use and [Section](#)
27 [11.4](#), Current Use of Lands and Resources for Traditional Purposes) including FSC fishing,
28 Aboriginal and Treaty rights, commercial uses, intergenerational knowledge transfer and the
29 ability to practice rights in the preferred manner. TMJ-related vessel traffic has the potential to
30 affect the safety and perception of safety of Indigenous marine resource users. This effect could
31 occur from the TMJ jetty, out to Sand Heads, and out into the waters of the Salish Sea.

32 The EAO notes compliance with maritime regulations and legislation, and timing construction
33 and operations activities to avoid commercial and non-commercial salmon fishery openings

1 would reduce conflicts with TMJ vessels and Indigenous marine users. These measures are
2 likely to mitigate potential effects to Land and Marine Resource Use and Current Use of Lands
3 and Resources for Traditional Purposes VCs to a certain degree.

4 The EAO recommends a KMM under CEAA 2012 (Appendix 1) for a Marine Access and
5 Transportation Plan in the Lower Fraser which would include mitigations to reduce disruptions
6 caused by construction and operations for commercial and non-commercial marine users. TJLP
7 would also be required to identify, in consultation with Indigenous Groups and DFO via publicly
8 accessible information on recently issued DFO licences, fishing licenses and other Indigenous
9 traditional uses. TJLP would also be required to develop measures to mitigate effects on
10 Indigenous traditional use activities, including LNG carrier call scheduling that accounts for and
11 attempts to reduce LNG carrier calls during the anticipated timing window for Indigenous
12 fishers operating under DFO fishing licenses. TJLP would also synchronize bunker vessels
13 arrivals at and departures from the jetty with regularly scheduled marine traffic (not associated
14 with TMJ) when Indigenous fishers are operating under DFO fishing licenses. TJLP would be
15 required to provide opportunities to Indigenous Monitors to participate in monitoring during
16 FSC fisheries windows to determine the effectiveness of the mitigation. The Marine Access and
17 Transportation KMM includes a follow-up program pertaining to adverse effects on Current Use
18 of Lands and Resources for Traditional Purposes. The EAO also recommends a Marine
19 Communication Plan as a KMM under CEAA 2012 which would identify the procedures to notify
20 Indigenous Groups and other Marine Users of planned activities associated with TMJ as well as
21 a means by which Indigenous groups and other marine users can provide feedback to TMJ on
22 adverse effects related to navigation as a result of TMJ activities.

23 The EAO also acknowledges that TMJ is anticipated to have positive effects to the Economy VC
24 ([Section 8.4](#), Economy) which would have a positive effect on income, employment and
25 working conditions for Indigenous people. This positive effect was considered a benefit to
26 community health and well-being. The EAO proposes Condition 16: Indigenous Training,
27 Employment and Procurement Plan, which would be developed in consultation with Indigenous
28 Groups (Schedule B) and include measures to support the procurement of goods and services
29 from businesses owned by Indigenous Groups and to provide training opportunities for
30 Indigenous monitors and enhance the hiring and retention of Indigenous Groups and their
31 members. The EAO also proposes Condition 9: Indigenous Monitors and recommends a KMM
32 under CEAA 2012 for Indigenous Monitors to determine opportunities for Indigenous Group
33 (Schedule B) participation in the implementation of all required monitoring, including how TJLP
34 would support participation by providing training and equipment.

1 In consideration of the views of Indigenous Groups concerning access to fish and traditional
2 foods and medicine, including those important to Indigenous economy, the EAO concludes that
3 there would be a predicted residual effect to Indigenous socio-economic conditions from TMJ,
4 which is likely to interact with existing and foreseeable future projects. Considering the EAO's
5 proposed provincial conditions and recommended KMMs under CEAA 2012, and the
6 conclusions related to the VC's described above, the EAO concludes that residual and
7 cumulative effects are unlikely to be significant for the Application scenario and BVS. The EAO
8 acknowledges that views of Indigenous Groups and the assessment of impacts on access to fish
9 and traditional foods and medicine are discussed in Current Use (Section 11.4) and Part C
10 sections of this Report.

11

12 **Key Effects and Mitigation Measures for Indigenous Health**

13 The EAO evaluated key potential effects to components of Indigenous health due to changes
14 from TMJ to the environment. Below is a summary of the EAO's conclusions on key Indigenous
15 health effects pathways reported in this Report for the Application scenario and BVS:

16 • **Noise (Section 6.2):** The EAO concludes that there would be negligible to low effects to
17 noise during construction and decommissioning at the TMJ site.

18 • **Nighttime Light (Section 8.3):** The EAO concludes that there would be negligible effects
19 to nighttime viewing. TMJ light sources associated with construction are likely to be
20 indistinguishable from background/ existing light sources. During operations, new light
21 sources would be introduced from prominent navigational and floodlighting of the
22 marine jetty and the navigational lighting TMJ-related vessels. While these light sources
23 may appear prominent within the existing lighting conditions, which currently has a
24 range of direct light sources and ambient lighting, it is anticipated that they would have
25 no effect on the existing level of brightness locally and regionally.

26 • **Visual quality (daytime viewing) (Section 8.3):** The EAO concludes that there would be
27 negligible to low effects to daytime viewing. TMJ would result in noticeable presence of
28 visible TMJ components and marine vessel movements but is not expected to change
29 the visual character of the landscape. Given the existing landscape conditions around
30 the TMJ site, including marine industrial infrastructure and activity along the Fraser
31 River, TMJ would minimally disrupt user experience. In the MSA, users would have
32 temporary visibility of vessels while transiting through the LAA, however, these effects
33 are considered negligible as a result of the small number of TMJ associated vessels (up
34 to two to three per week for the Application scenario) and compliance with both
35 Maritime Regulations and Legislation, and Regulations related to required navigational

1 lighting.

2 • **Air Quality (Section 5.1) and Human Health (Section 6.1):** The EAO concluded that
3 there would be low-moderate residual effects to Human Health as a result of change in
4 Air Quality. Proposed provincial conditions and the EAO's recommended KMMs under
5 CEAA 2012 for air quality also apply to human health:

6 ○ Condition 19: Air Quality Management Plan (provincial condition) and Air Quality
7 Management Plan (KMM) with best management practices to mitigate effects to
8 air quality.

9 • **Community Health and Well-being (Section 8.1):** The EAO concludes that there would
10 be negligible effects to Community Health and Well-being (subcomponent that
11 addresses social determinants of health).

12 • **Current use and consumption of land and marine resources (including FSC, country
13 foods [fish, wildlife, and vegetation], and commercial harvest) (Section 11.4):** The EAO
14 concludes that there would be negligible to low effects on Land and Marine Resource
15 Use (Section 8.2), and negligible to moderate effects to Current Use of Lands for
16 Traditional Purposes (Section 11.4). The potential effects to land and marine use, as
17 outlined above, are likely negligible to low. Additionally, the EAO predicts a low
18 magnitude of effects to fish, negligible effects to traditional use plants, and negligible to
19 low effects to wildlife from TMJ. The EAO did not predict and residual effects to fish in
20 the MSA and predicted negligible to low residual effects to marine birds in the MSA. The
21 EAO's recommended KMM under CEAA 2012 include:

22 ○ Marine Access and Transportation Plan (KMM); and

23 ○ Marine Communications Plan (KMM).

24 The EAO has concluded on the pathways of effects (noise, night time light, visual quality, air
25 quality, and consumption of FSC resources) for Indigenous Health in other sections of this
26 Report. These pathway effects are assessed in the Air Quality (Section 5.1), Vessel Wake
27 (Section 5.4), Fish and Fish Habitat (Section 5.6), Vegetation (Section 5.8), Wildlife and Wildlife
28 Habitat (Section 5.9), Human Health (Section 6.1), Noise (Section 6.2), Visual Quality (Section
29 8.3), and Current Use of Lands and Resources for Traditional Purposes (Section 11.4).

30 In consideration of the views of Indigenous Groups on the potential risk of accident or
31 malfunction, real and/ or perceived health risks associated with air, noise, visual disturbance
32 and consumption of country foods, knowledge transmission, cultural continuity, and cultural

1 health, the EAO concludes that there would be a predicted residual effect to Indigenous health
2 and well-being from TMJ, which is likely to interact with existing and foreseeable future
3 projects. Considering the EAO's proposed provincial conditions and recommended KMMs under
4 CEAA 2012, and the conclusions related to the VC's described above, the EAO concludes that
5 residual and cumulative effects are unlikely to be significant for the Application scenario and
6 BVS. The EAO acknowledges that views of Indigenous Groups and the assessment of impacts on
7 knowledge transmission, cultural continuity and cultural health are discussed in Current Use
8 (Section 11.4) and Part C sections of this Report.

9 **11.3.5 CONCLUSION**

10 The EAO has considered the above analysis, including the significance determinations for the
11 pathways of effects above, proposed conditions in the TOC (which would become legally
12 binding if an EAC is issued), and the recommended KMMs under CEAA 2012 (Appendix 1). The
13 EAO is satisfied that TMJ is not likely to result in significant adverse residual or cumulative
14 effects to the health and socio-economic conditions of Indigenous Groups due to changes to
15 the environment from TMJ.

16 **11.4 CURRENT USE OF LANDS AND RESOURCES FOR TRADITIONAL** 17 **PURPOSES AND CULTURAL HERITAGE**

18 This chapter assesses potential effects to the Current Use of Lands and Resources by Indigenous
19 Peoples for Traditional Purposes ("Current Use") VC and as required under the CEAA 2012
20 Section 5(1)(c)(iii) (see Sections 9.2.3.3 and 9.3.1.3 of the Application). This chapter also
21 assesses potential effects to Cultural Heritage¹³⁵ [a component of c), Section 11.2.3.3 of the
22 Application].

23 In the assessment of effects to Current Use [CEAA 5(1)(c)(iii)] and Cultural Heritage [CEAA
24 5(1)(c)(ii)], the EAO considered the effects of potential TMJ induced changes to the
25 environment on access to activities and sites, the availability and quality of harvested
26 resources, and the quality of experience for fishing, hunting, trapping, and gathering. The EAO

¹³⁵ The use of the lands and resources by Aboriginal peoples may have tangible values (e.g., wildlife species or traditional plants) and/ or intangible values (e.g., quiet enjoyment of the landscape or sites used for teachings). Intangible values are often linked with spiritual, artistic, aesthetic and educational elements that are often associated with the identity of Aboriginal groups (CEAA 2012 <https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/technical-guidance-assessing-current-use-lands-resources-traditional-purposes-under-ceaa-2012.html>).

1 also considered potential TMJ-induced changes to other traditional and cultural uses of
2 resources and the area. Effects on Aboriginal Interests and Treaty Rights are assessed for each
3 individual Indigenous Group and for each category of rights in Part C of this Report.

4 This chapter does not include the evaluation of effects to commercial fishing and other
5 economic opportunities related to commercial harvesting. These topics are addressed in the
6 Land and Marine Resource Use chapter ([Section 8.2](#)) of this Report. Physical Heritage under
7 Section 5(1)(c)(ii) of CEAA 2012 is assessed in Heritage Resources ([Section 7.1](#)) of this Report.

8 **11.4.1 BACKGROUND**

9 Current Use and Cultural Heritage were identified for assessment due to their importance to
10 Indigenous Groups and due to their regulatory importance under CEAA 2012. The Application
11 assessed potential TMJ-related effects on Current Use and Cultural Heritage based on
12 information from Indigenous Groups related to harvesting, the experience of land and aquatic
13 use and sites, and landforms and natural features associated with cultural or spiritual use using
14 the following four indicators:

- 15 • **Access to preferred locations** for harvesting marine resources including access to
16 cultural, sacred and spiritual locations;
- 17 • **Availability of preferred resources** including abundance and distribution of wildlife, fish,
18 marine and plant resources available for harvesting;
- 19 • **Quality of preferred resources** including changes in the real or perceived quality of
20 traditional resources; and
- 21 • **Quality of experience** when accessing areas for current use including sensory
22 experience (changes to noise, visual quality, and air quality).

23 The Application assessed the potential for effects to Current Use and Cultural Heritage based
24 on both publicly available and confidential documents provided to TJLP ([see Section 11.4.2.1](#)
25 below). TJLP also considered the results of their engagement meetings with the Indigenous
26 Groups in their summary of effects and conclusions on effects to Current Use.

27 The EAO acknowledges that Musqueam Indian Band has proven Aboriginal rights within their
28 territory, which are protected under Section 35 of the *Constitution Act*, 1982.

29 The Tsawwassen First Nation have Treaty Rights recognized and affirmed by Section 35 of the
30 *Constitution Act*, 1982. Tsawwassen First Nation entered into the Tsawwassen First Nation Final
31 Agreement (“Tsawwassen Final Agreement”) with Canada and B.C. which was negotiated under
32 the BC Treaty Commission and came into effect on April 3, 2009. The Tsawwassen Final
33 Agreement established a new government-to-government relationship based on mutual

1 respect, providing the basis for reconciliation between Tsawwassen First Nation and the Crown.
2 The Tsawwassen Final Agreement also sets out Tsawwassen First Nation rights to harvest
3 wildlife, migratory birds, fish and aquatic plants for food, social, and ceremonial purposes
4 within designated areas and Tsawwassen Territory.

5 Maa-nulth First Nations entered into the Maa-nulth First Nations Final Agreement (Maa-nulth
6 Final Agreement), a modern comprehensive agreement concluded with Canada and B.C. under
7 the BC Treaty Commission process that took effect April 1, 2011. The Final Agreement outlines
8 the Section 35 rights of each of the five Maa-nulth First Nations, including the right to harvest
9 fish and aquatic plants (including intertidal bivalves), for FSC purposes in the Maa-nulth
10 Domestic Fishing Areas. Maa-nulth First Nations are comprised of Huu-ay-aht First Nations,
11 Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations, Toquaht Nation, Uchucklesaht Tribe, and
12 Yuułu?if?ath Government.

13 **MARINE SHIPPING ASSESSMENT**

14 TJLP assessed an expanded scope of potential effects of marine shipping on Current Use and
15 Cultural Heritage. The PCs for the original Application area (that is, jetty to Sand Heads) were
16 applied to the shipping route (see Boundaries, Section 11.4.1.2 below).

17 **11.4.1.1 REGULATORY CONTEXT**

18 Current Use is a factor identified under subsection 5(1)(c)(iii) of CEAA 2012 as project
19 components and activities have the potential to adversely affect the current and future use of
20 locations and resources that support traditional diets, social and spiritual life, governance and
21 cultural transmission. Cultural heritage is identified under CEAA 2012 5(1)(c)(ii), and can also be
22 related to the effects on Current Use noted above.

23 Other regulations pertinent to the understanding of the assessment of effects to Current Use
24 are outlined in the Land and Marine Resource Use chapter ([Section 8.2](#)) of this Report.

25 **11.4.1.2 BOUNDARIES**

26 The LAA and the RAA for the original Application area (that is, jetty to Sand Heads)
27 corresponded to the overlap of contributing VCs (such as Fish and Fish Habitat, Marine
28 Mammals, Noise, Vegetation, Wildlife and Wildlife Habitat, Visual Quality, Heritage Resources,
29 and Land and Marine Resource Use) with each Schedule B and Schedule C Indigenous Group's
30 area of use for traditional purposes. Cumulative effects were assessed according to the LAA/
31 RAA boundaries for each Schedule B and Schedule C Indigenous Group. There is no single figure
32 that illustrates the LAA and RAA since the assessment area for Current Use is unique for each
33 Indigenous Group based in part on Indigenous Group traditional territories.

1 **MARINE SHIPPING ASSESSMENT**

2 Potential effects of TMJ-related shipping were assessed between the Sand Heads and the
3 12 nm limit (see Figure 2 in [Section 2.2.3](#) of Part A). For the assessment of effects to Current
4 Use, the MSA Local Study Area (LSA) and the MSA RSA corresponded to each Schedule B,
5 Schedule C, and Schedule D Indigenous Group's asserted or established traditional territories,
6 or otherwise defined areas used for traditional purposes. Cumulative effects were assessed
7 according to the MSA LSA/ MSA RSA boundaries.

8 The MSA LSA and MSA RSA, as it pertains to each Indigenous Group's traditional territory, were
9 outlined in the MSA where publicly available or provided by the Indigenous Group. There is no
10 single figure that illustrates the MSA LSA and MSA RSA since the assessment area for Current
11 Use is unique for each Indigenous Group based in part on Indigenous Group traditional
12 territories.

13 **11.4.2 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATION MEASURES** 14 **IN THE APPLICATION**

15 **11.4.2.1 BASELINE INFORMATION**

16 TJLP reviewed TMJ-specific studies, traditional use and knowledge and other studies submitted
17 by Indigenous Groups, TJLP's consultation records, treaty-related documents, legal decisions,
18 and other relevant documents to determine existing conditions for the Current Use VC. TJLP
19 assessed MSA-related effects to Current Use by augmenting TMJ-specific information with
20 information submitted for the TMX EA and the federal RBT2 panel process and hearings. The
21 following sections discuss both the original Application area (that is, jetty to Sand Heads) and
22 the MSA.

23 The EAO notes that during Application review, Tsawwassen First Nation identified errors in the
24 Application from misrepresented information relayed from Tsawwassen First Nation reports,
25 inconsistencies with language from the Tsawwassen Final Agreement, and updated fisheries
26 information and report references in both the Land and Marine Resource Use and Current Use
27 sections of the Application. Tsawwassen First Nation drafted an erratum, which TJLP issued, to
28 capture the corrected information. The EAO added Snuneymuxw First Nation to [Schedule B of](#)
29 [the Section 11 order](#) on January 19, 2022. The Application did not provide a summary of
30 Snuneymuxw First Nation fishing and resource use practice; however, the EAO has reflected
31 information provided by Snuneymuxw First Nation or information included in TJLP's BVSA in the
32 summaries below.

33

1 Fishing

2 The Application noted that fishing for food, social, and ceremonial (FSC) purposes by Indigenous
3 Groups is regulated and takes place during fisheries openings authorized by DFO. Indigenous
4 fishers also fish under commercial and recreational fishing licences administered by DFO.
5 Currently, members of Musqueam Indian Band hold DFO authorizations for FSC fisheries in the
6 Fraser River near and within the TMJ site and have indicated that this is a preferred fishing
7 location. Tsawwassen First Nation members have the right to fish within the Fraser River and
8 within the TMJ site, in the Tsawwassen Fishing Area¹³⁶ as outlined in the
9 Tsawwassen First Nation Final Agreement. Tsleil-Waututh Nation holds DFO authorizations for
10 FSC fisheries in the Fraser River and into the Salish Sea (i.e., approaches to the Fraser River),
11 and have informed the EAO that Tsleil-Waututh peoples fish in the Fraser River and to the have
12 intentions to fish there in the future. Tsleil-Waututh Nation also have access to fisheries in the
13 Fraser River for traditional purposes through means other than FSC licenses (e.g., through
14 cultural protocols). Cowichan Nation Alliance¹³⁷ has informed the EAO that its member Nations
15 have intermittent, one-off DFO authorizations for FSC fishing within the Fraser River; however,
16 the EAO understands that Cowichan Nation Alliance is consulting with DFO on establishing a
17 long term FSC license for this area as they wish to re-establish regular fishing in the Lower
18 Fraser.

19 In the BVSA, TJLP noted that they had not received information about locations for ongoing use
20 of the Fraser River, FSC fishing, or other cultural uses from Snuneymuxw First Nation. The EAO
21 understands that Snuneymuxw First Nation has interests in the lower Fraser River and asserts
22 rights specific to stewardship of fishing villages, land, and waters, which is captured in more
23 detail in Part C of this Report. The EAO is aware that Snuneymuxw First Nation's former village
24 site is located near the confluence of the Pitt and Fraser Rivers east of Barnston Island, and
25 Snuneymuxw also used one or more seasonal fishing camps on Lulu Island (located across the
26 river from TMJ's proposed marine terminal area). The EAO also understands that Snuneymuxw

¹³⁶ The Tsawwassen Fishing Area includes Boundary Bay, the lower reaches of the Fraser River, and roughly out to the "elbow" of the USA Canada marine border. This area is covered by the Original Application area and segments A-1 and A of the MSA area.

¹³⁷ Cowichan Nation Alliance represents Cowichan Tribes, Halalt First Nation, Stz'uminus First Nation, and Penelakut Tribe. Cowichan Nation Alliance informed the EAO that some of their communities had been authorized by DFO to fish the Fraser River in 2018 and 2019 on a one-off basis.¹³⁸ The Stó:lō communities or Nations include: Aitchelitz Indian Band, Leq'a:mel First Nation, Matsqui First Nation, Popkum First Nation, Skawahlook First Nation, Skowkale First Nation, Shxwhá:y Village, Squiala First Nation, Sumas First Nation, Tzeachten First Nation and Yakweakwioose First Nation.

1 First Nation have and continue to use the southern Salish Sea between Nanaimo and the Lower
2 Mainland for fishing and transportation to its fisheries in the Fraser River.

3 Ts'uubaa-asatx Nation (formerly Lake Cowichan First Nation), Lyackson First Nation and
4 Squamish Nation, indicated their desire to fish within the Fraser River in the future. Kwantlen
5 First Nation members continue to fish for FSC purposes in the Fraser River from north of the
6 Pattullo Bridge up towards Mission. These groups indicated that they aspire to fish or continue
7 to fish on a more regular basis in the Fraser River, but their efforts are limited due to regulatory
8 restrictions including limited FSC licenses and short notices and openings for commercial
9 fisheries windows.

10 Katzie First Nation, Métis Nation B.C., Stó:lō Nation and Stó:lō Tribal Council¹³⁸, Indigenous
11 Groups on Schedule C of the Section 11 Order, have indicated use, including fishing, in the
12 Fraser River. Katzie First Nations reports that fishing occurs upstream of the Port Mann Bridge.
13 Stó:lō communities report that fishing by Stó:lō members occurs in the Fraser River but not
14 below the Port Mann Bridge. Métis Nation B.C. have indicated that land use mapping data
15 shows Métis Nation B.C. use the TMJ area and shipping area for harvesting fish.

16 For the MSA area, TJLP provided contextual information regarding the known Current Use areas
17 for each Schedule B and Schedule D Indigenous Groups. Tsawwassen First Nation members
18 have the right to harvest intertidal bivalves in the MSA area, in the Tsawwassen Intertidal
19 Bivalve Fishing Area¹³⁹ as outlined in the Tsawwassen First Nation Final Agreement. Tsleil-
20 Waututh Nation reported that they obtain the bulk of their FSC crab from the Tsawwassen
21 area, adjacent to Roberts Bank and the Tsawwassen Ferry Terminal. Musqueam Indian Band
22 report a growing reliance on crab and prawn for FSC purposes, but also harvest other shellfish
23 and invertebrate species from marine areas in the MSA area. The EAO understands that
24 Snuneymuxw First Nation currently fish in the Salish Sea, primarily harvesting sockeye and
25 halibut under FSC licences, and also rely on commercial fisheries and shellfish aquaculture.

26 According to the available information, all Indigenous Groups on Schedule D directly or
27 indirectly use the Salish Sea and adjacent lands to undertake traditional fishing activities that
28 represent their Current Use of the area. The MSA area overlaps with the southern portion of

¹³⁸ The Stó:lō communities or Nations include: Aitchelitz Indian Band, Leq'a:mel First Nation, Matsqui First Nation, Popkum First Nation, Skawahlook First Nation, Skowkale First Nation, Shxwhá:y Village, Squiala First Nation, Sumas First Nation, Tzeachten First Nation and Yakweakwioose First Nation.

¹³⁹ The Tsawwassen Intertidal Bivalve Area is composed of the shores of Galiano, Mayne, Saturna, and Tumbo Islands which are within Segments A & B of the MSA area.

1 the Maa-nulth First Nations domestic fishing area, as outlined in the Maa-nulth First Nations
2 Final Agreement ¹⁴⁰, and Ditidaht and Pacheedaht First Nations' traditional territories. Ditidaht
3 First Nation and Pacheedaht First Nation stressed the importance of Swiftsure Bank as a key
4 fishing site and that they are concerned about effects to fishing from the shipping lanes as the
5 lanes overlap Swiftsure Bank along its southern limits. In accordance with the Maa-nulth First
6 Nations Treaty, Maa-nulth First Nations¹⁴¹ has an allocation of Fraser River sockeye salmon that
7 may be harvested within their domestic fishing area. Beyond the Maa-nulth Domestic Fishing
8 Areas, Maa-nulth Harvesting of the Maa-nulth Fish Allocation for sockeye salmon may occur, as
9 outlined in the Maa-nulth Fisheries Operational Guidelines, consistent with the Final
10 Agreement, and in accordance with the Fraser Sockeye Salmon Workplan.

11 **Hunting, Trapping, and Gathering**

12 The Application did not identify any Current Use by Indigenous Groups of the TMJ site for
13 hunting, trapping or gathering purposes. The EAO understands that the TMJ site does not
14 contain any known plant gathering areas and, as TMJ is located on fee simple land where
15 hunting and trapping activities are not permitted.

16 Tsawwassen First Nation's Wildlife and Migratory Bird Harvest Areas¹⁴², as per the Tsawwassen
17 Final Agreement, overlap the TMJ site. Kwantlen First Nation, Tsleil-Waututh Nation and
18 Ts'uubaa-asatx Nation have identified their desire to regain or increase hunting, trapping and
19 gathering activities in and along the Fraser River and nearby locations. The Maa-nulth First
20 Nations have the right to harvest wildlife and migratory birds within the Wildlife Harvest Areas
21 and Migratory Bird Harvest Areas as identified in the Maa-nulth Final Agreement. Two of the
22 Maa-nulth Bird and Wildlife Harvest Areas are adjacent to, but do not overlap with, a small part
23 of the MSA area.

24 The MSA identified hunting areas along the shipping route that were highlighted by Musqueam
25 Indian Band, Quw'utsun Nation⁷¹, Tsawout First Nation, Tsleil-Waututh Nation, and Tsartlip First
26 Nation. The MSA noted that concerns regarding potential effects to the ability to access these

¹⁴⁰ <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/consulting-with-first-nations/first-nations-negotiations/first-nations-a-z-listing/maa-nulth-first-nations>

¹⁴¹ The Maa-nulth First Nations represents Huu-ay-aht First Nations, Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations, Toquaht Nation, Uchucklesaht Tribe, and the Ucluelet First Nation.

¹⁴² Harvesting under the Tsawwassen Final Agreement is limited by measures necessary for conservation, public health, or public safety.

1 areas to hunt waterfowl, as well as access to islands where deer are harvested were raised by
2 these Indigenous Groups.

3 **Other Traditional and Cultural Uses and Cultural Heritage**

4 Indigenous Groups expressed an important historical connection to, and continued desired use
5 of, known sites and places near the TMJ site and throughout the Salish Sea that are important
6 for a range of cultural purposes including cultural continuity and revitalization.

7 TMJ would be located across the Fraser River from a former Indigenous village site
8 (approximately 300 m north of the TMJ site boundary, see Figure 20). The former Indigenous
9 village site was identified by the Cowichan Nation Alliance, Tsawwassen First Nation, Kwantlen
10 First Nation, Musqueam Indian Band, Tsleil-Waututh Nation, and Snuneymuxw First Nation as
11 an important traditional resource gathering area (plant harvesting and fishing), a former
12 habitation site, a boat landing place, and also a place of spiritual and cultural value. The
13 Tsawwassen Final Agreement identifies additional cultural and historic sites of significance to
14 Tsawwassen First Nation to be designated as provincial heritage sites, including:

- 15 • *Skwəkwəwqən* or Poplar Island (identified as DhRr-000 or “not registered”), which is in
16 the North Arm of the Fraser River; and
- 17 • *xwlic’əm* (identified as DgRs-35), which is located downstream of TMJ at Brunswick Point
18 on Canoe Pass.

19 Some Indigenous Groups identified that there is an overlap between the MSA RSA and
20 important cultural and sacred sites; Indigenous Group-specific information can be found in Part
21 C of this Report. Indigenous Groups also expressed the importance of annual long-distance
22 canoe journeys in the MSA area, including crossing shipping lanes, to maintain and exchange
23 cultures, identities, kinship, and inter-generational teachings.

24 Many Indigenous Groups stressed the importance of the SRKW as being a cultural keystone
25 species critical for cultural continuity and transmission of culture to younger generations. The
26 EAO understands that SRKW play an important role in the spiritual universe of some Indigenous
27 Groups as evidenced in their depictions in visual art, stories, and songs, and in their role in
28 depicting kin relations. Some Indigenous Groups describe the orca as their relatives. The EAO
29 understands that many Indigenous Groups are concerned that TMJ could affect their sacred
30 relationship with SRKW through acoustic effects to critical habitat and cumulative effects and
31 that effects to SRKW populations could have effects on the balance of the ecosystem. The
32 EAO’s evaluation of biophysical effects to SRKW are included in the Marine Mammals chapter
33 ([Section 5.7](#)) of this Report and informed the EAO’s conclusions on effects to Other Traditional
34 and Cultural Uses that contribute to Current Use outlined below.

1 11.4.2.2 POTENTIAL PROJECT EFFECTS

2 The Application evaluated potential adverse effects from construction and operations activities
3 on Indigenous Current Use and Cultural Heritage. For the assessment on Current Use, the
4 Application predicted no adverse residual effects on the availability of preferred resources,
5 quality of preferred resources, quality of current use experience when accessing areas for
6 harvesting and cultural practices.

7 TJLP's BVSA considered how the increase in bunker vessel traffic would change TJLP's effects
8 assessment compared to the Application. TJLP also considered additional information provided
9 by Indigenous Groups subsequent to the Application submission and through ongoing
10 consultation with Indigenous Groups on the proposed additional bunker vessel traffic.

11 **Effects on Access to Fishing**

12 TJLP found that there is potential for reduced access to fishing for Indigenous fishers during
13 construction, operations and decommissioning, within and adjacent to the TMJ marine jetty
14 area and due to TMJ-related vessels in transit. The Application found that reduced access to
15 fishing would be due to transportation and marine shipping in the Fraser River and MSA,
16 dredging activities, onshore construction and the approximately 20 ha marine safety zone¹⁴³,
17 which would be in effect while TMJ-related vessels are at berth. FSC fishing on the Fraser River
18 is regulated and takes place during fisheries openings authorized by DFO.

19 The Application noted that 14,336 vessels transited past the TMJ site from July 2010 – June
20 2011 (estimated traffic in 2018 was not expected to grow substantially). In 2022, TJLP provided
21 updated vessel traffic predictions for the Southern Arm of the Fraser River. TJLP noted that
22 TMJ-related LNG carriers could comprise up to an estimated 4.1% percent of all large vessel
23 traffic and up to an estimated 5.2% for bunker vessel-sized vessel traffic transiting the Southern
24 Arm of the Fraser River, for the Application scenario and BVS.

25 In the MSA, TJLP anticipates that TMJ-associated vessels in the MSA area would represent an
26 increase of 0.5 percent in Segment A¹⁴⁴ (from a baseline of 49,717), a 0.2 percent increase in

¹⁴³ In the Application, TJLP proposed a "marine safety exclusion zone"/ "marine security zone". During Application review, TJLP proposed a revised, protocol-based approach to ensure public safety and a spatially defined zone is no longer proposed by TJLP. Please refer to Section 8.2.3 and Section 9.3 of this Report for more details. The term "marine safety exclusion zone" is used in Section 11.4.2 of this Report, consistent with the Application.

¹⁴⁴ Please see Figure 16 in the Land and Marine Use [Section 8.2](#) of this Report for the MSA area segments.

1 Segment B (from a baseline of 45,435), and a 1.1 percent increase in Segments C and D (from a
2 baseline of 43,673) of the total vessel movements relative to existing conditions.

3 In the Application and MSA, TJLP concluded that after mitigations, including communicating
4 TMJ-related vessel shipping schedules, potential effects to access to fishing sites in the Fraser
5 River and MSA area would be negligible for all Indigenous Groups within Schedules B and D. In
6 concluding this, TJLP noted that Indigenous fishers would consider the restrictions within the
7 shipping lanes in their decisions on where to fish. TJLP concluded that given the relatively low
8 frequency of regular TMJ-related vessel transits, interactions with Indigenous fishers would be
9 infrequent.

10 In the Application, TJLP concluded that that access effects could be experienced by Musqueam
11 Indian Band and Tsawwassen First Nation. TJLP concluded there would be no interaction for
12 other Schedule B Indigenous Groups in the TMJ area. After mitigations including
13 communicating TMJ-related vessel shipping schedules, potential effects to access to fishing
14 sites in the Fraser River would be low in magnitude for Musqueam Indian Band and
15 Tsawwassen.

16 In the MSA, TJLP concluded that area would be negligible for all Indigenous Groups within
17 Schedules B and D. In concluding this, TJLP noted that Indigenous fishers would consider the
18 restrictions within the shipping lanes in their decisions on where to fish. TJLP concluded that
19 given the relatively low frequency of TMJ-related vessel transits, interactions with Indigenous
20 fishers would be infrequent. TJLP noted in the MSA that the public record for TMX and RBT2
21 indicated that Esquimalt First Nation, Scia'new First Nation, and T'Sou-ke First Nation had
22 requested that their information not be reproduced for subsequent assessments. As well, the
23 MSA noted that Malahat First Nation did not make information available to TJLP to assess
24 access to Current Use locations. As such, TJLP did not complete an assessment of effects to
25 access for these Indigenous Groups.

26 **Bunker Vessel Scenario**

27 In the BVSA, TJLP stated that although a greater number of vessels would call to TMJ compared
28 to what was assessed in the Application, the bunker vessels would not require the same
29 amount of time to berth and de berth. The bunker vessels would be self-propelled and more
30 maneuverable resulting in less time obstructing the navigational channel and other portions of
31 the river. As the potential interaction with Indigenous vessel access and use around the TMJ
32 site would occur more frequently, but for shorter periods of time compared to the scenario
33 presented in the Application, TJLP concluded effects from additional bunker vessel traffic are
34 expected to be consistent with the findings of the Application.

1 Further, TJLP noted that because bunker vessels are smaller and more maneuverable than LNG
2 carriers, the bunker vessels would therefore be associated with comparably fewer safety
3 concerns due to the smaller size of the bunker vessels and reduced spatial and temporal
4 disruption to Indigenous fishing vessels.

5 As assessed in the BVSA, the overall number of vessel movements for the BVS would increase
6 to an average of one vessel call to TMJ per day (or two vessel movements each day) and the
7 potential for Indigenous FSC harvesters to remove their nets to allow TMJ-related vessels to
8 transit through the shipping lane may increase from what was assessed in the Application.
9 While this increases the likelihood of a FSC harvester being required to move nets to allow for
10 TMJ-related vessel to transit through the shipping lane, as required under the Collision
11 Regulations, TJLP stated that this would only occur during FSC harvesting openings. TJLP
12 pointed to the implementation of the proposed new mitigation measure (see Section 11.4.2.3
13 below) to synchronize movement of bunker vessels with existing marine traffic including
14 Indigenous fishers is expected to reduce the frequency of this interaction. TJLP noted that
15 bunker vessels have more flexibility in their movement schedule relative to the larger LNG
16 carriers, as they are not reliant on tidal cycles and that there would be fewer accompanying
17 vessels as no tug assist would be required for the bunker vessels. TJLP concluded that the
18 residual effect would be throughout the operational phase of TMJ, continuous as it could occur
19 more than once per week during FSC harvesting periods, and reversible. TJLP concluded that
20 the residual effects has a high likelihood of occurring due to the daily potential for interaction.
21 TJLP noted the interaction is already occurring in the highly industrialized lower Fraser River
22 where vessels regularly transit through the shipping lanes and concluded the residual effects
23 are not significant. TJLP concluded that TMJ would result in low magnitude residual effects on
24 Current Use for those Indigenous Groups who fish in and around the TMJ site (i.e., Musqueam,
25 Tsawwassen, Cowichan Nation Alliance and Tsleil-Waututh Nation).

26 Based on the assessment of the Fish and Fish Habitat VC in the BVSA, TMJ concluded that TMJ
27 activities associated with the increased bunker vessel traffic are not anticipated to result in
28 changes to the availability of preferred resources for FSC fishing.

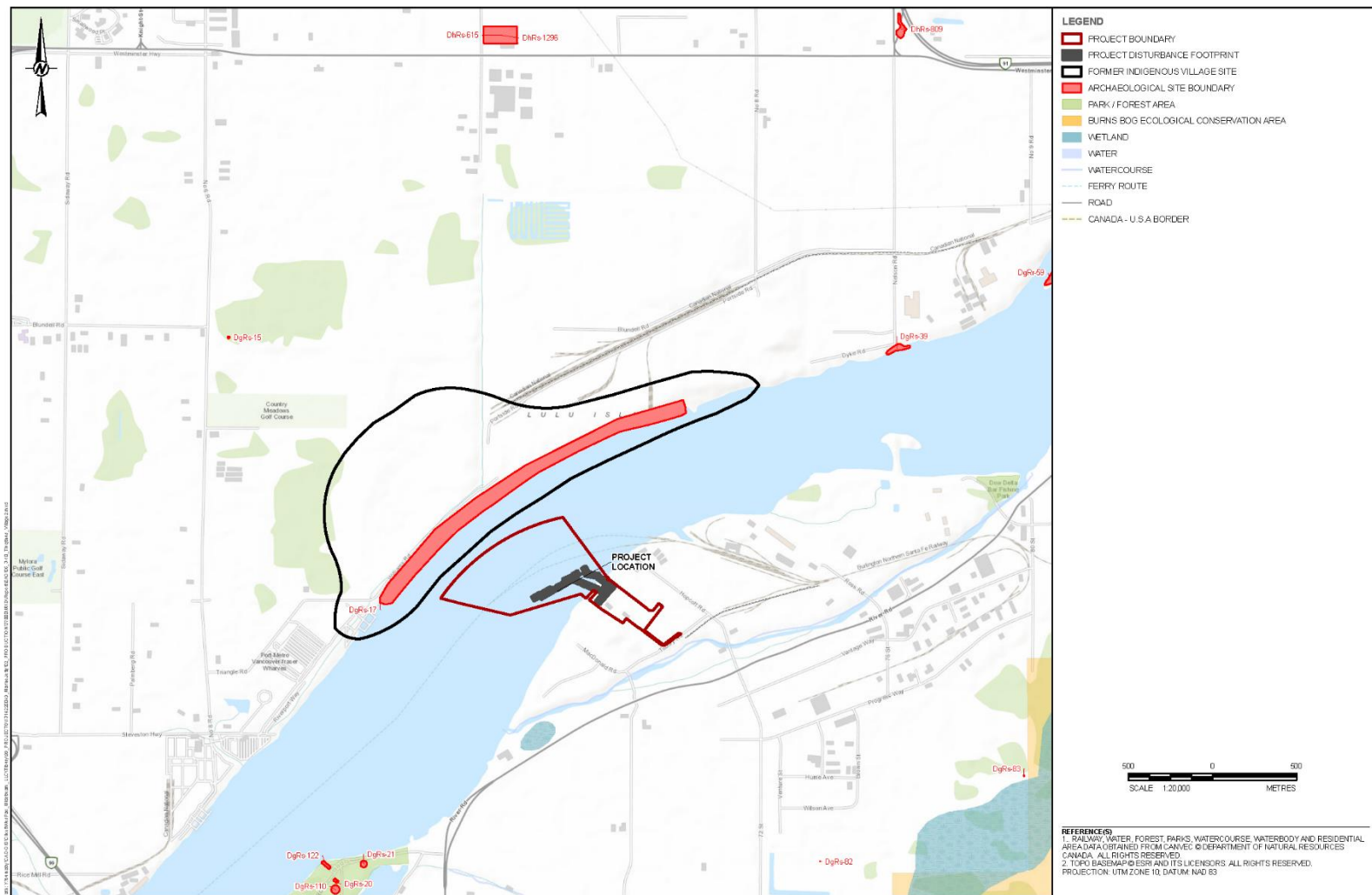


Figure 20: Location of the former Indigenous Tl'uqtinus Village Site.

1 **Effects on Access to Hunting, Trapping, and Gathering Practices**

2 In the Application, TJLP found that TMJ would result in loss of habitat and vegetation, sensory
3 disturbance to wildlife, and possible bird mortality from clearing or indirectly by strikes with
4 infrastructure at the TMJ site. In the MSA, TJLP found that TMJ-related vessels could result in
5 possible mortality of birds due to collisions with vessels in the MSA area. TJLP also found that
6 there would be no change to access of plant harvesting due to TMJ given that the TMJ site is
7 privately owned. TJLP predicted that, with mitigation measures in place, there would not be
8 residual effects to preferred wildlife, access to hunting, trapping or gathering sites, or the
9 experience of hunting, trapping and gathering in the Fraser River or MSA area.

10 In the BVSA TJLP did not predict an interaction with the increased bunker vessel traffic;
11 therefore, did not assess changes as part of the BVSA.

12 **Effects to Other Cultural and Traditional Uses and Cultural Heritage**

13 TJLP reported that the Schedule B Indigenous Groups indicated concerns related to TMJ and
14 potential effects on their current or future use of the area. Schedule B Indigenous Groups
15 identified the areas adjacent to the TMJ site as being important for knowledge transfer and
16 teaching. Further, Musqueam Indian Band, Tsawwassen First Nation, Tsleil-Waututh Nation,
17 Quw'utsun Nation, and Kwantlen First Nation and identified the TMJ site as important for
18 cultural continuity, heritage and archaeological resources either in the past (and desired future)
19 or present day.

20 The Application stated that Musqueam Indian Band, Tsawwassen First Nation, Ts'uubaa-asatx
21 Nation, Tsleil-Waututh First Nation, Squamish First Nation, Lyackson First Nation, and Kwantlen
22 First Nation raised concerns that development in their territories and throughout the Salish Sea
23 was impeding their cultural continuity and their efforts at revitalizing cultural practices.

24 TJLP concluded that TMJ-related activities would not affect access to locations for cultural,
25 sacred and spiritual locations in the Fraser River or MSA area, such as the former Indigenous
26 village site across the Fraser from the TMJ site. TJLP concluded that, based on the current visual
27 quality surrounding the TMJ site, effects to visual quality are anticipated to be minimally
28 disruptive for Indigenous users. TJLP concluded that after the application of mitigations
29 measures, the residual effects on noise and visual quality would be negligible.

30 In the MSA application, TJLP assessed potential TMJ effects in relation to Current Use [CEAA
31 Sectio(C) (1)(c)(iii)] and no effects were identified for the following: changes in availability or
32 resources and change in quality of Current Use experience. In the MSA, TJLP described the
33 following interactions: TMJ associated shipping activities, including wake, could temporarily
34 displace and affect Current Use areas and access to preferred resources; and not significant

1 residual effects were identified for marine mammals, resulting in a potential change in
2 availability of a preferred resource for Current Use including concern for species of cultural
3 importance to Indigenous Groups. TJLP assessed potential effects to (C)A 5(1)(c)(ii) in the
4 following manner: physical heritage was assessed in the Heritage Resources section; and
5 cultural heritage was assessed in the Current Use chapter. TJLP did not specifically assess canoe
6 journeys and potential effects on intangible cultural heritage associated with SRKW; however,
7 the EAO considers potential effects later in this chapter.

8 In the BVSA, TJLP concluded that predicted changes to air quality, noise, and visual quality due
9 to increased bunker vessel traffic is either unchanged, lower, or negligible compared to the
10 Application. Based on the assessment of the Marine Mammals VC in the BVSA, TJLP concluded
11 that TMJ activities associated with the increased bunker vessel traffic are not anticipated to
12 result in changes to marine mammals that are of cultural importance to Indigenous Groups.

13 **11.4.2.3 MITIGATION MEASURES PROPOSED IN THE APPLICATION AND MSA**

14 Based on their assessment of effects to Current Use, TJLP developed mitigations to address
15 potential effects to fishing and traditional and cultural use in the original Application area (that
16 is, jetty to Sand Heads) and the MSA areas under the following:

- 17 • Marine Access and Transportation Plan at the TMJ site: Outlines construction and
18 operational activities and procedures, to maintain commercial and non-commercial
19 vessel navigation passage;
- 20 • Marine Communication Plan: Meets TC Navigation Protection Program requirements;
21 and
- 22 • Implementation of the recommendations under the TMJ Tilbury LNG Cargo Loading and
23 Marine Transit Risk Assessment ([Appendix 1.0-1 of the Application](#)): Identifies potential
24 emergency response scenarios that would reduce the likelihood of effects to Current
25 Use (i.e., LNG release due to LNG carrier grounding, allision or collision).

26 TJLP identified additional mitigations, outlined in Sections 4 through 9 of the Application, that
27 would reduce effects of noise, project lighting, and project emissions on biophysical, heritage,
28 and experiential components of Current Use.

29 In the BVSA, TJLP proposed a new mitigation measure to synchronize bunker vessel traffic with
30 existing vessel traffic during fishing FSC openings to manage effects of more frequent
31 interruptions to FSC fishing. During fishing openings, TJLP propose that bunker vessel arrivals
32 and departures would be synchronized with existing traffic (subject to minimum separation),
33 reducing the potential frequency that Indigenous fishers would be required to move or retract
34 their nets. If a synchronized passage results in an Indigenous fisher being required to move or

1 retract their nets, the time of the disruption due to the bunker vessel movement would be
2 extended by approximately 5 minutes depending on minimum separation between vessels and
3 speed on the water to pass by.

4 **11.4.3 POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATIONS** 5 **IDENTIFIED DURING APPLICATION REVIEW**

6 During Application review, the following key issues related to the assessment of Current Use
7 [CEAA 5(1)(c)(iii)] and Cultural Heritage [CEAA 5(1)(c)(ii)] for TMJ were identified based on
8 feedback from Indigenous Groups:

- 9 • Access and experience for indigenous fishers;
- 10 • Effects to fish;
- 11 • Effects to cultural sites and cultural heritage;
- 12 • Publicly available information in the Marine Shipping Assessment;
- 13 • Bunker Vessel Scenario; and
- 14 • Cumulative effects.

15 ***ACCESS AND EXPERIENCE FOR INDIGENOUS FISHERS***

16 Musqueam Indian Band, Tsawwassen First Nation, Quw'utsun Nation, Tseil-Waututh Nation
17 have emphasized the importance of the continued use of the Fraser River, including the TMJ
18 site, for navigation and fishing activities and have expressed concern that TMJ would affect
19 their ability to access preferred locations for fishing and to travel routes. During the BVS review,
20 Indigenous Groups include raised concerns that increased bunker vessel traffic would further
21 effect access and experience.

22 Indigenous Groups have expressed their concerns regarding TMJ-related effects including
23 increased noise levels, changes to visual quality, and perceived or actual shipping-related safety
24 risks on the quality of experience for Indigenous Groups when accessing areas for Current Use.

25 Tsawwassen First Nation stressed the importance of the Final Agreement and a need to protect
26 their treaty rights from TMJ-related effects. Tsawwassen First Nation raised strong concerns
27 about potential effects to their fishers from large vessels interfering with access to fishing areas
28 during fish openings in the Fraser River and elsewhere. Tsawwassen First Nation informed the
29 EAO that TMJ activities would directly overlap and interact with areas that are crucial and
30 irreplaceable for Tsawwassen First Nation harvesting.

31 Musqueam Indian Band, Quw'utsun Nation, Pacheedaht First Nation, and Tseil-Waututh Nation
32 also raised strong concerns about the potential for TMJ-related vessels to interrupt their

1 fishers. These same Indigenous Groups advised the EAO that should TMJ-related shipping
2 interruptions occur during high yield fishing opportunities (for example, a large run of salmon
3 during a time limited DFO authorized fisheries opening) that requires the removal of gear for
4 safety reasons, the effect to the community would be high. Cowichan Nation Alliance expressed
5 concern that further development of the foreshore in the Lower Fraser would affect their intent
6 to reestablish shore-based fishing in the area.

7 Musqueam Indian Band noted that TMJ is a preferred fishing area for Musqueam Indian Band
8 fishers and expressed concern that the “marine safety zone” could block Musqueam Indian
9 Band navigation and fishing activities in the area. They also noted that the quality of their
10 fishing experience includes a sense of ‘peacefulness’ that would be disturbed by construction
11 and operations activities. Musqueam Indian Band and Cowichan Nation Alliance also raised
12 concerns that the berthing of LNG carriers and the related marine safety zone could affect
13 navigation and marine user access.

14 During their review of the EAO’s draft Assessment Report, Musqueam Indian Band, Tsleil-
15 Waututh Nation, Tsawwassen First Nation, Pacheedaht First Nation, and Cowichan Nation
16 Alliance asserted that TMJ effects would constitute a serious effect to their access to fishing
17 sites and fishing experience.

18 In lieu of a marine safety zone, TJLP has proposed a revised, protocol-based approach to
19 provide for public safety and reduce the potential for interference with navigation. The
20 proposed Marine Safety Protocol would come into effect during construction and remain in
21 place for the life of TMJ. The EAO understands that mariners may enter or pass through the
22 marine terminal area and TJLP have operational measures in place for public safety. For the
23 purpose of the EA, the EAO has assumed that mariners would avoid entering and remaining in
24 the marine terminal area due to the warning signs and notifications regarding elevated public
25 risk due to LNG vessel berthing, loading and de-berthing activities. Refer to [Section 8.2.3](#) of this
26 Report for more details.

27 In response to Indigenous Group concerns regarding access to fishing, the EAO recommends a
28 KMM under CEAA 2012 for a Marine Access and Transportation Plan in the Lower Fraser which
29 would include mitigations to reduce disruptions, caused by construction and operations, for
30 commercial and non-commercial marine use. TJLP would also be required to identify, in
31 consultation with Indigenous Groups and DFO via publicly accessible information on recently
32 issued DFO licences, fishing licenses and other Indigenous traditional uses. TJLP would also be
33 required to develop measures to mitigate effects on Indigenous traditional use activities,
34 including LNG carrier call scheduling that accounts for and attempts to reduce LNG carrier calls
35 during the anticipated timing window for Indigenous fishers operating under DFO fishing

1 licenses. TJLP would also synchronize bunker vessels arrivals at and departures from the jetty
2 with regularly scheduled marine traffic (not associated with TMJ) when Indigenous fishers are
3 operating under DFO fishing licenses. TJLP would be required to provide opportunities to
4 Indigenous Monitors to participate in monitoring during FSC fisheries windows to determine
5 the effectiveness of the mitigation. The Marine Access and Transportation KMM includes a
6 follow-up program pertaining to adverse effects on Current Use of Lands and Resources for
7 Traditional Purposes. The EAO also recommends a Marine Communication Plan as a KMM
8 under CEAA 2012 which would identify the procedures to notify Indigenous Groups and other
9 marine users of planned activities associated with TMJ as well as a means by which Indigenous
10 Groups and other marine users can provide feedback to TMJ on adverse effects related to
11 navigation as a result of TMJ activities. In response to Indigenous Groups' concerns regarding
12 the effects of noise and visual quality on the quality of experience, the EAO is proposing
13 provincial conditions and KMMs under CEAA 2012 for noise and vibration management
14 ([Chapter 6.2](#) of this Report), lighting management ([Chapter 8.3](#) of this Report).

15 ***EFFECTS TO FISH***

16 Indigenous Groups, including Tsawwassen First Nation, Musqueam Indian Band, Tsleil-Waututh
17 Nation, Quw'utsun Nation, Ts'uubaa-asatx Nation, Pauquachin First Nation, Pacheedaht First
18 Nation, T'Sou-ke First Nation, Ditidaht First Nation, and Maa-nulth First Nations identified
19 traditionally and culturally important food fish that were, and in some cases are currently,
20 fished in the Salish Sea and the South Arm of the Fraser River. The species that were
21 consistently raised were salmon (all five pacific species), sturgeon, and eulachon.

22 Tsawwassen First Nation commented that eulachon was not included in TJLP's assessment of
23 effects and identified eulachon and sturgeon as species of concern and of importance to
24 Tsawwassen First Nation. Tsawwassen First Nation has commented that the existing levels of
25 eulachon and sturgeon are insufficient to be able to fish in their preferred manner. This is
26 considered further in Part C of this Report.

27 Tsleil-Waututh Nation commented that, as with sockeye and chinook, there are no alternative
28 sources of eulachon and sturgeon within Tsleil-Waututh territory besides the lower Fraser River
29 area. Tsleil-Waututh Nation expressed that they seek to increase access to eulachon and
30 sturgeon and would harvest eulachon and sturgeon in the South Arm of the Fraser River if
31 eulachon and sturgeon populations increased to levels allowing a sustainable harvest. Tsleil-
32 Waututh Nations stated that community members are unable to access the desired amount of
33 local, traditional food.

1 More information on potential effects to fish and fish habitat including issues raised by
2 Indigenous Groups regarding the effects assessment can be found in the Fish and Fish Habitat
3 ([Section 5.6](#)) section of this Report, which concluded non-significant effects to fish and fish
4 habitat. The EAO has considered concerns about preferred fish species and linkages to
5 Aboriginal and Treaty rights in Part C of this Report. The EAO proposes key mitigations under
6 CEAA 2012 as described in Fish and Fish Habitat ([Section 5.6](#)) section of this Report, including:
7 Fish Mitigations to Reduce Harm and Mortality; a Fish Habitat Offset Plan; and conditions and
8 key mitigations outlined in the River Processes ([Section 5.3](#)) and Water Quality ([Section 5.5](#))
9 sections of this Report.

10 ***EFFECTS TO CULTURAL SITES AND CULTURAL HERITAGE***

11 Several Indigenous Groups expressed concerns that TMJ could adversely affect users of the
12 former Indigenous village site. Musqueam Indian Band, Tsawwassen First Nation, and the
13 Cowichan Nation Alliance raised concerns about potential TMJ effects, including light and noise,
14 to their enjoyment of Tilbury Island and the south arm of the Fraser River. Cowichan Nation
15 Alliance expressed that the former Indigenous village site would be particularly affected by
16 visual and auditory disruptions due to its proximity to the TMJ site. Tsleil-Waututh Nation
17 expressed that potential interruptions to access to heritage resources in the TMJ-area would be
18 significant due to increasing vessel transits and the distance from TMJ to the known heritage
19 resources. Tsawwassen First Nation commented that the regular visual and physical presence of
20 large LNG vessels would affect the experience of visiting sites of importance to
21 Tsawwassen First Nation. These effects would occur regardless of whether the vessels made
22 physical contact with the sites.

23 The EAO assessed visual quality and acoustic effects (in [Section 8.3](#) and [Section 6.2](#) of this
24 Report, respectively) and these conclusions are considered in the EAO's assessment of effects
25 to Current Use (see [Section 11.4.1](#) below). Effects to access to cultural sites are also evaluated
26 below.

27 The EAO heard concerns from Musqueam Indian Band about the EAO's characterization of
28 Aboriginal rights and title related to the village site in the draft assessment report for TMJ. To
29 address these concerns, Musqueam Indian Band requested that the EAO include more
30 information to appropriately contextualize claims and a deeper understanding of the familial
31 ties and protocols that govern access to ʔəqtinəs as provided in Musqueam's 2018 Knowledge

1 and Use Study (KUS) study¹⁴⁵. More information about the potential impacts of TMJ on
2 Musqueam Indian Band's cultural continuity and sense of place and identity can be found in
3 [Section 14.5.3](#) of Part C.

4 The EAO understands, through the TMJ EA and through the RBT2 panel process, that a number
5 of Indigenous Groups have cultural interests in SRKW and have expressed concern that the
6 cumulative effects of shipping within the Salish Sea would result in significant adverse residual
7 effects on SRKW, including acoustic disturbance, vessel strikes and catastrophic accidents,
8 combined with cumulative effects. Indigenous Groups that raised concerns about effects to
9 SRKW relating to cultural and spiritual practices include: Musqueam Indian Band Tsleil-Waututh
10 Nation; Tsawwassen First Nation; Quw'utsun Nation; Snuneymuxw First Nation, Kwantlen First
11 Nation; Malahat First Nation; Pacheedaht First Nation; Ditidaht First Nation; Pauquachin First
12 Nation; Esquimalt First Nation; Tsawout First Nation; T'sou-ke First Nation; Maa-nulth First
13 Nations; Tsartlip First Nation; Tseycum First Nation; Songhees First Nation; and Scia'new First
14 Nation.

15 A number of Indigenous Groups have indicated that they conduct canoe journeys for cultural
16 purposes in the MSA area and feel that additional shipping would cause adverse effects to
17 these practices, in particular due to potential safety concerns while travelling traditional routes
18 and crossing shipping lanes. Indigenous Groups that have indicated their concern about
19 potential effects to canoe journeys as a result of TMJ-related shipping include: Malahat First
20 Nation; Musqueam Indian Band; Ditidaht First Nation; T'Sou-ke First Nation; Scia'new First
21 Nation; Cowichan Nation Alliance; Pacheedaht First Nation; Pauquachin First Nation; and
22 Tsartlip First Nation.

23 Indigenous Groups commented that effects to access to cultural and spiritual sites, experience
24 and effects to cultural resources, including SRKW, could result in reduced opportunities for
25 cultural transmission including Indigenous language acquisition by younger generations.
26 Overall, the EAO has heard from Indigenous Groups about potential unmitigable effects to
27 cultural uses in the original Application area and the MSA. Musqueam Indian Band expressed
28 concerns that their cultural continuity and sense of place and identity would be affected by
29 several aspects of TMJ. Tsleil-Waututh Nation expressed deep concerns about the effects of
30 TMJ-related shipping to Tsleil-Waututh Nation cultural health and intangible cultural heritage,
31 and the effect on the ability to undertake traditional cultural practices in spiritually significant

¹⁴⁵ Musqueam Indian Band. 2018. Musqueam Indian Band Knowledge and Use Study for WesPac Midstream's Proposed LNG Marine Jetty Project.

1 areas and sacred tunnels; in particular, effects on the cultural landscape in the Tsawwassen and
2 Roberts Bank area¹⁴⁶. Tsleil-Waututh noted irreversible impacts to cultural health and
3 intangible cultural heritage for the duration of TMJ operations, and expressed that there are
4 existing significant cumulative effects to intangible cultural heritage, and that TMJ-related
5 vessels would contribute to existing cumulative effects.

6 ***PUBLICLY AVAILABLE INFORMATION IN THE MARINE SHIPPING ASSESSMENT***

7 Tsawwassen First Nation, Tsleil-Waututh Nation, Musqueam Indian Band, Halalt First Nation,
8 and Pauquachin First Nation raised concerns about the reliance on information from RBT2 and
9 TMX to understand baseline conditions in the MSA. The EAO notes that the MSA information
10 request required the TJLP to use information from the TMX and RBT2 projects and complement
11 it with additional information from the RBT2 panel hearings and any information provided by
12 Indigenous Groups. TMX and RBT2 are recent EA projects in the region that have considered
13 marine shipping in the Salish Sea and Strait of Juan de Fuca. They include substantial baseline
14 information on existing environmental and human environmental conditions along B.C.'s south
15 coast and completed assessments, including a review of regional cumulative effects associated
16 with shipping.

17 With respect to applying Current Use information provided by Indigenous Groups for the TMX
18 and RBT2 MSAs to the TMJ MSA, the EAO is of the opinion that publicly available information
19 provided by Indigenous Groups for the assessment of shipping effects in the Salish Sea is
20 relevant to the assessment of TMJ shipping effects. The EAO also heard from Musqueam Indian
21 Band regarding their concerns that the spatial and temporal limitations of the underlying data
22 in the MSA would result in the EAO underestimating the potential impact of TMJ on
23 Musqueam's current use of lands and resources. The EAO understands that Musqueam Indian
24 Band considered that the MSA relied heavily on data gathered in the regional study area of the
25 2017 Knowledge and Use Study for RBT2 Project. Please see [Section 13.2.1](#) for more details
26 related to concerns raised by Indigenous Groups related to the EAO's reliance on information
27 from RBT2 and TMX in its assessment of TMJ.

28 ***BUNKER VESSEL SCENARIO***

29 During the BVS review, the EAO heard from Indigenous Groups, including Tsawwassen First
30 Nation and Tsleil-Waututh Nation, that the increase in annual vessel calls from 137 to 365 was

¹⁴⁶ For more details, please refer to Tsleil-Waututh Nation's assessment of effects on Aboriginal Interests in Part C, authored by Tsleil-Waututh Nation.

1 substantial that any additional vessel traffic would impact their marine area use and access and
2 experience, including fishing and cultural practices. Tsleil-Waututh Nation expressed that there
3 are already high impacts from existing vessel traffic and these intense cumulative impacts in the
4 lower Fraser affect Tsleil-Waututh Nation members' ability to fish and engage in cultural
5 activities. Snuneymuxw First Nation expressed that the frequency of vessel interruption is more
6 invasive and disturbing to the exercise of harvesting rights than the size of the interrupting
7 vessel.

8 TJLP has proposed synchronizing TJLP-related LNG bunker vessel movements with existing
9 traffic on the Fraser River during FSC fishing openings. TJLP proposed this new mitigation
10 measure to reduce the frequency of interruptions (e.g. the number of times that nets must be
11 moved or retracted and reset) thereby reducing effects to the critical limited FSC fishing
12 openings. TJLP would work with other users of the Fraser River, such as cargo ferries that have
13 scheduled transits between TMJ and Sand Heads, to make arrangements to coordinate vessel
14 movements with these existing, regular transits. TJLP noted that collaboration with the nearby
15 marine terminals would facilitate concurrent departure and vessel synchronization. Based on
16 the minimum separation distance, and accounting for the length and average speed, TJLP
17 estimates that it would take less than five minutes for a synchronized bunker vessel to pass a
18 fixed point on the Fraser River. TJLP noted that they would have standard terms and conditions
19 of service which would be incorporated into the agreements with its customers, and that TJLP
20 would impose scheduling and traffic coordination restrictions in those contracts. Under those
21 contractual provisions, TJLP would be entitled to refuse to provide service to vessels under
22 certain circumstances. This is the contractual provision TJLP would employ to require bunker
23 vessel operators to participate in communication with TJLP and coordinate their movements
24 with other traffic during FSC openings. TJLP's customers would be responsible for arranging
25 LNG bunker vessels to call at the TMJ and for LNG to be delivered to the TMJ from the adjacent
26 LNG facility.

27 Tsleil-Waututh Nation expressed that while the proposed mitigation measure is a start, it is
28 insufficient in addressing the issue. Tsleil-Waututh Nation noted that synchronizing of bunker
29 vessel traffic with existing traffic during affected FSC openings does not address the impacts on
30 other cultural activities for Tsleil-Waututh Nation. Tsawwassen First Nation questioned whether
31 and to what extent these vessel schedules would accommodate the community's preferred
32 means of exercising their rights.

33 The EAO understands the perspectives from Indigenous Groups about cumulative effects and
34 that additional vessel traffic would adversely affect fishing and cultural practices. The EAO has
35 recommended a new Cultural Heritage KMM, which would require TJLP to develop nation-

1 specific measures to address the effects on tangible and intangible cultural losses caused by the
2 construction and operation of TMJ, in consultation with those Indigenous Groups experiencing
3 the effects in the lower Fraser River, as described in the EAO's Assessment Report. As part of
4 the measures, TJLP would be required to consider developing or contributing to Indigenous-led
5 programs to preserve and enhance cultural heritage.

6 Also, as part of the recommended Marine Access and Transportation Plan KMM, the EAO has
7 recommended additional mitigation measures based on the BVS. TJLP would be required to
8 identify, in consultation with Indigenous Groups and DFO via any publicly accessible
9 information on recently issued DFO licences, fishing licenses and other Indigenous traditional
10 uses. TJLP would also be required to develop measures to mitigate effects on Indigenous
11 traditional use activities, including LNG carrier call scheduling that accounts for and attempts to
12 reduce LNG carrier calls during the anticipated timing window for Indigenous fishers operating
13 under DFO fishing licenses. TJLP would also synchronize bunker vessels arrivals at and
14 departures from the jetty with regularly scheduled marine traffic (not associated with TMJ)
15 when Indigenous fishers are operating under DFO fishing licenses. TJLP would be required to
16 provide opportunities for Indigenous Monitors to participate in monitoring during FSC fisheries
17 windows to determine the effectiveness of the mitigation. The Marine Access and
18 Transportation KMM includes a follow-up program pertaining to adverse effects on Current Use
19 of Lands and Resources for Traditional Purposes. The EAO acknowledges that synchronizing
20 bunker vessel traffic with existing traffic does not completely mitigate effects, including impacts
21 on FSC openings and other cultural activities.

22 **CUMULATIVE EFFECTS**

23 Indigenous Group concerns regarding cumulative effects, as well as the EAO's assessment of
24 cumulative effects on Current Use and Cultural Heritage, can be found in [Section 11.4.5](#) below.

25 **11.4.4 THE EAO'S ANALYSIS AND CONCLUSIONS**

26 This section presents the EAO's conclusions on the potential adverse residual effects from TMJ,
27 for the Application scenario and BVS, on:

- 28 • The Current Use VC: Including fishing, hunting trapping, gathering and other traditional
29 and cultural uses of the area;
- 30 • CEAA 2012 (5)(1)(c)(iii): Changes to the environment on the current use of lands and
31 resources for traditional purposes by Indigenous peoples; and
- 32 • CEAA 2012 5(1)(c)(ii): Cultural Heritage.

1 The EAO evaluated the potential residual effects to the above by considering construction,
2 operations and decommissioning activities that could affect access to current use activities and
3 sites, the availability and quality of current use resources, the quality of the experience of
4 current use activities (fishing, hunting, trapping, and gathering) and effects on other cultural
5 and traditional uses and Cultural Heritage. The criteria and assessment ratings used to evaluate
6 the residual effects are defined in Appendix 5: Residual Effects Characterization Definitions.
7 Effects on Aboriginal Interests and Treaty Rights are assessed for each individual Indigenous
8 Group and for each category of rights in Part C – Effects to Aboriginal Interests and Treaty
9 Rights of Indigenous Groups – of this Report.

10 **Proposed Provincial Conditions and Key Mitigation Measures (CEAA 2012)**

11 Based on mitigations proposed in the Application and BVSA, and issues raised during
12 Application review, the EAO proposes the following provincial conditions and recommended
13 KMMs under CEAA 2012:

- 14 • To mitigate effects to the quality of experience of current use and cultural heritage
15 activities:
 - 16 ○ Condition 17: Indigenous Cultural Awareness, Recognition and Mitigation
17 (provincial condition);
 - 18 ○ Condition 10: Construction Environmental Management Plan and Condition 11:
19 Operations Environmental Management Plan for noise, air quality and lighting
20 management (provincial conditions);
 - 21 ○ Condition 19: Air Quality Management Plan (provincial condition) and Air Quality
22 Management Plan (KMM) with best management practices to mitigate effects to
23 air quality; and
 - 24 ○ Condition 20: Greenhouse Gas Reduction Plan (provincial condition).
- 25 • To mitigate effects to access to current use and cultural heritage activities and sites:
 - 26 ○ Marine Access and Transportation Plan (KMM);
 - 27 ○ Marine Communications Plan (KMM);
 - 28 ○ Cultural Heritage (KMM);
 - 29 ○ KMM recommending that the number of LNG carriers berthing at TMJ to be
30 loaded for export would not exceed 68 carriers per year; and
 - 31 ○ KMM recommending that TJLP identify how they are participating in the
32 identification and implementation of regional initiatives related to effects on
33 current use of lands and resources for traditional purposes as a result of marine
34 shipping (KMM).

- 1
- 2 • To mitigate effects to Current Use [CEAA 5(1)(c)(iii)] CEAA 5(1)(c)(ii):
- 3 ○ See KMMs outlined in [Section 5.5](#) (Water Quality), [Section 5.6](#) (Fish and Fish
- 4 Habitat), [Section 5.7](#) (Marine Mammals), [Section 5.8](#) (Vegetation) and
- 5 [Section 5.9](#) (Wildlife) of this Report.
- 6

7 **Residual Effects**

8 The EAO predicts negligible to no residual effects to hunting, trapping and gathering at the TMJ

9 site because TMJ is on private land, where resources are limited/ unavailable, and therefore

10 unlikely to further the effects to harvestable resources. The EAO predicts that TMJ-related

11 shipping activities, including vessel wake, noise, visual presence would have no measurable

12 effect on terrestrial or marine-based hunting, trapping and gathering.

13 After considering the proposed mitigation measures, the EAO predicts that TMJ (both the

14 Application scenario and BVS) would result in the residual adverse effects to:

- 15 • Current Use [CEAA 5(1)(c)(iii)] for fishing, through effects to fish, access to fishing areas
- 16 and the experience of fishing; and
- 17 • Current Use for other Traditional and Cultural Uses [CEAA 5(1)(c)(iii)] and Cultural
- 18 Heritage [CEAA 5(1)(c)(ii)] through access, quality of experience and, in the case of
- 19 cultural interests in SRKW, through the resource itself.

20 **Current Use for Fishing**

21 *Fish and Fish Habitat:* The EAO predicts that construction (over approximately three years) and

22 operations (annual dredging) are likely to result in low-moderate changes to fish habitat and

23 low magnitude potential behavioural changes to fish species at the TMJ site. The EAO predicts

24 low magnitude and infrequent to continuous effects to sturgeon from vessels strikes. The EAO

25 does not predict any residual effects to fish and fish habitat in the MSA area. Please see the

26 EAO's conclusions on potential adverse residual effects in Fish and Fish Habitat ([Section 5.6](#) of

27 this Report) for further details.

28 *Access to Fishing:* The EAO concludes that TMJ would have potential residual effects to access

29 to fishing for Indigenous Groups that currently fish or that have future intentions to fish near or

30 within the TMJ site. Access to the TMJ site would be affected during construction through

31 operations when vessels are berthing, loading and de-berthing, as outlined in TJLP's Marine

32 Safety Protocol. For the purpose of the EA, the EAO has assumed that mariners would avoid

33 entering and remaining in the marine terminal area due to the warning signs and notifications

1 regarding elevated public risk due to LNG berthing, loading and de-berthing activities (on
2 average, daily in the BVS). TMJ-related vessels in transit could affect Indigenous Groups who
3 fish in, or in proximity, to the navigational channel or shipping lanes, or those who need to
4 cross these areas to access fishing resources. TMJ-related vessels would transit through the
5 Salish Sea and Fraser River. For the BVS, on average, one vessel call on the jetty every day (i.e.,
6 two vessel movements a day). At the scale of the LAA and RAA, the EAO predicts the effects to
7 access within the TMJ site would be a low magnitude effect. Effects to access from vessels in
8 transit are predicted to be low in magnitude compared baseline levels. Under the Application
9 scenario and BVS, TMJ would increase vessel traffic in the Fraser River by up to 1.5 percent and
10 up to 4 percent, respectively. In the MSA area, TMJ would increase vessel traffic by between 0.2
11 percent and 1.1 percent, depending on the segment of shipping lane. The EAO heard from
12 Indigenous Groups and DFO that some of the DFO-regulated FSC fisheries windows in the
13 Fraser River are only open for extremely short periods of time during the season. The EAO
14 acknowledges that interactions between Indigenous Groups and TMJ-related vessels during the
15 FSC fisheries windows, which are in limited duration, could have a greater effect on access to
16 fishing and that the likelihood of an interaction is high based on the BVS. The EAO recommends
17 as part of the Marine Access and Transportation Plan, measures to mitigate effects on
18 Indigenous traditional use activities, including LNG carrier call scheduling that accounts for and
19 attempts to reduce LNG carrier calls during the anticipated timing window for Indigenous
20 fishers operating under DFO fishing licenses. TJLP would also synchronize bunker vessels
21 arrivals at and departures from the jetty with regularly scheduled marine traffic (not associated
22 with TMJ) when Indigenous fishers are operating under DFO fishing licenses. TJLP would be
23 required to provide opportunities to Indigenous Monitors to participate in monitoring during
24 FSC fisheries windows to determine the effectiveness of the mitigation. Residual effects are
25 considered continuous at the jetty site and frequent for vessels in transit, long-term (life of
26 TMJ) and reversible. The increase of large vessels in transit from baseline would also be higher
27 in the Fraser River than in the MSA area, so effects to access from TMJ-related vessel in transit
28 could be experienced as higher in the Fraser River than the Salish Sea.

29 *Experience:* The EAO acknowledges that increased vessel traffic, noise associated with
30 construction and operations, and changes in visual quality could affect Indigenous fishers'
31 experience during navigation to fishing sites and the experience of harvesting at those sites.
32 The EAO also acknowledges that the presence of LNG carriers and bunker vessels could affect
33 the safety and perception of safety for Indigenous fishers through the potential for collision or
34 other accidents and malfunctions. The EAO concludes that given the relatively small changes
35 from current conditions predicted in the noise and visual quality assessments (negligible to low
36 in magnitude) during construction and operations, in addition to information from Indigenous

1 Groups provided through the EA including about safety and perception of safety, TMJ effects to
2 the experience of fishing would be low in magnitude at the TMJ site and low from TMJ-related
3 vessels in transit, compared to baseline conditions.
4

5 *Conclusion:* The EAO concludes that TMJ would result in low magnitude residual effects on
6 Current Use for those Indigenous Groups who fish in and around the TMJ site and on the Lower
7 Fraser River, which are currently Musqueam Indian Band, Tsawwassen First Nation, Quw'utsun
8 Nation and Tsleil-Waututh Nation. The EAO acknowledges that interactions between
9 Musqueam Indian Band, Tsawwassen First Nation, Quw'utsun Nation, and Tsleil-Waututh
10 Nation fishers and TMJ-related vessels during FSC windows would have a greater effect. The
11 EAO acknowledges that Ts'uubaa-asatx Nation, Lyackson First Nation, Squamish Nation,
12 Snuneymuxw First Nation, and Kwantlen First Nation expressed a strong interest in fishing the
13 lower reaches of the Fraser River in the future and should they do so on a regular basis, the
14 EAO would expect similar residual effects to their Current Use for fishing. The EAO concludes
15 that TMJ-related vessels would also result in low magnitude residual effects on Current Use for
16 fishing for Pacheedaht Nation and Ditidaht Nation as these Nations preferentially fish in the
17 marine shipping lanes (e.g., Swiftsure Bank). The EAO concludes that TMJ would result in
18 negligible-low effects to Maa-nulth First Nations as there is a portion of their domestic fishing
19 area that overlaps with the shipping lanes. The effects would be regular, long term (up to 30
20 years), and reversible.

21 The EAO concludes that TMJ would result in negligible effects to Current Use for Semiahmoo
22 First Nation, Squamish First Nation, Stó:lō Nations, Katzie First Nation, the Métis Nation of BC,
23 Songhees First Nation, Esquimalt First Nation, Malahat First Nation, T'Sou-ke First Nation,
24 Tsawout First Nation, Pauquachin First Nation, Tsartlip First Nation, Tseycum First Nation and
25 Scia'new First Nation. The EAO does not have information to suggest that these Indigenous
26 Groups currently fish in and around the TMJ site, or preferentially in the shipping lanes.
27 However, there could be incremental to access to fishing sites in the Fraser River and MSA area
28 from TMJ-related vessels interacting with Indigenous Groups' transit to fishing areas.

29 Given the above low magnitude residual effects to some Indigenous Groups, the EAO concludes
30 that TMJ is not likely to have significant residual effects on Current Use for fishing. Please see
31 [Section 11.4.5](#) below for the EAO's cumulative effects assessment.

32 ***Current use for other Traditional and Cultural Uses [CEAA 5(1)(c)(iii)] and Cultural Heritage*** 33 ***CEAA 5(1)(c)(ii)***

34 *Effects to cultural resources:* Many Indigenous Groups have identified SRKW to be of key
35 importance to Indigenous culture. Refer to Part C of this Report for Indigenous Group-specific

1 details on cultural values associated with SRKW. For example, in their comments on the EAO's
2 draft Assessment Report, Tseil-Waututh Nation commented that TMJ-related shipping effects
3 to SRKW would result in serious effects to their cultural relationship with the SRKW and their
4 ability to practice their ongoing traditional Coast Salish culture which Tseil-Waututh views as
5 key part of maintaining and improving cultural health. Musqueam Indian Band identified an
6 important role of SRKW in Musqueam's oral histories and traditions, including songs and
7 artwork, which are essential for cultural wellbeing. Musqueam Indian Band considers that
8 effects on SRKW and their potential loss, would result in disruptions to their cultural continuity.
9 The EAO concluded that TMJ would not cause significant residual adverse effects to SRKW from
10 shipping, as outlined in the Marine Mammals chapter ([Section 5.7](#)) of this Report. Cumulative
11 effects to Cultural Heritage, including SRKW, are assessed in [Section 11.4.5](#).

12 *Access:* The EAO has assumed that mariners would avoid entering and remaining in the marine
13 terminal area due to the warning signs and notifications regarding elevated public risk due to
14 LNG berthing, loading and de-berthing activities (on average, one vessel call or two vessel
15 movements a day in the BVS). Indigenous access to known heritage resources could be affected
16 during construction and operations by LNG berthing, loading and de-berthing activities and
17 through TMJ-related vessels in transit. However, the EAO considers that potential effects to
18 access to heritage resources including cultural sites, cultural travel routes, and Cultural Heritage
19 in the TMJ area would be low magnitude due to size of the marine terminal area compared to
20 the LAA/ RAA and the low magnitude increase from baseline of vessel in transits, short duration
21 of the transit, and the distances from the TMJ area to the known heritage resources. The EAO
22 acknowledges that, the BVS (i.e., daily vessel calls at the jetty) may result in more frequent
23 interactions with vessels in transit. For the MSA area, the EAO is of the opinion that, given the
24 potentially infrequent and short duration of interactions between regular TMJ-related vessel
25 transits within the MSA and Indigenous mariners (including fishers and those travelling the MSA
26 area on traditional canoe journeys), the effects listed above would not likely result in significant
27 residual effects to other traditional and current uses.

28 *Experience:* As noted in the Noise ([Section 6.2](#)) and Visual Quality ([Section 8.3](#)) chapters of this
29 Report, noise and visual effects during construction and operations (when LNG carrier vessels
30 are at berth) would have negligible to low level effects depending on the location of the viewer/
31 listener. The EAO is of the opinion that the visual and acoustic changes as a result of TMJ are
32 not likely to be substantially different than the existing conditions adjacent to the TMJ site.
33 Nevertheless, the EAO acknowledges that some Indigenous people may find the presence and
34 sound of LNG carriers disturbing for safety and/ or aesthetic reasons or for other personal
35 reasons both at the TMJ site and from TMJ-related vessels in transit. The EAO also
36 acknowledges Indigenous concerns that noise and visual disruptions and concerns about safety

1 could then lead to reduced opportunities for cultural transmission including Indigenous
2 language acquisition by younger generations while undertaking traditional harvesting activities
3 on land or on the water. In their comments on the EAO's draft Assessment Report,
4 Tsawwassen First Nation stated that any disruption to Tsawwassen's ability to exercise its
5 Treaty fishing and harvesting rights could have potentially severe consequences for
6 Tsawwassen's cultural continuity, as well as its members' physical and mental health and
7 economic conditions. Tsleil-Waututh Nation expressed that effects on Tsleil-Waututh peoples'
8 ability to participate in all aspects of their traditional culture and spiritual practice would
9 negatively member's cultural health.

10 *Conclusions:* Given the above, the EAO concludes that TMJ is not likely to result in significant
11 adverse effects on other traditional and cultural uses that contribute to their current use of
12 lands and resources for traditional purposes or Cultural Heritage for the Application scenario or
13 BVS. The EAO's assessment of TMJ contributions to existing cumulative effects on Other
14 Traditional and Cultural Uses and Cultural Heritage is outlined in [Section 11.4.5](#).

DRAFT

1 11.4.5 CUMULATIVE EFFECTS ASSESSMENT

2 As noted in other assessment sections of this Report, there are numerous existing and
3 reasonably foreseeable projects and activities in the RAA¹⁴⁷ and in the MSA RSA¹⁴⁸ that have
4 the potential to interact cumulatively with TMJ with respect to effects to Current Use and
5 Cultural Heritage. TJLP did not find any residual effects that interacted with components of
6 Current Use or Cultural Heritage following application of mitigation measures, and as such, did
7 not undertake a cumulative effects assessment in either the original Application area or for the
8 MSA. The following information summarizes the issues identified during Application review and
9 the EAO's conclusions on cumulative effects.

10 11.4.5.1 ISSUES IDENTIFIED DURING APPLICATION REVIEW

11 Many Indigenous Groups expressed that from their vantage baseline conditions caused by past
12 and present projects and activities combined with incremental effects from TMJ and other
13 reasonably foreseeable projects would result in significant residual cumulative effects on
14 Current Use and Cultural Heritage.

15 CUMULATIVE EFFECTS TO FISHING

16 Indigenous Groups noted that current levels of development, shipping, and DFO fisheries
17 management activities in the Fraser River and the Salish Sea are already reducing their access
18 to and their ability to harvest resources. It was noted that reduced harvests would affect
19 economic, cultural, and social structures within their respective communities through a
20 reduced connection to historical and current traditions.

21 With respect to cumulative effects to access to marine fishing, Musqueam Indian Band
22 highlighted their Marine Shipping Effects Assessment that was submitted through the RBT2
23 panel process, which outlined their conclusions on shipping induced exclusion and effects to
24 fishing and fishing areas within tidal windows and time of year¹⁴⁹. Musqueam Indian Band's

¹⁴⁷ For this section the EAO considered the cumulative effects of the VAFFC (1.3km downstream); Vancouver Fraser Port Authority Fraser River Annual Dredging Program; the Seaspans Ferries Tilbury Terminal Expansion – Adjacent; the Fortis Tilbury LNG Plant Expansion Project – Adjacent; the Delta Grinding Facility – Adjacent; the Roberts Bank Terminal 2 Expansion Project; the Trans Mountain Expansion Project; Port Metro Vancouver's Centerm and Vanterm Expansion Projects; and the existing traffic levels in the Salish Sea.

¹⁴⁸ The EAO also considered the cumulative effects of the projects listed in Table 2.0-6 of the MSA Application.

¹⁴⁹ Tam, J., Olson, R., and the Firelight Group. May 9, 2016. Musqueam Marine Shipping Effects Assessment. Port Metro Vancouver's Proposed Robert's Bank Terminal 2 Project. <https://iaac-aeic.gc.ca/050/documents/p80054/129455E.pdf>.

1 report recommends monitoring future interactions, minimizing interactions during fishery
2 openings, engaging with project proponents to further minimize interactions, and to promote
3 communication amongst vessel operators to reduce effects to Musqueam Indian Band fishers.
4 Musqueam Indian Band have told the EAO that due to industrial development on the Fraser
5 River, and high levels of commercial traffic, there are a limited number of remaining areas
6 within Musqueam territory on the lower Fraser River to productively fish. Musqueam Indian
7 Band reported identified over fifty site-specific fishing values associated with the TMJ site and
8 from Musqueam Indian Band's perspective, if they are unable to continue to fish at Tilbury
9 Island, it would amount to an irreversible and irreplaceable loss of opportunity to exercise
10 Musqueam's fishing right on the Fraser River.

11 Tsawwassen First Nation have informed the EAO that fishing has been heavily constrained by
12 historic and existing effects and that from their perspective many rights-based thresholds have
13 already been surpassed and that the potential adverse effects and increased risks from TMJ will
14 take place in a context of many existing cumulative effects from existing development.
15 Tsawwassen First Nation have explained that due to the level of current cumulative effects,
16 further increases to vessel traffic and other conditions inconsistent with Indigenous fishing
17 would have significant cumulative effects.

18 Cowichan Nation Alliance highlighted that cumulative effects on Current Use are serious;
19 incremental increases in projects and activities heighten the degree of effect on use, access and
20 experience. Cowichan Nation Alliance have told the EAO that TMJ would impede access to an
21 area of Tilbury Island shoreline that has been used by Cowichan Nation Alliance community
22 members for harvesting for well over 30 years at the very least. Cowichan Nation Alliance noted
23 that TMJ precludes access along one of the last available stretches of shoreline on Tilbury Island
24 and that even with mitigations, from their vantage, TMJ would likely result in significant
25 adverse effects on Cowichan Nation Alliance fishing practices. Cowichan Nation Alliance
26 consider any interruption of fishing during a high-yield opportunity to be severe.

27 Tsleil-Waututh Nation commented that the use and occupancy of the Salish Sea has been
28 affected by changes in fish availability, seasonal change, closures, pressure by other marine
29 users, which in turn have forced Tsleil-Waututh Nation to adapt their fishing and harvesting
30 patterns to compensate for these changes. In general, Tsleil-Waututh Nation disagreed with
31 TJLP's conclusions on Current Use outlined in the Application and raised specific concerns about
32 cumulative effects to fish and marine mammals. Tsleil-Waututh Nation recommended that a
33 cumulative effects assessment for fish be undertaken.

34 Pacheedaht First Nation informed the EAO that any increase to levels of large marine vessel
35 traffic within Pacheedaht territory would have significant adverse effects on Pacheedaht people

1 and that the level of risk to Pacheedaht harvesters at Swiftsure bank has already surpassed a
2 critical threshold, resulting in loss of opportunity to harvest in preferred locations at preferred
3 times. Pacheedaht also stressed that the frequency of existing shipping traffic is so high as to
4 make it practically impossible for Pacheedaht fishers to schedule fishing activity to avoid vessels
5 even if this schedule were known to Pacheedaht fishers. Pacheedaht informed the EAO that the
6 potential for cumulative effects should be considered high due to the level of interference with
7 existing fishing practices as a result of the current level of shipping traffic in the Strait of Juan de
8 Fuca, in particular, at Swiftsure Bank. The EAO heard from Maa-nulth First Nations that
9 Swiftsure Bank represents a pinch point due to the levels of vessel traffic in the outbound
10 shipping lane that overlaps the area; however, the EAO also understands that the entire Maa-
11 nulth Domestic Fishing Area is considered as important areas for fishing by Maa-nulth First
12 Nations.

13 Indigenous Groups also raised concerns about existing conditions on the experience of
14 practicing traditional uses, including visual quality; noise quality; shipping interruptions of FSC
15 fishing; effects of cumulative vessel traffic to Indigenous mariner's safety from vessel wake and
16 collision risk; and corresponding willingness of their members to travel and harvest in the
17 marine environment. For example, Malahat First Nation commented that calm, summer days
18 are selected by for by Malahat First Nation to conduct traditional activities including harvesting
19 and canoe travel and reported accounts of canoes sinking due to freighter wakes while crossing
20 shipping lanes during traditional canoe voyages. Tsawwassen First Nation have noted that the
21 area is already heavily developed and visually affected at baseline, so overall the cumulative
22 effects of incremental change to visual quality would be significant from their perspective. Maa-
23 nulth First Nations stated that large vessels travel west and northwest outside of the MSA area
24 and through their Domestic Fishing Area and these vessels can restrict Maa-nulth First Nations'
25 fishing activities. Both Esquimalt First Nation and Maa-nulth First Nations told the EAO that any
26 impact to their treaty rights, interests, and culture due to marine shipping are significant, given
27 the volume of existing vessel traffic and reasonably foreseeable future increases vessel traffic
28 anticipated in their respective territories.

29 The EAO proposes provincial conditions and recommended KMMs under CEAA 2012, as per
30 [Section 11.4.4](#) above, to mitigate TMJ-related effects. However, the EAO acknowledges that
31 these mitigations measures would not reduce effects for baseline conditions and/or effects of
32 future projects, which are a key issue for many Indigenous Groups. The EAO notes several
33 existing initiatives of the Crown are currently underway to collect habitat and monitoring
34 information and implement management measures, to help slow, and ultimately reduce
35 cumulative effects in the Salish Sea and Fraser River. Recent Crown management measures and
36 existing initiatives related to the protection of SRKW (i.e., the Whales Initiative and ECHO

1 program) are outline in Marine Mammals ([Section 5.7](#)) of this Report. Also, other relevant
2 Crown initiatives designed to train, fund and equip Indigenous Groups to be safer, more
3 informed, and better prepared in the waters of the Salish Sea are also outlined in Section 2.1 of
4 Part C. The EAO notes that these programs are broad in nature and are not intended to mitigate
5 or accommodate for the specific potential effects to Indigenous mariners and fishers navigating
6 in proximity to TMJ vessels within the established Traffic Separation Scheme of the Salish Sea.

7 The EAO also recommends a KMM under CEAA 2012 for TJLP to identify how they are
8 participating in the identification and implementation of regional initiatives related to effects
9 on current use of lands and resources for traditional purposes as a result of marine shipping.

10 The EAO is aware that TJLP has proposed to contribute up to \$2 million to the First Nations
11 Fisheries Legacy Fund¹⁵⁰, which is an Indigenous-led program that support recovery programs
12 for chinook salmon, eulachon and sturgeon in the Fraser River and Salish Sea. For more
13 information about the EAO's consideration of TJLP's contribution proposal, refer to [Section 13.1](#)
14 on Current Context and Cumulative Effects in Part C.

15 ***CUMULATIVE EFFECTS OTHER TRADITIONAL AND CULTURAL USES [CEAA 5(1)(C)(iii)] AND*** 16 ***CULTURAL HERITAGE [CEAA 5(1)(C)(ii)]***

17 Musqueam Indian Band commented that even with mitigation, TMJ is expected to cause
18 significant adverse effects on Musqueam Indian Band's use of the preferred area in the vicinity
19 of Tilbury Island. This could result in future avoidance of the area and therefore loss of Cultural
20 Transmission and Musqueam Sense of Place and Identity and Cultural Continuity. Musqueam
21 Indian Band informed the EAO that the degree of change posed by TMJ, combined with effects
22 of past, current and foreseeable projects and activities, exceed Musqueam's own threshold of
23 acceptable change.

24 Indigenous Groups raised concerns about TJLP and the EAO's assessment of residual effects and
25 cumulative effects on SRKW, a species of key importance to Indigenous culture. Indigenous
26 Groups that raised concerns about effects to SRKW relating to cultural and spiritual importance
27 include: Musqueam Indian Band; Tseil-Waututh Nation; Tsawwassen First Nation; Quw'utsun
28 Nation; Snuneymuxw First Nation; Kwantlen First Nation; Malahat First Nation; Pacheedaht
29 First Nation; Ditidaht First Nation; Pauquachin First Nation; Esquimalt First Nation; Tsawout

¹⁵⁰ TJLP's proposal for Unconventional Offsetting Accommodation for Residual Project and Cumulative Effects, dated July 5, 2021.

(https://www.projects.eao.gov.bc.ca/api/document/61099898cd98620022b0832b/fetch/20210707_TilburyJettyLimitedPartnerShip_UnconventionalOffsetProposal.pdf).

1 First Nation; T'Sou-ke First Nation; Maa-nulth First Nation; Tsartlip First Nation; Tseycum First
2 Nation; Songhees First Nation and Scia'new First Nation. Refer to Part C of this Report for
3 Indigenous Group-specific details on cultural values associated with SRKW.

4 Tsleil-Waututh Nation submitted several technical comments regarding TJLP's assessment of
5 effects to marine mammals that were considered in the EA. Tsleil-Waututh Nation expressed
6 that increasing the cultural health of Tsleil-Waututh Nation community members by increasing
7 opportunities for members' participation in aspects of their traditional Coast Salish culture is a
8 high priority for Tsleil-Waututh Nation. Tsleil-Waututh Nation has expressed specific concerns
9 about significant cumulative effects of shipping to Tsleil-Waututh Nation's cultural health and
10 intangible cultural heritage, and specifically on spiritually significant areas and sacred tunnels¹⁵¹.
11 Tsleil-Waututh Nations stated that the severity of cumulative effects to Tsleil-Waututh's
12 Nations' ability to practice their ongoing Coast Salish culture and spiritual practices has been
13 extreme since 1792, and that TMJ-related vessels would contribute to existing cumulative
14 effects. Given the effects to SRKW, effects to Tsleil-Waututh Nation's ability to practice their
15 culture and the cumulative effects of more than a century of development in the area, several
16 specific TMJ-related activities are anticipated to negatively affect Tsleil-Waututh's Aboriginal
17 right to fish, right to practice and preserve their traditional culture, and right to self-
18 governance.

19 Tsawwassen First Nation are stewards of their entire Territory. Tsawwassen First Nation's
20 health is a balance of physical, cultural, and spiritual well-being and is tied to
21 Tsawwassen First Nation stewardship values, which are interwoven with several components of
22 Tsawwassen First Nation's way of life. Stewardship is integral to community health, prosperity,
23 and self-determination. Tsawwassen First Nation's goal is for their members to be united with a
24 strong connection to their culture, the land, and its resources. TMJ would be located within the
25 Tsawwassen Fishing Area and based on the potential effects to Tsawwassen First Nations'
26 ability to access and harvest culturally important species including eulachon, salmon and
27 sturgeon, and effects to knowledge transfer and cultural transmission, TMJ could affect their
28 ability to govern and steward the area for current and future fisheries resources according to
29 Tsawwassen laws, regulations and direction.

30 The EAO recommends a Cultural Heritage KMM under CEAA 2012, which would require TJLP to
31 develop nation-specific measures to address the effects on tangible and intangible cultural

¹⁵¹ For more details, please refer to Tsleil-Waututh Nation's assessment of impacts on Aboriginal Interests in Part C, authored by Tsleil-Waututh Nation.

1 losses caused by the construction and operation of TMJ, in consultation with those Indigenous
2 Groups experiencing the effects in the lower Fraser River, as described in the EAO's Assessment
3 Report. As part of the measures, TJLP would be required to consider developing or contributing
4 to Indigenous-led programs to preserve and enhance cultural heritage.

5 **11.4.5.2 THE EAO'S CONCLUSIONS ON CUMULATIVE EFFECTS**

6 The EAO notes that it did not conduct a comprehensive regional cumulative effects assessment
7 on all the various existing constraints and effects pathways for Current Use for fishing or
8 Cultural Heritage for the TMJ EA; this would be beyond the scope of a project-specific EA.
9 Notwithstanding this limitation, in the cumulative effects assessment, the EAO considered
10 where TMJ effects intersect with known constraints and cumulative effects and information
11 provided by Indigenous Groups to better inform decision makers on how cumulative effect may
12 be experienced by Indigenous Groups.

13 **CUMULATIVE EFFECTS CONCLUSIONS FOR CURRENT USE FOR FISHING**

14 The EAO concluded that there would be residual, non-significant cumulative effects on Fish and
15 Fish Habitat in the marine terminal area and no residual effects in the MSA area ([Section 5.6](#) of
16 this Report). However, the EAO has heard from Indigenous Groups about the negative trends of
17 fish populations, availability of fish, and that they are unable to fish particular species in either
18 the amount or frequency, or in the preferred areas at the RAA and MSA RSA scale. The EAO
19 notes that these baseline conditions, combined with the residual effects of TMJ and other
20 reasonably foreseeable projects in the Lower Fraser and in the Salish Sea could interact
21 cumulatively. The EAO acknowledges that there is already extensive development and
22 industrial activity in and around the lower Fraser River which is affecting Indigenous access to
23 fishing areas in the RAA. Additionally, there are many vessels transiting both the lower Fraser
24 River and the shipping lanes of the Salish Sea under baseline conditions which can affect
25 Indigenous fishers access or transit to fishing areas. These existing access conditions would
26 interact cumulatively with the residual effects to access in the TMJ marine terminal area (during
27 LNG berthing, loading and de-berthing) and TMJ-related vessels transit (Application scenario or
28 BVS), in addition to effects to access from future projects. Similarly, there are already high
29 levels of existing effects to the visual and acoustic environment from the Indigenous
30 perspective in the RAA. There are also existing concerns about safety from collisions and vessel
31 wake in both the RAA and MSA RSA that are already affecting the practice of fishing. These too
32 would interact cumulatively with effects from TMJ and future projects.

33 The EAO acknowledges that the current state of the RAA and MSA RSA may not provide
34 Indigenous Groups the ability to currently use the region for fishing in their preferred

1 manner¹⁵². Based on information from Indigenous Groups, and in consideration of the existing
2 landscape in the TMJ area, the EAO is of the view that it is reasonable to assume that there is
3 an existing significant, cumulative effect for fish resources, access and experience in the lower
4 Fraser River and in the shipping lanes, and that TMJ would further contribute to that significant
5 cumulative effect. The EAO concludes that it is reasonable to expect that past and future effects
6 on fish and fish habitat, access to fishing and the experience of fishing would combine with TMJ
7 effects to result in significant cumulative effects for those Indigenous Groups that fish
8 preferentially at the TMJ site: Tsawwassen First Nation, Musqueam Indian Band, Cowichan
9 Nation Alliance, and Tsleil-Waututh Nation. The EAO acknowledges that Ts'uubaa-asatx Nation,
10 Lyackson First Nation, Squamish Nation, Snuneymuxw First Nation, and Kwantlen First Nation
11 expressed a strong interest in fishing regularly in the lower Fraser River in the future and should
12 they do so, the EAO would conclude similar significant cumulative effects to their Current Use
13 for fishing in the RAA. Residual effects from TMJ on access and experience could combine with
14 existing significant cumulative effects for those Indigenous Groups that fish preferentially in the
15 shipping lanes: Pacheedaht First Nation and Ditidaht First Nation.

16 For Indigenous Groups that do not currently fish at the TMJ site or preferentially in the shipping
17 lanes, the EAO concludes that cumulative effects to Current Use for fishing would occur but
18 would not be significant. This would apply to Semiahmoo First Nation, Squamish First Nation,
19 Stó:lō First Nations, Katzie First Nation, and MNBC; Songhees First Nation, Esquimalt First
20 Nation, Malahat First Nation, T'Sou-ke First Nation, Tsartlip First Nation, Tseycum First Nation,
21 Tsawout First Nation, Pauquachin First Nation, Scia'new First Nation and Maa-nulth First
22 Nations.

23 Based on concerns raised by Indigenous Groups about cumulative effects and the number of
24 LNG carriers transiting the Fraser River and Salish Sea, as well as the EAO's conclusions of
25 significant cumulative effects to Current Use for fishing, the EAO also recommends a KMM
26 under CEAA 2012 to ensure that the number of LNG carriers berthing at TMJ to be loaded for
27 export would not exceed 68 carriers per year.

28 ***CUMULATIVE EFFECTS CONCLUSIONS FOR CURRENT USE FOR OTHER TRADITIONAL AND*** 29 ***CULTURAL USES AND CULTURAL HERITAGE***

¹⁵² A key factor contributing to the significance of existing cumulative effects is that the traditional activities of Indigenous Groups, which may be affected by TMJ, are not currently practiced in the preferred manner because of conservation issues, lack of access, or existing constraints.

1 The EAO reviewed the RBT2 Panel Report which concluded that there is an existing significant,
2 cumulative effect on cultural heritage at baseline in the MSA and that any increase in ship
3 movements would further contribute to that significant cumulative effect. Based on
4 information provided by Indigenous Groups regarding important cultural resources, such as
5 cultural travel or canoe journey routes, physical heritage sites, spiritual sites, ability to practice
6 and transmit culture and language and SRKW, that contribute to tangible and intangible cultural
7 heritage, the EAO is of the view that there is an existing significant, cumulative effect on
8 cultural heritage in both the lower Fraser River and around Tilbury Island, in or near the
9 shipping lanes, and for cultural values associated with SRKW.

10 The EAO concludes that TMJ-related activities and shipping, interacting with existing baseline
11 conditions and other present and foreseeable projects, would contribute to significant
12 cumulative effects to Cultural Heritage for:

- 13 • Indigenous Groups that identify SRKW to be of importance to Indigenous culture;
- 14 • Tseil-Waututh Nation related to cultural and spiritual practices;
- 15 • Musqueam related to cultural continuity and sense of place and identity;
- 16 • Tsawwassen First Nation related to cultural well-being and stewardship aspirations
17 under Tsawwassen First Nation's Treaty; and
- 18 • Pacheedaht First Nation and Ditidaht First Nation related to cultural practices, language
19 and knowledge transmission.

20 The EAO notes that several initiatives led by the Government of Canada are currently underway
21 to collect habitat and monitoring information, implement management measures to address
22 cumulative effects, and support capacity building by Indigenous groups to undertake studies
23 and stewardship activities in the Salish Sea and lower Fraser River. These include specific
24 initiatives, as well as additional measures targeted to support the protection and recovery of
25 SRKW, including cumulative effects from marine shipping. These measures are outlined in the
26 Marine Mammal ([Section 5.7](#)) and Part C ([Section 13.1.1](#)) of this Report. The EAO recommends
27 a Cultural Heritage KMM under CEAA 2012, which would require TJLP to develop nation-specific
28 measures to address the effects on tangible and intangible cultural losses caused by the
29 construction and operation of TMJ, in consultation with those Indigenous Groups experiencing
30 the effects in the lower Fraser River. As part of the measures, TJLP would be required to
31 consider developing or contributing to Indigenous-led programs to preserve and enhance
32 cultural heritage. Based on concerns raised by Indigenous Groups about cumulative effects and
33 the number of LNG carriers transiting the Fraser River and Salish Sea, as well as the EAO's
34 conclusions of significant cumulative effects to Current Use for other traditional and cultural
35 uses and cultural heritage, the EAO also recommends a KMM under CEAA 2012 to ensure that

- 1 the number of LNG carriers berthing at TMJ to be loaded for export would not exceed 68
- 2 carriers per year.

3 **11.4.6 CONCLUSIONS**

4 Considering the analysis above and the conditions identified in the CPD and TOC (which would
5 become legally binding if an EAC is issued), as well as the recommended KMMs under CEAA
6 2012 (Appendix 1), the EAO concludes that TMJ would not have significant residual adverse
7 effects on Current Use [CEAA 2012 5(1)(c)(iii)] and Cultural Heritage [CEAA 2012 5(1)(c)(ii)].

8 The EAO concludes that the predicted residual effects from TMJ, in combination with the
9 effects of past, existing and reasonable foreseeable projects, would cause significant adverse
10 cumulative effects on the fishing component of Current Use [CEAA 2012 5(1)(c)(iii)] for
11 Tsawwassen First Nation, Musqueam Indian Band, Cowichan Nation Alliance, Tsleil-Waututh
12 Nation, Pacheedaht First Nation and Ditidaht First Nation (and potentially Ts'uubaa-asatx
13 Nation, Lyackson First Nation, Snuneymuxw First Nation, Squamish Nation and Kwantlen First
14 Nation, should they fish regularly in the Fraser River in the future).

15 The EAO concludes that the predicted residual effects from TMJ, in combination with the
16 effects of past, existing and reasonably foreseeable projects, would cause significant adverse
17 cumulative effects on Cultural Heritage [CEAA 2012 5(1)(c)(ii)]. Specifically for Tsleil-Waututh
18 Nation related to cultural and spiritual practices, Musqueam related to cultural continuity and
19 sense of place and identity, Tsawwassen First Nation related to cultural well-being and
20 stewardship aspirations under Tsawwassen First Nation's Treaty, and for Pacheedaht First
21 Nation and Ditidaht First Nation related to cultural practices, language and knowledge
22 transmission, and those Indigenous Groups that use SRKW for cultural purposes including:
23 Musqueam Indian Band; Tsleil-Waututh Nation; Tsawwassen First Nation; Quw'utsun Nation
24 Indigenous Groups; Kwantlen First Nation; Snuneymuxw First Nation, Ts'uubaa-asatx Nation;
25 Malahat First Nation; Pacheedaht First Nation; Ditidaht First Nation; Pauquachin First Nation;
26 Esquimalt First Nation; Tsawout First Nation; T'Sou-ke First Nation; Maa-nulth First Nation;
27 Tsartlip First Nation; Tseycum First Nation; Songhees First Nation; and Scia'new First Nation.

1 PART C – ABORIGINAL CONSULTATION REPORT

2 12 EAO CONSULTATION PROCESS METHODOLOGY

3 12.1 ABORIGINAL INTERESTS

4 The Governments of BC. and Canada have a duty to Consult and where necessary,
5 accommodate for government decisions that may impact potential or established Aboriginal or
6 Treaty Rights (including title). In carrying out this duty, in its assessment the EAO considered
7 potential for impacts to “Aboriginal Interests” more broadly to include Aboriginal or Treaty
8 Rights, (including title), as well as a range of interests held by Indigenous Groups¹⁵³, including
9 Treaty partners¹⁵⁴, that extends beyond those that are strictly linked to the duty to Consult. This
10 approach is consistent with BC and Canada’s commitment to relationship building and
11 reconciliation with Indigenous Groups.

12 Through their work with Indigenous peoples, the EAO and IAAC are also committed to
13 advancing reconciliation by implementing the standards set out in the United Nations
14 Declaration on the Rights of Indigenous Peoples (the UN Declaration) and the Truth and
15 Reconciliation Commission (TRC) of Canada Call to Actions. In November 2019, the Government
16 of BC passed the *Declaration on the Rights of Indigenous Peoples Act* into law, which establishes
17 the UN Declaration as the framework for reconciliation, as called for by the TRC’s Calls to
18 Action. Also, the *United Nations Declaration on the Rights of Indigenous Peoples Act* received
19 Royal Assent in June 2021.

20 Below is more information about the EAO’s impact assessment methodologies, consultation
21 and engagement activities related to the EA for TMJ, and potential impacts to Aboriginal
22 Interests. Please note, that where Indigenous Groups have identified a specific preferred term
23 to use in reference to their Aboriginal Interests, the EAO has used that term. Also note, that
24 throughout this document the use of the term “territory” refers to the asserted traditional
25 territories of Indigenous Groups unless the territories are established treaty lands or otherwise
26 established at law or recognized by B.C. and Canada. An EA is not a rights-determining process.

¹⁵³ “Indigenous Groups” means those Aboriginal entities identified in Schedule B and Schedule C of the Section 11 Order for TMJ, and subsequent Section 13 Orders that amended the Section 11 Order to include Schedule D (see [Section 2.2](#) of Part B).

¹⁵⁴ Refers to interests of Treaty partners extending beyond just the four corners of the Treaty.

1 12.2 IMPACTS ASSESSMENT METHODS

2 The EAO's analytical framework for assessing the seriousness of impacts on Aboriginal Interests
3 is not the same as the significance test for environmental, socio-economic, or other VCs in Part
4 B of this assessment report. A holistic approach is taken on the impact assessment on
5 Aboriginal Interests, which considers cumulative effects, including through the consideration of
6 the existing state or baseline conditions of various biophysical factors, any conservation
7 concerns, impacts of existing or past developments, and the relative importance of an area to
8 an Indigenous Group.

9 The EAO recognizes that adverse project impacts on Aboriginal Interests may not arise solely
10 from changes to the biophysical environment. In many instances, information regarding
11 potential biophysical and/or socio-economic effects from a project or activity, and in particular
12 effects on traditional, current, and future land and marine resource uses, will be relevant to an
13 assessment of impacts on Aboriginal Interests. In addition to information in the Application, the
14 assessment of impacts on Aboriginal Interests also considers information provided during the
15 course of the Application Review, including information provided directly by Indigenous
16 Groups.

17 Rights-based Aboriginal Interests are understood as associated with traditional practices
18 related to hunting, trapping, gathering, fishing, marine harvesting, or other cultural or spiritual
19 practices, but may not be limited to these practices. The EAO has considered the following
20 three components in the assessment for potential impacts of project-related activities on
21 rights-based Aboriginal Interests of Indigenous Groups:

- 22 • **Biophysical factors:** Consideration of potential effects on biophysical factors that are
23 important for, or associated with, the exercise of the right. This can include
24 consideration of the sufficiency of resources specific to VCs relevant to the exercise of
25 the right (e.g., fish, wildlife), the species harvested by the Indigenous Group (with
26 respect to the harvesting rights), the potential effects of the proposed activity on the
27 resources habitat, food source quantity and quality, existing state of habitat or food
28 source, potential effects on species distribution, duration of impacts to biophysical
29 component, relevant mitigation measures, and the efficacy of such mitigation measures;
30
- 31 • **Geospatial factors (sites, places and access):** Consideration of potential effects on
32 specific sites or traditional use areas where rights are currently exercised or held,
33 including those sites where an Indigenous Group has exercised the right in the past,
34 plans to exercise, or aspires to exercise a right in the future. This can include
35 consideration of whether there are any traditional land or marine use sites associated

1 with the exercise of the right identified overlapping or in proximity to the project area,
2 the number of such sites, effects on the access to such sites, and the frequency,
3 duration or timing of impacts to access to such sites, increased public access, relevant
4 mitigation measures, and the efficacy of such mitigation measures; and
5

- 6 • **Social, Cultural, Experiential Values:** Consideration of potential effects on social,
7 cultural, spiritual and experiential aspects of the exercise of the right. This can include
8 potential direct and indirect effects of the project, including duration and frequency of
9 potential effect, on sensory disturbance, the experience of exercising the right in the
10 area, effects on community health, on socio-cultural institutions, teaching and
11 knowledge transfer, ceremonial or spiritual practices associated with the right and any
12 relevant mitigation measures and the efficacy of such mitigation measures. This also
13 includes if there are any special characteristics or unique features of this area, the
14 relative importance of the project area and its surroundings to the exercise of the right
15 and associated activities, practices, customs and traditions.

16 Within each of the components of rights-based Aboriginal Interests above, there are a number
17 of relevant factors considered, including factors relating to cumulative effects (e.g., the site in
18 question is the only remaining and most important harvesting site for the Nation, or a
19 determination of significant residual or cumulative effects of a biophysical from Part B), which
20 could increase the seriousness of impact for that component. The EAO recognizes that
21 Aboriginal Interests are held at a larger geographic scale than that which is generally assessed
22 during an environmental assessment (i.e., rights are often exercised at a scale beyond the RAA).

23 The assessment of seriousness of impacts on rights-based Aboriginal Interests is primarily
24 focused on factors related to impacts from the project itself (e.g., impacts from the project to
25 biophysical factors, Indigenous use of the site, social, cultural and experiential factors).
26 However, the assessment also considers the historical context or current state of affairs in the
27 broader regional area in relation to an Indigenous Group's use of this portion of its territory
28 (e.g., relative importance of the site), see [Section 13.1](#) of Part C.

29 The overall assessment of the seriousness of impact on the right includes a supporting rationale
30 based upon residual and cumulative impacts to the biophysical factors, specific sites or areas,
31 and the social, cultural, spiritual, and experiential context within which the rights are exercised,
32 in addition to considering mitigations and accommodations. The overall seriousness of impact
33 conclusions is generally based on an equal weighing of the components noted above (i.e.,
34 biophysical factors, geospatial factors, or social, cultural and experiential values); however, the
35 assessment process is subject to modification on a case-by-case basis. Where Indigenous

1 Groups or Treaty Nations have provided additional information beyond the factors listed above,
2 the EAO has also considered this information in the overall seriousness of impact assessment.

3 The EAO's overall assessment of the seriousness of impacts on Aboriginal title includes a
4 supporting rationale based upon a consideration of the residual impacts of the project on the
5 use and occupation, decision making, and economic components of Aboriginal title¹⁵⁵:

- 6 • **Use and occupation:** Consideration of any potential alienation of an area, the degree of
7 potential disturbance or functional effect of the potential disturbance associated with
8 TMJ, how the proposed decision might restrict community members' access to the area,
9 and how the proposed decision might affect community members' enjoyment,
10 experience, and use of the area, now and in the future;
- 11 • **Decision-making:** Consideration of the proposed decision, the extent to which an
12 Indigenous Group might be involved in the decision-making process, and whether the
13 activity might be consistent or inconsistent with any cultural or other objectives of the
14 Indigenous Group for management in this area, now and in the future; and
- 15 • **Economic benefits:** consideration of whether the project-related decision might affect a
16 community's ability to derive direct and/or indirect economic benefits from the area,
17 and how the proposed decision might affect a community's economic development
18 aspirations for the area, now and in the future.
- 19 •

20 Understanding the level of impacts to Aboriginal Interests requires an understanding of
21 potential project effects, including the perspectives of Indigenous Groups on potential project
22 effects gained through an iterative engagement process. The overall seriousness of impact on
23 Aboriginal Interests is informed by residual impacts after mitigations and accommodations have
24 been factored in, including a consideration of the adequacy of those measures. Generally, the
25 EAO considers mitigations as including EA mechanisms (e.g., EAC conditions, environmental
26 mitigation and management plans, habitat offsetting and follow-up plans, etc.), relevant
27 government-led initiatives, or other processes that address specific impacts. Potential
28 accommodation may also be brought forward by other sources, such as the proponent, that are
29 considered and assessed to determine if they would further reduce the potential seriousness of
30 impact on Aboriginal Interests. These measures may include commitments such as financial

¹⁵⁵ With respect to the interests of Treaty Nations, which are unique to each Treaty relationship, the EAO's assessment of potential impacts to Aboriginal Interests are included in each Treaty Nation's individual sections below.

- 1 compensation, procurement contracts, or employment training . Impacts on Aboriginal
 2 Interests are assessed for each individual Indigenous Group and for each category of rights in
 3 [Section 14](#) (Schedule B), [Section 15](#) (Schedule C), and [Section 16](#) (Schedule D) of this Report.
 4 These impacts are described based on the level of seriousness of potential impacts from
 5 negligible to serious, defined as follows¹⁵⁶:

Potential Impact ¹⁵⁷	Characterization
Negligible	No detectable impact or any change from current conditions
Negligible-to-minor	Some detectable impacts or change from current condition
Minor	Ability to exercise the right (or interest) is minimally disrupted
Minor-to-moderate	Ability to exercise the right (or interest) is more than minimally disrupted
Moderate	Ability to exercise the right (or interest) has been diminished or disrupted
Moderate-to-serious	Ability to exercise the right (or interest) has been more than moderately diminished
Serious	Ability to exercise the right (or interest) has been significantly diminished

- 6
- 7 When reporting on potential impacts to Aboriginal Interests, the EAO acknowledges that the
 8 impacts experienced by Indigenous Groups can vary in time and space. That is, impacts on
 9 Aboriginal Interests in one area of an Indigenous Group’s territory may not be the same as
 10 elsewhere, and impacts during construction may not be the same as during operations or
 11 decommissioning. The EAO recognizes that areas within the territory of each Indigenous Group
 12 may be particularly important and valuable for specific qualities associated with traditional
 13 cultural or spiritual practices, and that this could vary throughout the year or under certain
 14 circumstances. These areas may also be used for traditional harvesting activities (e.g., hunting,
 15 trapping, fishing, and gathering) by individual members or families. The EAO also acknowledges
 16 that the current context includes the effects of past and present projects or activities and

¹⁵⁶ The EAO described impacts based on the level of seriousness from negligible to serious as shown, except where Indigenous Groups provided their own description of the level of seriousness for an impact to their Aboriginal Interests in Part C.

¹⁵⁷ As noted in the list of “factors” the EAO considers in its assessment of impacts to Aboriginal Interests, the extent to which current conditions affects the exercise of rights is also considered in the assessment.

1 considers these factors when determining the overall seriousness of impact assessment of TMJ
2 on Aboriginal Interests.

3 The rationale for the level of impact to Aboriginal Interests will highlight key factors and
4 information considered and those factors that are given greater weight while noting confidence
5 in any assumptions made and any remaining uncertainties. For each Indigenous Group, the
6 level of impact reported in the impact assessment is the greatest expected impact on Aboriginal
7 Interests from construction and operation of TMJ. Further, the EAO considers that where the
8 cumulative effects of past and present activities have negatively affected conditions today
9 compared to those required for the meaningful practice of the right, the conclusion on overall
10 effects from a current project combined with existing constraints or effects would be more
11 serious. If consensus on the level of impact is not reached with the Indigenous Groups who
12 have communicated to this effect through written submissions or in meetings with the EAO,
13 this difference of opinion will be clearly articulated. Further information related to the EAO's
14 considerations of current context and cumulative effects in the impact assessment on
15 Aboriginal Interests is provided in [Section 13.1](#).

16 **12.3 DEPTH OF CONSULTATION**

17 The following sections discuss the procedural elements of Indigenous consultation or
18 engagement activities undertaken by the EAO and TJLP¹⁵⁸.

19 To determine whether an Indigenous Group would be included on Schedule B or C of the
20 Section 11 Order, the EAO considered the overlap of TMJ with each Indigenous Group's
21 asserted traditional territory or Treaty Lands, the nature of the potential impact on each
22 Indigenous Group's Aboriginal Interests, and, where applicable, an initial assessment of the
23 strength of claimed Aboriginal rights and title.

24 Schedule B lists Indigenous Groups engaged at the deeper end of the consultation spectrum
25 (including participation in the Working Group) and Schedule C lists Indigenous Groups at the
26 lower end of the consultation spectrum. Schedule D lists Indigenous Groups at the deeper end
27 of the consultation spectrum specifically with respect to potential impacts of marine shipping
28 (including participation in the Marine Shipping Working Group).

¹⁵⁸ On June 11, 2020, the EAO was notified that Tilbury Jetty Limited Partnership (TJLP) replaced WesPac Midstream-Vancouver LLC as the new proponent for TMJ. TJLP is a partnership between affiliates of Fortis and Seaspan. References to TJLP includes all consultation and engagement activities, submissions and studies conducted by WesPac Midstream-Vancouver LLC prior to the ownership transfer of TMJ.

- 1 The EAO's initial assessment of the required scope of the duty to consult was presented to
2 Indigenous Groups identified on Schedules B and C for review and comment as part of
3 consulting on the draft Section 11 Order.
- 4 The EAO issued a Section 11 Order which specifies the consultation activities that both the EAO
5 and TJLP would undertake with all Indigenous Groups potentially affected by TMJ. The EAO
6 considered comments received from Indigenous Groups and issued the Section 11 Order on
7 July 24, 2015, and then subsequently updated it five times with Section 13 Orders¹⁵⁹ (September
8 25, 2015, May 11, 2016, February 14, 2018, August 6, 2019, and January 19, 2022). The EAO
9 updated the Indigenous Groups that would be consulted in relation to TMJ and the depth of
10 consultation.
- 11 The BC EA of TMJ was substituted for the federal EA as set out in the MOU between the EAO
12 and the Agency. As specified in the MOU, the EAO conducted procedural aspects of Aboriginal
13 consultation on behalf of both the provincial and federal Crown for the TMJ EA. To meet federal
14 consultation agreements consistent with the MOU, the Métis Nation of BC (Métis Nation BC)
15 was included on Schedule C for TMJ. Consultation with the Métis Nation BC is not an
16 acknowledgement on the part of BC that it owes a duty to consult or accommodate Métis in BC
17 under Section 35 of the *Constitution Act, 1982*. The EAO consulted Métis Nation BC on behalf of
18 the Agency pursuant to the MOU on Substitution of EAs.
- 19 The Section 13 Orders (dated February 14, 2018 and January 19, 2022) identified consultation
20 with the Schedule B and Schedule C Indigenous Groups outlined below.

¹⁵⁹ A Section 13 Order is used to modify, update, or replace sections of the Section 11 Order.

1 Schedule B:

- 2 • Cowichan Tribes
- 3 • Halalt First Nation
- 4 • Kwantlen First Nation
- 5 • Lake Cowichan First Nation (Ts'uubaa-asatx Nation)
- 6 • Lyackson First Nation
- 7 • Musqueam Indian Band
- 8 • Penelakut Tribe
- 9 • Tsawwassen First Nation⁹
- 10 • Stz'uminus First Nation
- 11 • Tsleil-Waututh Nation
- 12 • Semiahmoo First Nation
- 13 • Squamish Nation
- 14 • Snuneymuxw First Nation

15

16 Schedule C:

- 17 • Katzie First Nation
- 18 • People of the River Referrals Office
- 19 • Stó:lō Nation
- 20 • Stó:lō Tribal Council
- 21 • Métis Nation British Columbia
- 22 • Kʷikʷəłəm (Kwkwetlem) First Nation

23 On August 6, 2019, at the request of the Government of Canada, the EAO under a Section 13
24 Order amended the geographic scope for the assessment of potential effects from marine
25 shipping from Sand Heads to the 12nm mark and added the Schedule D First Nations listed
26 below. The EAO and the Agency considered the overlap between the anticipated effects from
27 TMJ related vessels and an initial estimate of potential impacts on Aboriginal Interests and
28 Treaty Rights in deciding which Indigenous groups to include under Schedule D.

- 1 **Schedule D:**
- 2 • Ditidaht First Nation
- 3 • Pacheedaht First Nation
- 4 • Maa-nulth First Nations¹²:
- 5 ○ Huu-ay-aht First Nations
- 6 ○ Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations
- 7 ○ Toquaht Nation
- 8 ○ Uchucklesaht Tribe
- 9 ○ Ucluelet First Nation (Yuuʔuʔifʔath First Nation)
- 10 • Pauquachin First Nation
- 11 • Tsawout First Nation
- 12 • Tsartlip Indian Band
- 13 • Malahat First Nation
- 14 • Tseycum Indian Band
- 15 • Esquimalt Nation
- 16 • Songhees Nation
- 17 • Scia'new (Beecher Bay) First Nation
- 18 • T'sou-ke (Sooke) First Nation

12.4 THE EAO-LED CONSULTATION ACTIVITIES WITH INDIGENOUS GROUPS

The EAO is of the view that it has approached consultation with the intent to identify potential impacts on Aboriginal Interests identified by Indigenous Groups in the project area, including the expanded marine shipping route to the 12 nm territorial limit. The EAO is also of the view that it has approached consultation with the intent to consider ways to address potential impacts to Aboriginal Interests through measures to avoid, mitigate, or offset, including assessing the adequacy of those, other relevant processes, or any proposed accommodation measures brought forward by the proponent.

The EAO invited Indigenous Groups on Schedule B to participate in the Working Group. As described in the Role of the Advisory Working Group section of Part A of this Report, working group participation included: review and comments on the draft VC Selection and draft AIR documents, screening of the Application, and review and comment on the Application and supplemental material, as well as the opportunity to review and comment in an iterative manner on the EAO's draft decision materials. The EAO is of the view that it has endeavoured to reflect and consider the concerns and perspectives that Indigenous Groups shared during the EA about the potential impacts to Aboriginal Interests in the project area, the adequacy of the proposed measures to address potential impacts to Aboriginal Interests, and the EAO's approach to consultation for the EA process in its decision materials.

Consultation with the Schedule B Indigenous Groups includes the following:

- Notification of the following major milestones:
 - Issuance of any Orders from the EAO, including Section 11 and 13 Orders;
 - The public comment period for the draft VC document;
 - Approval of the final VC document and the final AIR;
 - When the Application has been accepted, and the start of Application Review has commenced;
 - Commencement of public comment periods on the Application, and on the EAO's draft decision materials; and
 - Notification of the decision on the Application, when made;
- Participation in the Working Group or relevant Working Group subcommittee meetings;
- Opportunities to identify Aboriginal Interests or Treaty Rights and the potential adverse effects of TMJ on Aboriginal Interests or Treaty Rights, as appropriate;

- 1 • Providing a copy of the Application during the applicable legislated time period and
2 inviting Schedule B Indigenous Groups to comment on the conformity of the Application
3 with the AIR and the Proponent's past and proposed Aboriginal Consultation activities;
- 4 • Opportunity to submit comments on the Application and to request additional
5 information;
- 6 • Opportunities to meet with the EAO to discuss any outstanding concerns, including in
7 relation to potential adverse its Aboriginal Interests or Treaty Rights with respect to the
8 proposed project and measures to avoid, mitigate, or otherwise address or
9 accommodate potential adverse impacts on Aboriginal Interests or Treaty Rights, as
10 appropriate;
- 11 • Opportunity to review and comment on key documents for the EAO's consideration,
12 including the draft Project Description, draft Section 11 Order, draft VC Selection
13 document, draft AIR, TJLP's Application for EAC, supplemental materials, the EAO's draft
14 Assessment Report (including Part C of the Assessment Report), the draft Certified
15 Project Description (CPD) and draft Table of Conditions (TOC), and iterations of these key
16 documents;
- 17 • Opportunity to review and comment on the KMMs, including revised iterations;
- 18 • Opportunity to collaboratively draft sections of the EAO's Assessment Report (Part C)
19 within established timelines and propose certificate conditions within established
20 timelines;
- 21 • Opportunity to comment on the adequacy of TJLP's responses to the comments and
22 information requests submitted by Indigenous Groups; and
- 23 • Opportunity to submit a document outlining the Indigenous Group's views on the
24 Assessment Report to be included in the package of materials sent to Ministers when
25 TMJ is referred for decision.

26 Schedule C Indigenous Groups were provided the following:

- 27 • Notification of the following major milestones:
 - 28 ○ Issuance of any Orders from the EAO, including Section 11 and 13 Orders;
 - 29 ○ The public comment period for the draft VC document;
 - 30 ○ Approval of the final VC document and the final AIR;
 - 31 ○ When the Application has been accepted, and the start of Application Review
32 has commenced;
 - 33 ○ The public comment period on the Application; and
 - 34 ○ Notification of the Decision on the Application;

- 1 • Opportunity to raise any issue with the EAO for discussion; and
- 2 • Opportunity to comment on the draft Assessment Report, proposed and draft CPD
- 3 within established timelines.

4 As part of the increased shipping assessment area decision, the EAO invited Indigenous Groups
5 on Schedule D to participate in a marine shipping working group. Participation in the working
6 group for Schedule D Nations included the opportunity to review and comment on TJLP's
7 Marine Shipping Assessment (MSA) and Bunkering Vessel Scenario Assessment (BVSA) reports
8 as well as the opportunity to review and comment in an iterative manner on the EAO's draft
9 decision materials. Consultation with Schedule D Indigenous Groups includes the following:

- 10 • Notification of the following major milestones:
 - 11 ○ Issuance of any Orders from the EAO;
 - 12 ○ Commencement of public comment periods on the Application, and on the
 - 13 EAO's draft decision materials; and
 - 14 ○ Notification of the Decision on the Application;
- 15 • Participation in the Working Group or relevant Working Group subcommittee meetings;
- 16 • Opportunities to identify Aboriginal Interests or Treaty Rights and the potential adverse
- 17 effects of TMJ on Aboriginal Interests or Treaty Rights, as appropriate;
- 18 • Opportunities to meet with the EAO to discuss any outstanding concerns, including in
- 19 relation to potential adverse effects to its Aboriginal Interests with respect to the
- 20 proposed Project and measures to avoid, mitigate, or otherwise address or
- 21 accommodate potential adverse impacts on Aboriginal Interests or Treaty Rights, as
- 22 appropriate;
- 23 • Opportunity to review and comment on key documents for the EAO's consideration,
- 24 including the EAO's draft Assessment Report (including Part C of the Assessment
- 25 Report), the draft CPD, and the draft TOCs;
- 26 • Opportunity to review and comment on the KMMs, including revised iterations;
- 27 • Opportunity to collaboratively draft sections of the EAO's Assessment Report (Part C)
- 28 within established timelines and propose certificate conditions within established
- 29 timelines;
- 30 • Opportunity to be consulted on determining the adequacy of TJLP's responses to the
- 31 comments and information requests received from Indigenous Groups; and
- 32 • Opportunity to submit a document outlining the Indigenous Group's views on the
- 33 Assessment Report to be included in the package of materials sent to Ministers when

1 TMJ is referred for decision.

2 **12.5 PROPONENT-LED CONSULTATION ACTIVITIES WITH** 3 **INDIGENOUS GROUPS**

4 As part of the Section 11 Order and through subsequent applicable amendments under
5 Section 13 Orders, the EAO directed TJLP to undertake certain procedural aspects of
6 consultation during the EA with Schedule B Indigenous Groups. The Orders also required TJLP to
7 develop and share drafts of an Aboriginal Consultation Plan and multiple Aboriginal
8 Consultation Reports (ACRs), including ACR-1 (March 2017); ACR-2 (March 2019); ACR-3 (July
9 2019); and ACR-4 (May 2022), with the specified Indigenous Groups at prescribed milestones
10 during the EA. These documents were reviewed by Schedule B Indigenous Groups and revised
11 by TJLP based on input received from and concerns expressed by Indigenous Groups prior to
12 being submitted for review to the EAO, as required.

13 These documents enabled the EAO to:

- 14 • Understand TJLP's consultation plans and subsequent efforts and the perspectives of
15 the Indigenous Groups related to those efforts;
- 16 • Understand any issues and concerns identified by Indigenous Groups to TJLP and how
17 TJLP has made efforts to respond to or address these issues; and
- 18 • Evaluate TJLP's consultation plan for subsequent consultation activities required with
19 these Indigenous Groups during Application Review.

20 During the EA process, the EAO also requested that TJLP share a draft of the Application or
21 specific chapters with certain Indigenous Groups prior to submission to the EAO for Application
22 evaluation. During Application Review, the EAO also required TJLP to provide a draft version of
23 the BVSA Report for the Working Group, including Schedule B and D Indigenous Groups, to
24 provide feedback and comment prior to final submission of TJLP's BVSA Report.

25 Through the August 6, 2019 Section 13 Order that officially brought Schedule D Indigenous
26 Groups into the EA. The Section 13 Order required TJLP to include an assessment of potential
27 impacts of TMJ pursuant to CEAA 2012, and as directed by the EAO provide a response to
28 comments received within specified timeframes or implement additional measures for
29 consultation and accommodation of the Schedule D Nations. While the EAO led consultation
30 with the Schedule D Indigenous Groups, TJLP also met with some Schedule D Indigenous
31 Groups if requested by a Schedule D Indigenous Group.

1 **13 POTENTIAL IMPACTS ON ABORIGINAL INTERESTS**

2 The purpose of this section is to describe the current context and summarize the main issues
3 heard across Indigenous Groups regarding the pathways of potential TMJ effects on Aboriginal
4 Interests and is not intended to generalize impacts. The EAO's conclusions on the impacts to
5 Aboriginal Interests specific to each Indigenous Group are included in [Section 14](#) (Schedule B),
6 [Section 15](#) (Schedule C), and [Section 16](#) (Schedule D) of this Report.

7 **13.1 CURRENT CONTEXT AND CUMULATIVE EFFECTS**

8 Throughout the TMJ EA, Indigenous Groups expressed concerns about the cumulative effect of
9 historical, current, and foreseeable economic development on the Fraser River and the Salish
10 Sea¹⁶⁰ environment. Many Indigenous Groups told the EAO that past and present economic
11 development over the last 200 years is limiting their ability to meaningfully practice their
12 Aboriginal Interests and Treaty Rights and interrupting their ability to pass on their Indigenous
13 knowledge and culture to the next generation.

14 Many Indigenous Groups raised concerns about the cumulative effects of shipping traffic and
15 the other cumulative effects of development in the lower mainland and the Salish Sea that are
16 affecting the flora, fauna, and ecology of the region. Some Indigenous Groups told the EAO that
17 the rate of development and the amount of marine shipping have rapidly increased over a short
18 period of time.

19 Indigenous Groups consider that past and present development is contributing to:

- 20 • Declining fish stocks, in particular Fraser River salmon and other fish species;
- 21 • Poor health and premature death of Southern Resident Killer Whales;
- 22 • Reductions in the visual, acoustic, and spiritual quality of areas within their territories;
23 and
- 24 • Greatly reduced access to and the quantity and quality of resources utilized for FSC

¹⁶⁰ The EAO considers the Salish Sea to include the waters from the southern end of Johnstone Strait—near Campbell River—along the eastern shore of Vancouver Island, past Victoria, Vancouver and into Puget Sound to Seattle and Tacoma. It includes the Gulf Islands of Canada, and the San Juan group of islands in the United States. The EAO acknowledges that the name “Salish Sea” may not be the preferred term for this area by all Indigenous Groups.

1 purposes contributing to deep cultural impacts from the Indigenous perspective.

2 Many Indigenous Groups identified that future increases in development and vessel traffic,
3 including increased traffic related to bunkering vessels under TMJ's BVS, could:

- 4 • Further limit their community members' access to fishing and harvest areas, including
5 areas that would support shore-based or marine-based fishing, hunting, trapping and
6 gathering in the area;
- 7 • Contribute to adverse effects to marine species from vessel noise or ship strikes from
8 transiting TMJ vessels, or negative effects on fish habitat;
- 9 • Contribute to adverse effects to shoreline erosion due to TMJ vessel-related wake, and
10 lead to potential impacts to cultural heritage and archaeology sites;
- 11 • Make the marine environment less safe for their members due to vessel wakes and an
12 increased potential for collisions that would result in further interruptions to
13 transmission of Indigenous knowledge and culture to younger generations.
- 14 • Introduce harmful chemicals or invasive species into the environment through ballast
15 water discharges or biofouling from ships; and
- 16 • Contribute air and noise emissions, environmental impacts to vegetation or wildlife
17 habitat, and changes to the visual landscape that would impact use of their traditional
18 Territory and their sense of place within it.

19 Many Indigenous Groups noted that TMJ's effects would overlap with cumulative effects of
20 shipping and restrictions on access to important cultural and harvesting sites. This could
21 discourage their members' overall use of waterways in the lower Fraser River and the MSA
22 area, leading to reduced harvests that would impact wellbeing, economic, cultural, and social
23 structures within their respective communities. Tsawwassen First Nation, Musqueam Indian
24 Band, Tsleil-Waututh Nation, Kwantlen First Nation, and Cowichan Nation Alliance felt that the
25 appropriate baseline from which to assess effects would be prior to the arrival of European
26 settlers. Indigenous Groups also noted that fisheries management by DFO limits access to
27 resources and ability to harvest for FSC purposes. Indigenous Groups told the EAO that
28 combined cumulative impacts to fishing rights and a reduction in transmission of cultural
29 practices to younger generations could result in a loss of Indigenous knowledge.

30 The EAO considers that the current context of the state of the environment includes the
31 cumulative effects of past and present projects or activities, and that these factors are
32 considered when determining "overall" levels of impact of TMJ. Further, the EAO considers that

1 where the cumulative effects of past and present activities have negatively affected conditions
2 today compared to those required for the meaningful practice of the right, the conclusion on
3 effects from a current project on that right would be more serious. As the EAO did not conduct
4 territory-wide assessments for each Indigenous Group for this EA, the EAO is not concluding on
5 the current conditions or degree of cumulative effects throughout an Indigenous group's entire
6 territory and how TMJ might interact with these. Rather, the EAO has considered cumulative
7 effects within the scope of the EA, at the scale of the RAA and RSA.

8 The EAO also did not conduct a comprehensive regional cumulative effects assessment on all
9 the various existing constraints and pathways of impact to Indigenous Groups, and considers
10 that such a regional-level assessment would be beyond the scope of a project-specific EA.
11 Notwithstanding this limitation, where TMJ effects intersect with known constraints and
12 cumulative effects (e.g. see the paragraph below), the EAO has increased the "overall impact"
13 conclusions based on information provided by Indigenous Groups to better inform decision
14 makers on how cumulative impacts may be experienced by Indigenous Groups. The EAO notes
15 however, that there is uncertainty around the precise degree to which the overall seriousness
16 of impacts on rights is increased due to cumulative effects. This uncertainty is associated with
17 the complexities in understanding conditions needed to meaningfully practice rights.

18 Cumulative effects can increase the seriousness of impact on rights assessment in a general
19 manner across the entire assessment and specifically through increasing the seriousness of
20 impact of certain "factors" noted in [Section 12.2](#) above. As an example of the latter, in the
21 Current Use of Lands and Resources for Traditional Purposes assessment of this Report ([Section](#)
22 [11.4](#)), the EAO concluded that for Indigenous Groups that prefer to fish in and around the TMJ
23 site or in the shipping lanes, it is reasonable to expect that the impacts of past and existing
24 activities on fishing would combine with TMJ effects to result in significant cumulative effects to
25 some or all aspects of Current Use for fishing. These findings increase the relative importance of
26 the area to those Indigenous Groups who fish there and increase impacts to potential future
27 use of the broader assessment area. Additionally, the findings increase the impact on the
28 experience of practicing the right.

1 The EAO is aware that TJLP is actively engaged with some Indigenous Groups regarding a
2 proposal¹⁶¹, to contribute up to \$2 million to the First Nations Fisheries Legacy Fund (FNFLF),
3 which is an Indigenous-led program that support recovery programs for Chinook salmon,
4 eulachon and sturgeon in the Fraser River and Salish Sea¹⁶². The EAO understands that TJLP has
5 developed the contribution proposal in response to concerns raised by Indigenous Groups, the
6 EAO, and the Agency about the existing state of availability of salmon and other fish including
7 eulachon and sturgeon in the Fraser River, as well as availability of Chinook salmon to Southern
8 Resident Killer Whales, as their primary food source.

9 The EAO shared the memo about TJLP's proposal with the Working Group, posted the memo to
10 ePIC, and sought feedback on the proposal from some Indigenous Groups. The EAO received a
11 letter of support for TJLP's contribution proposal from the FNFLF, that established the role of
12 the legacy fund as there to help facilitate matters of a broad concern but clarifying that the
13 rights and the potential to infringe on rights is a bilateral approach with the rights Holder. The
14 EAO heard from Musqueam Indian Band that TJLP and Musqueam had worked collaboratively
15 to determine appropriate mitigations despite having outstanding concerns with the EAO's
16 approach to consultation and cumulative effects assessment, and that Musqueam views the
17 proposal as an appropriate approach to mitigating cumulative effects on Musqueam's territory,
18 particularly considering the FNFLF's expertise in local habitat and restoration projects.

19 Tsawwassen First Nation identified a concern that TJLP's proposed contribution is being seen as
20 something to mitigate a much larger scope of impacts than is possible given the scale of the
21 proposal, the many project impacts/ risks it is potentially purporting to address, and the many
22 groups within the FNFLF that may be competing for that funding contribution. Also,
23 Tsawwassen First Nation suggested that the EAO provide an evaluation tool with costing and
24 decision-making criteria to evaluate potential outcomes of the proposed contribution over life
25 of TMJ.

¹⁶¹ TJLP's proposal for Unconventional Offsetting Accommodation for Residual Project and Cumulative Effects, dated July 5, 2021

(https://www.projects.eao.gov.bc.ca/api/document/61099898cd98620022b0832b/fetch/20210707_TilburyJettyLimitedPartnership_UnconventionalOffsetProposal.pdf).

¹⁶² The First Nations Fisheries Legacy Fund involves the following Indigenous Groups – Katzie First Nation, Kwantlen First Nation, Kwikwetlem First Nation, Musqueam Indian Band, Tsawwassen First Nation, and Tsleil-Waututh Nation.

1 In their review of TJLP's proposed contribution, Tsleil-Waututh Nation determined that the
2 proposal would not sufficiently address impacts on Tsleil-Waututh Nation's intangible cultural
3 heritage and cultural health, advised the EAO to not recommend to decision makers that the
4 proposal should be considered as adequate to mitigate, offset, or accommodation for TMJ's
5 potential impacts to Tsleil-Waututh Nation's Aboriginal Interests, and that the EAO should
6 remove all references of the proposal from the referral materials. Cowichan Nation Alliance
7 raised a concern that the proposed contribution would not provide opportunities for their
8 member First Nations to contribute to decisions on the activities and suggested that TJLP
9 contribute to a fund that involved all Indigenous Groups in Schedule B for TMJ. The EAO heard
10 that Lyackson First Nation view TJLP's proposal as narrowly inclusive of a few Indigenous
11 Groups and would exclude others.

12 The EAO considers the proposed contribution to the FNFLF as TJLP working towards fostering
13 better long-term relationships with Indigenous Groups by supporting Indigenous-led
14 stewardship activities including fish habitat enhancement or continued research in eulachon,
15 sturgeon, and Chinook salmon. Based on feedback received from Indigenous Groups, the
16 FNFLF, TJLP and WG members, the EAO is not recommending the financial contribution as a key
17 mitigation measure under CEAA 2012 due to the limitations on effectiveness monitoring for
18 indirect financial offsetting over the life of TMJ (minimum 30 years). The EAO has identified that
19 the proposed contribution is relevant for Decision Makers to consider as part of the context
20 when making their decision on TMJ.

1 **13.1.1 EXISTING REGIONAL GOVERNMENT OF CANADA INITIATIVES**

2 Canada promotes a safe, secure, efficient, and environmentally responsible marine
3 transportation system, which may address some concerns related to the exercise of rights on
4 the waterways. Marine shipping associated with TMJ would be required to meet the
5 international standards and Canadian regulations set out by Canada's compliance-based marine
6 safety and security system, which is designed to protect life, property, and the marine
7 environment¹⁶³. Compliance with those standards and regulations would be monitored and
8 enforced through existing compliance and enforcement programs.

9 In addition to Canada's marine safety and security system, the EAO notes that several initiatives
10 led by the Government of Canada are currently underway to collect habitat and monitoring
11 information, implement management measures to address cumulative effects, and support
12 capacity building by Indigenous groups to undertake studies and stewardship activities in the
13 Salish Sea and lower Fraser River. Although these initiatives are not TMJ-specific, the EAO
14 recognizes that these regional, and in some instances national initiatives, are working towards a
15 better understanding of cumulative effects in the Salish Sea and lower Fraser River as well as
16 taking actions to address cumulative effects, and are therefore considered relevant by EAO as
17 important context for understanding regional cumulative effects. The following list of existing
18 regional Government of Canada initiatives does not represent an exhaustive or formal region-
19 wide inventory and the EAO acknowledges there may be additional initiatives related to
20 cumulative effects management in the region that are not included. Also, the EAO understands
21 that Indigenous Groups have raised concerns about a lack of municipal, provincial, and federal
22 coordination in managing the cumulative effects of development in the Lower Mainland and
23 the Salish Sea.

24 Descriptions of existing regional Government of Canada initiatives designed to collect baseline
25 information to increase knowledge, address cumulative effects, foster Indigenous partnership
26 with government or support stewardship initiatives are provided below. Additionally, measures
27 developed as part of Canada's Indigenous consultation process for the TMX, intended to
28 accommodate the potential for TMX to impact Aboriginal Interests or Treaty Rights are included
29 below for their relevance:

¹⁶³ From the Canadian Coast Guard and Transport Canada re: Joint Oral Presentation for the May 28, 2019 Public Hearing Session – Marine Shipping – Roberts Bank Terminal 2 Project CEAR 1780 (<https://iaac-aeic.gc.ca/050/evaluations/document/129851>).

1 • **British Columbia Salmon Restoration and Innovation Fund (5-year contribution**
2 **program; ending March 31, 2024)**

3 Funded jointly by provincial and federal governments, this contribution program aims to
4 support BC's fish and seafood sector, and to ensure the sustainability of wild Pacific salmon
5 and other BC fish stocks. A current priority of the fund includes restoration, protection and
6 maintenance of salmon populations and their habitats, including Fraser River steelhead,
7 chinook, and Coho.

8 • **The Oceans Protection Plan (administered by TC, DFO, and ECCC):**

9 The OPP aims to develop a world class marine safety system, preserve, and restore marine
10 ecosystems, build Indigenous partnerships, create a stronger evidence base and increase
11 community participation and public awareness. Built on science, technology, and traditional
12 knowledge, the OPP includes over 50 marine safety, research, and ecosystem initiatives
13 from coast-to-coast-to-coast. Below are descriptions of specific OPP-related initiatives that
14 overlap with the TMJ project area and are relevant to issues raised during the EA.

15 • **Cumulative Effects of Marine Shipping (CEMS) (November 2016 – March 2022);**
16 To preserve coastal marine ecosystems that are vulnerable to increases in
17 marine shipping, while reducing the impact of day-to-day vessel traffic, TC is
18 working with Indigenous Groups, local stakeholders and coastal communities to
19 better understand the effects of these activities on coastal environments and to
20 identify options for mitigating these effects. The CEMS Initiative has been and is
21 relying on regional and sub-regional engagement and collaboration with many
22 Indigenous Groups and coastal communities to improve our understanding of
23 cumulative effects from marine shipping at each of the identified pilot sites,
24 including the South Coast of BC. TC is currently holding regional and
25 bilateral/collaborative discussions with interested South Coast Nations for this
26 multi-tiered and complementary assessment approach (see Indigenous and Local
27 Communities Engagement and Partnership Program, below). As part of the South
28 Coast CEMS Initiative, a Ship Movement and Vessel Management Coordinating
29 Committee has been formed.

30 • **Community Partnership Funding Program (CPFP):** Short-term grants available
31 (up to \$5K maximum) to cover costs of activities and workshops for eligible
32 Indigenous Groups and local communities to take part in developing and
33 improving Canada's marine transportation system.

34 ○ **Coastal Environmental Baseline Program (5-year initiative; launched 2016);**

1 includes funding to collect comprehensive data over 5 years on the state of 6
2 marine ecosystems in Canada, including the Port of Vancouver. DFO scientists
3 are working closely with Indigenous and coastal communities in these areas to
4 develop and implement the program and determine what data will be collected.
5 By gathering comprehensive baseline data, changes in the environment can be
6 better detected over time. Existing projects under this Canada-led initiative are
7 occurring within the Port of Vancouver area, including the 3-year Fraser River
8 Estuary Eulachon Migration Study and 4-year Port of Vancouver Ecosystem
9 Characterization Project.

- 10 ○ **Coastal Restoration Fund** (5-year initiative; launched 2017 and fully allocated);
11 The fund supports projects that help to restore coastal aquatic habitats,
12 including 25 projects in the Pacific Region.
- 13 ○ **OPP Enhanced Maritime Situational Awareness (EMSA) Initiative (EMSA)**
14 Initiative¹⁶⁴ (5-year initiative; launched 2017); TC is partnered with Indigenous
15 communities to develop and test a web-based geographic information system.
16 The EMSA system provides access to maritime information and data such as near
17 real-time vessel traffic, weather, sensitive habitats, hydrography, and local
18 information. By creating a common operating picture for Indigenous partners,
19 coastal communities and stakeholders, the EMSA system fosters collaboration
20 around the marine space and supports local and regional initiatives as well as
21 analysis and decision-making for: improving maritime awareness, monitoring,
22 and safety; planning vessel routes; identifying sensitive areas; protecting the
23 environment; and addressing concerns about the possible impacts that more
24 vessel traffic could cause for marine activities and the local environment. Access
25 to the EMSA system, training and technical support is available to interested
26 Indigenous communities to support local and regional marine-related needs and
27 priorities.

¹⁶⁴Transport Canada – Enhanced Maritime Situation Awareness Initiative pilot projects.

<https://tc.canada.ca/en/marine-transportation/navigation-marine-conditions/enhanced-maritime-situational-awareness-initiative-pilot-projects>¹⁶⁵ Transport Canada. 2021 management measures to protect Southern Resident killer whales. <https://www.pac.dfo-mpo.gc.ca/fm-gp/mammals-mammiferes/whales-baleines/srkw-measures-mesures-ers-eng.html>

1 • **The Whales Initiative:**

2 The EAO understands that Killer Whales hold a strong spiritual and cultural importance to
3 many Indigenous Groups. The Government of Canada is committed to protecting and
4 supporting the recovery of endangered whales and is implementing measures to better
5 understand and manage cumulative effects on the recovery of Southern Resident Killer
6 Whales. The Whales Initiative (announced 2018; in place until 2023), as well as additional
7 measures targeted to support the protection and recovery of SRKWs (announced in 2019
8 and in place until 2024) build on a strategy developed under OPP and aim to address
9 imminent threats to SRKWs. For more information about the recent regulatory actions
10 taken by the Government of Canada to protect SRKWs¹⁶⁵, and other Whales Initiative
11 activities see the Marine Mammals ([Section 5.7](#)) of Part B in this Assessment Report.

12 • **Vancouver Fraser Port Authority-led ECHO Program:**

13 The VFPA (an agent of the Crown that acts at arm's length from the government¹⁶⁶)
14 manages the ECHO Program that aims to better understand and reduce cumulative effects
15 of shipping activities on at-risk whales throughout the southern coast of BC. For more
16 information about ECHO program activities see the Marine Mammals ([Section 5.7](#)) of Part B
17 of this Assessment Report.

18 • During the MSA, TJLP committed to incorporating contractual measures to support
19 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
20 initiatives. The Application considered the voluntary measures of the ECHO program
21 would contribute to reducing cumulative effects on the disturbance and masking effects
22 from threat of underwater noise and vessel strikes, but there was uncertainty in the
23 effectiveness because the initiative relies on voluntary compliance.

24 • **Aboriginal Fund for Species at Risk (AFSAR; aquatic programming focused on aquatic
25 species at risk and is delivered by DFO).** Currently open for 2021/2022 proposals, this
26 federally funded initiative aims to support development of Indigenous capacity to
27 participate actively in the implementation of Species at Risk Act (SARA), including
28 improving habitat and addressing threats to the species; collaboration, information

¹⁶⁵ Transport Canada. 2021 management measures to protect Southern Resident killer whales.
<https://www.pac.dfo-mpo.gc.ca/fm-gp/mammals-mammiferes/whales-baleines/srkw-measures-mesures-ers-eng.html>

¹⁶⁶ *Canada Marine Act* S.C. 1998, c. 10. <https://laws-lois.justice.gc.ca/eng/acts/c-6.7/FullText.html>

1 sharing and partnership between Indigenous communities, government and
2 organizations and other interested parties, and support capacity within Indigenous
3 communities to lead in the stewardship of species at risk and contribute to broader
4 SARA implementation.

5 • **Marine Spatial Planning (MSP)** (currently in the initial stages of pre-planning); MSP is a
6 process in the South Coast of British Columbia that will bring together federal and
7 provincial governments, Indigenous communities and organizations and stakeholders, to
8 better coordinate human use across marine spaces to achieve ecological, economic,
9 cultural and social objectives through collaborative governance, shared science,
10 knowledge, and data, and analysis/planning in future phases. The MSP process will
11 contribute to the advancement of reconciliation with Indigenous peoples through their
12 involvement as partners in MSP and meaningful inclusion of Indigenous knowledge and
13 Indigenous knowledge systems in planning, management, and decision-making, which
14 will be foundational to the MSP process.

15 • **Government of Canada Trans Mountain Pipeline Expansion Project (TMX)**
16 **Initiatives¹⁶⁷:**

17 As a result of the meaningful, two-way dialogue that took place during the re-initiated Phase III
18 consultations for TMX, the Government developed eight accommodation measures to address
19 the concerns of potentially impacted Indigenous groups. These measures focus on building
20 capacity and long-term relationships, marine safety, spill prevention, response capacity,
21 cumulative effects, fish and fish habitat, and quieter vessels, as well as further terrestrial
22 studies.

23 Additionally, the Canada Energy Regulator provided the Government of Canada with sixteen
24 recommendations as well as amended conditions aimed to bolster marine safety, strengthen
25 emergency response, protect oceans (including SRKW) and advance cumulative effects
26 management. In addition to their objectives as accommodation measures, and the
27 recommendations, the EAO considers the following TMX initiatives provide relevant context for
28 understanding substantial efforts that are being undertaken by the Government of Canada in
29 response to concerns regarding impacts to Indigenous rights.

¹⁶⁷ Government of Canada. Trans Mountain Pipeline Expansion Accommodation Measures.
<https://www.canada.ca/en/campaign/trans-mountain/what-is-tmx/the-decision/backgrounder11.html>

- 1 • **Salish Sea Initiative (SSI)** (5-year program; 2019 – March 2024; additional Arm’s-Length
2 Funding to support ongoing stewardship activities); SSI resulted from previous
3 engagement and consultations with Indigenous Groups to co-develop an integrated
4 monitoring, evaluation and reporting structure that is inclusive and responsive to
5 Indigenous Groups in the Salish Sea. The initiative will build capacity within the
6 Indigenous Groups to enable the acquisition and reporting of data on baseline
7 environmental conditions, tracking of environmental impacts and changes, assessment
8 of cumulative environmental effects from human actions and determination of valued
9 ecosystem components within the marine area of the Salish Sea. In addition, the Crown
10 and Indigenous Groups will co-develop an Indigenous-led Investment Fund under a
11 shared governance model to access long-term funding.
- 12 • **Co-Developing Community Response (CDCR)** (3-year program launched in 2019, with
13 funding available until March 2022); Responds to concerns about risks of increased
14 project-related tanker traffic to marine activities, the environment and culturally
15 important and sacred sites within traditional territories by supporting the government
16 and Indigenous communities to co-develop response capacity at the community level
17 and foster a meaningful role for Indigenous communities in the broader marine
18 response system.
- 19 • **Aquatic Habitat Restoration Fund;** (5-year program; launched May 2017 and beginning
20 in 2021, further funding will be available for aquatic habitat restoration activities
21 through until 2024); Responds to concerns about potential impacts to cumulative effects
22 from development projects, including assisting in the maintenance and restoration of
23 fish and fish habitat in watersheds along the TMX pipeline corridor, including inland
24 watersheds in British Columbia and Alberta, the Fraser River watershed and in the Salish
25 Sea and increasing capacity within communities to protect and restore aquatic habitats
26 that may be impacted by cumulative effects of development through encouraging an
27 ecosystem-based management approach.
- 28 • **Enhanced Maritime Situational Awareness; (EMSA);** This initiative is a web-based pilot
29 project that displays a range of near real-time data on vessel traffic, weather,
30 hydrography, and marine protected areas. The information helps coastal Indigenous
31 communities better plan vessel routes, identify sensitive areas, enhance local marine
32 safety, and protect the environment. The initiative was initially launched as part of the
33 Oceans Protection Plan. TC will provide up to \$3.1 Million over three years (2019-2022)

1 through the Enhanced Marine Situational Awareness Initiative (EMSA) pilot project to
2 support pilot hosts located along the TMX marine shipping route. While pilot partners
3 have already been selected, all Indigenous communities along the TMX marine shipping
4 route are offered EMSA accounts, including training and technical support to employ the
5 EMSA system for their specific priorities and requirements.

- 6 • **Marine Safety Equipment and Training (MSET)**; (5-year program; Launched in October
7 2020 and accepting applications from eligible Indigenous communities until June 2024
8 for activities to be completed by March 2025). MSET responds to concerns regarding the
9 safety of Indigenous mariners who may face increased interactions with TMX-related
10 vessels along the TMX marine shipping route, including interactions faced while
11 pursuing traditional activities. MSET provides funding to Indigenous communities for
12 equipment to enhance the safety of certain Indigenous vessels and for training to build
13 understanding around safety on the water. Indigenous communities located along the
14 TMX marine shipping route are eligible to participate in MSET.
- 15 • **Quiet Vessel Initiative (QVI)** (5-year program; 2020 – 2024; This initiative is testing safe,
16 environmentally-responsible, and effective quiet vessel technologies retrofits, designs
17 and operational practices to reduce noise in the Salish Sea. It aims to protect the marine
18 environment and vulnerable marine mammals — including the SRKW. Indigenous
19 communities located along the TMX marine shipping route are eligible for consideration
20 for QVI funding. Eligible Indigenous communities along the TMX marine shipping
21 route can seek funding for projects to address their concerns about the impacts of
22 underwater vessel noise on the marine environment, such as (non-exhaustive):
 - 23 ○ Researching or testing projects to evaluate “quiet” technologies on marine
24 vessels;
 - 25 ○ Underwater noise monitoring to assess the effectiveness of operational and
26 technical mitigations aimed at addressing underwater noise; and
 - 27 ○ Capacity building activities to further develop groups’ science capacity related to
28 the underwater radiated noise impacts and mitigations.

29 • **TMX Recommendations:**

30 In response to the National Energy Board (now the Canadian Energy Regulator (CER)) TMX
31 Recommendation 1, the Government of Canada (DFO and ECCC) is enhancing knowledge to
32 support cumulative effects assessment and management in the Salish Sea by 1) taking stock

1 of the current state of knowledge, 2) identifying gaps in understanding ecosystem
2 components of value and concern, 3) enhancing research and monitoring on water quality,
3 air quality, and air emissions; and 4) improving access to this knowledge through tools such
4 as an interactive maps or other publicly available open science and data platforms related to
5 cumulative effects. Collectively, this will enhance regionally based cumulative effects
6 assessment and management by Indigenous and local communities from the perspective of
7 their values and knowledge. Specific initiatives, such as MSP, SSI, and the TMX Marine Bird
8 Monitoring and Conservation Program (Recommendation 3) are the primary programs linked
9 to TMX Recommendation 1; however, additional links can be made to the OPP and the
10 Whales Initiative, among others. Currently, work is also underway to inventory existing
11 programs, datasets, publications, and tools that are relevant to the Salish Sea.

12 The CER TMX Recommendation 2 recommends public reporting on the oversight, progress,
13 and status of measures to address cumulative effects, which is closely linked to
14 Recommendation 1. In response the Government of Canada is assessing current reporting
15 gaps, which will be used to inform appropriate levels of reporting and next steps. This work
16 aligns with corresponding initiatives, notably the Salish Sea Initiative and marine spatial
17 planning for the Salish Sea. Work is underway to inventory existing reporting related to the
18 health of the Salish Sea Ecosystem including investigation of on-line user-friendly interfaces
19 (e.g., Cumulative Effects Open Science Data Portal). The Government of Canada has
20 launched the ‘Sharing Knowledge on Cumulative Effects in the Salish Sea Ecosystem’
21 webpage¹⁶⁸, which provides links to datasets, publications, and tools that can be used by
22 Indigenous Groups and local communities.

23 **13.1.2 THE EAO’S CONSIDERATION OF EXISTING REGIONAL GOVERNMENT OF** 24 **CANADA INITIATIVES**

25 The EAO considers that the existing regional initiatives described above are working towards a
26 better understanding of cumulative effects in the Salish Sea and Fraser River, as well as taking
27 actions to manage these effects. Some initiatives relate to better understanding and managing
28 cumulative effects to ecosystem health or the recovery of SRKW, while others are related to
29 developing and implementing tools to make navigation safer for Indigenous mariners and

¹⁶⁸ Government of Canada. Sharing Knowledge on Cumulative Effects in the Salish Sea Ecosystem.
<https://www.canada.ca/en/environment-climate-change/services/cumulative-effects/salish-sea-ecosystem/sharing-knowledge.html>

1 fishers. These initiatives are relevant to the assessment of impacts on Aboriginal Interests
2 resulting from TMJ's contribution to cumulative effects of marine shipping. Together the
3 existing regional initiatives represent substantial government efforts to respond to cumulative
4 effects issues in the Salish Sea and concerns of Indigenous people. The initiatives provide
5 avenues for Indigenous people to work with Canada to manage cumulative effects beyond the
6 EA of TMJ.

7 Tsleil-Waututh Nation, Cowichan Nation Alliance, Pacheedaht First Nation and T'Sou-ke First
8 Nation raised concerns that such initiatives of the Crown do not constitute TMJ-specific
9 mitigations under CEAA 2012 and should not be weighed in the evaluation of TMJ mitigations
10 and residual effects. Tsawwassen First Nation identified a concern that TJLP's proposed
11 contribution is being seen as something to mitigate a much larger scope of impacts than is
12 possible given the scale of the proposal. Musqueam Indian Band commented that the initiatives
13 led by TC, or any of the other Federal initiatives, would not likely meaningfully reduce the risk
14 of impacts to Musqueam fishers in a manner that would avoid or compensate for cumulative
15 impacts on Musqueam fishing rights. The EAO views this information as relevant to decision-
16 makers whose interests include both reconciliation and considering existing land use objectives,
17 which establish government direction or desired outcomes for a range of natural resource
18 values. As mentioned above, the EAO views the existing initiatives as an illustration of the
19 substantial efforts that are being undertaken by the Crown in relation to past and future
20 impacts that contribute to the "current state" within the territories of many of the Indigenous
21 Groups.

22 The EAO understands that Indigenous Groups have highlighted the OPP and SSI as steps in the
23 right direction but that that adequate funding of these initiatives is uncertain, and that
24 consultation and engagement activities are ongoing. The EAO heard from Maa-nulth First
25 Nations that most of the initiatives are at an early stage of development or implementation,
26 and that access to adequate, long-term, and more stable funding is needed. Maa-nulth First
27 Nations told the EAO that in Maa-nulth First Nations' view the SSI-related governance model for
28 the \$50 M arms length fund would be unlikely to provide long-term support because the
29 funding would be split by 33 First Nations. In their review of TJLP's BVSA Report, Snuneymuxw
30 First Nation identified that the Government of Canada initiatives would be limited in ability to
31 accommodate for TMJ-related impacts to Snuneymuxw First Nation's Aboriginal Interests.

32 The EAO understands that the Government of Canada has heard through consultation with
33 Indigenous groups that engaging fully in each of the initiatives taking place in the region can be

1 challenging and resource intensive. Maa-nulth First Nations identified that the large number of
2 initiatives and COVID-19 pandemic has made it difficult to meaningfully engage in all of regional
3 initiatives. Additionally, the EAO understands that the Canada has heard concerns about the
4 effectiveness and future outcomes of programs given the various stages of implementation,
5 scope, and duration of funding. The EAO acknowledges, that while the outcomes of this work
6 have yet to be realized, the ongoing collection and analyses of targeted data with Indigenous
7 communities will support informed decision-making and the development of potential
8 measures to manage cumulative effects moving forward. The EAO understands that the Crown
9 is committed to working with Indigenous people in shaping the initiatives to better understand
10 and manage cumulative effects in the Salish Sea and Fraser River.

11 When applicable, the EAO has further indicated where specific engagement activities through
12 existing regional Government of Canada initiatives may be particularly relevant as additional
13 context to the assessment of impacts on Aboriginal Interests and Treaty rights resulting from
14 TMJ's contribution to regional cumulative effects from marine shipping.

15 **13.2 CONCERNS RAISED BY INDIGENOUS GROUPS**

16 **13.2.1 RELIANCE ON INFORMATION FROM ROBERT'S BANK TERMINAL 2 AND** 17 **TRANS MOUNTAIN EXPANSION**

18 Tsleil-Waututh Nation, Musqueam Indian Band, Pauquachin First Nation, T'Sou-ke First Nation,
19 Scia'new First Nation, Maa-nulth First Nations, Esquimalt First Nation and Quw'utsun Nation
20 raised concerns about the reliance on information from the RBT2 and TMX assessment
21 processes, including using this information to understand baseline conditions in the MSA.
22 Indigenous Groups criticized the status of these sources of information used in the MSA,
23 including that some of the information was incomplete, out of date, may not be directly
24 applicable for assessing impacts from TMJ-related shipping activities, and/or contained
25 sensitive Indigenous use information that may not be appropriate to use between EAs.

26 The EAO acknowledges that Indigenous knowledge must be used with appropriate permissions
27 and according to the governance, laws, policies, and practices of the Indigenous Group. When
28 requested by Indigenous Groups, the EAO is open to different approaches relating to the
29 management and utilization of sensitive Indigenous knowledge, while ensuring the
30 requirements of Provincial law and principles of administrative fairness are met throughout and
31 beyond the EA. The EAO considers the TMX and RBT2 processes as recent EAs in the region that
32 have considered marine shipping in the Salish Sea, including the Strait of Juan de Fuca. These

1 processes provide substantial baseline information on existing conditions along B.C.'s south
2 coast and completed assessments, including a review of regional cumulative effects associated
3 with shipping. Therefore, the EAO is of the opinion that the publicly available information
4 provided by Indigenous Groups for the assessment of shipping effects in the Salish Sea is
5 relevant to inform the assessment of TMJ shipping effects. The EAO understands that the
6 concerns raised by Indigenous Groups regarding TMX and RBT2 do not necessarily reflect all
7 concerns pertinent to TMJ. During the MSA process, the EAO offered to share a high-level
8 summary of key concerns relevant to the marine shipping component of TMJ based on
9 information provided by Indigenous Groups for TMX and RBT2 processes for review and
10 feedback, or followed up through dialogue about specific concerns related to TMJ or the
11 consultation process for the MSA.

12 Several Indigenous Groups stated that it was inappropriate to rely on proponent-generated
13 reports for a process that is still underway (at the time TJLP submitted the MSA to the EAO, the
14 RBT2 panel report had not yet been issued). Some of the Indigenous Groups noted that
15 concerns were raised regarding those reports in the RBT2 process that have yet to be
16 addressed. Maa-nulth First Nations identified gaps in the RBT2 reports, including inadequate
17 modelling of potential accidents and malfunctions, and told the EAO that where applicable,
18 those gaps should have been addressed in the EA for TMJ. Indigenous Groups requested that
19 the MSA should be based on new studies or information specific to TMJ. The MSA information
20 request¹⁶⁹ required TJLP to use information from these projects and complement it with
21 additional information from the RBT2 panel hearings and any information provided by
22 Indigenous Groups. TJLP explained that the MSA considered publicly available reports and
23 comments that were submitted through the RBT2 Panel hearings, updating data where
24 appropriate. Further, comments and concerns raised by regulators and Working Group
25 members during the panel review were reviewed and considered when incorporating RBT2
26 information. Following TJLP's submission of the MSA, the EAO continued to seek the additional
27 views of Indigenous Groups and the Working Group, and has made a number of changes to its
28 decision materials as a result of this input, supplementing the information considered from the
29 RBT2 panel report.

¹⁶⁹[Marine Shipping Supplemental Assessment – Information Request for WesPac Tilbury Marine Jetty Project](#).
Issued by the EAO on November 15, 2019.

1 In its review of the EAO's draft assessment report, Snuneymuxw First Nation raised a concern
2 that the EAO relied on publicly available data from the TMX and RBT2 assessments to assess
3 impacts to Aboriginal Interests. Snuneymuxw First Nation did not participate in the RBT2
4 assessment and identified that the information provided by Snuneymuxw First Nation for the
5 TMX assessment (i.e., written evidence for the NEB hearing in 2016; and comments on the TMX
6 reconsideration in 2018) was not specific to the project or the MSA and was collected several
7 years prior. In their review of TJLP's BVSA Report, Snuneymuxw First Nation also identified that
8 by not being able to adequately assess TMJ-related marine shipping impacts to Snuneymuxw
9 First Nation's Aboriginal Interests leaves significant gaps in understanding for the TMJ EA
10 process. The EAO understands that the concerns raised by Snuneymuxw First Nation that the
11 TMX processes may not necessarily reflect all concerns pertinent to TMJ; however, the EAO
12 considers the TMX Panel Review and Reconsideration processes as recent EAs in the region that
13 have considered marine shipping in the Salish Sea, and that information from these processes
14 provide substantial baseline information on existing conditions along BC's south coast, and
15 therefore, the EAO is of the opinion that the publicly available information provided by
16 Snuneymuxw First Nation for the assessment of shipping effects in the Salish Sea is relevant to
17 inform the assessment of TMJ shipping effects.

18 Given the publicly available information, and the information received by the EAO through
19 consultation with Indigenous Groups during the EA for TMJ, the EAO is of the opinion that it has
20 sufficient information to understand the key pathways to impacts to Aboriginal Interests for the
21 purposes of the EA. The EAO does not dispute Indigenous Groups' worldviews and perspectives
22 that the current conditions in the lower Fraser River, and in some areas of the Salish Sea, do not
23 currently support the practice of cultural activities in their preferred manner. The EAO
24 acknowledges there is some uncertainty associated with the EAO's conclusions on the overall
25 potential seriousness of impact from TMJ (i.e., TMJ effects combined with cumulative effects)
26 on Aboriginal Interests. The level of uncertainty in the EAO's conclusions is affected by multiple
27 factors, including the extent of the EAO's understanding of the locations where Indigenous
28 Groups practice their Aboriginal Interests, and the complex relationship between incremental
29 increases in shipping from TMJ-related vessels and existing cumulative effects to Aboriginal
30 Interests. As described in the Current Use of Lands and Resources for Traditional Purposes and
31 Cultural Heritage Section 11.4 of Part B, the EAO found it is reasonable to expect that past
32 effects would combine with effects from TMJ-related marine shipping to result in significant
33 cumulative effects to current use for fishing and other cultural use of marine areas for
34 Indigenous Groups that preferentially use or rely on sites located at TMJ or within and adjacent
35 to shipping lanes.

1 13.2.2 SCOPE OF THE MARINE SHIPPING ASSESSMENT

2 Tsleil-Waututh Nation, Maa-nulth First Nations, Pacheedaht First Nation, Ditidaht First Nation,
3 Pauquachin First Nation, Esquimalt First Nation, T'sou-ke First Nation, and Scia'new First Nation
4 requested the scope that the MSA extend out to the 200 nm exclusive economic zone (EEZ) as
5 opposed to the 12 nm limit of Canada's territorial sea. Maa-nulth First Nations proposed
6 scoping the assessment to 200 nm for a variety of reasons, including language in CEAA 2012
7 referencing the EEZ and federal jurisdiction within the EEZ. Indigenous Groups identified
8 concern that the EA did not characterize potential TMJ-related residual or cumulative effects
9 from marine shipping to SRKW, air quality, or accidents and malfunctions beyond the 12 nm in
10 Canada's EEZ. Tsleil-Waututh Nation and T'Sou-ke First Nation also expressed that the scope of
11 the MSA does not include all SRKWs critical habitat; therefore, in their view the effects would
12 be underestimated due to impacts to SRKWs in Canada's EEZ.

13 The EAO considered the 12 nm territorial limit an appropriate scope for the assessment of
14 impacts of marine shipping for the following reasons:

- 15 • *Potential interactions:* An interaction between a TMJ-related vessel and an
16 environmental or human receptor has the greatest likelihood of occurring within the area
17 encompassing the 12 nm limit because most of these receptors are located closer to
18 shore and this is also where the greatest probability and consequence of a marine
19 incident would be because of the presence of navigational hazards, and vessels and
20 environmental receptors are constrained within a smaller area.
- 21 • *Predicting potential effects:* The ability to predict environmental effects from marine
22 shipping is unreliable beyond 12 nm because it is not clear where vessels will be located,
23 nor the speeds at which they will be travelling; and
- 24 • *Enforcement:* Promoting or enforcing compliance conditions outside of established
25 shipping lanes (12 nm boundary) is limited because vessel movements are less well
26 known.

27 For the reasons outlined above and in consideration of the predicted residual effects within the
28 assessed project areas and the measurability and enforceability of potential conditions, the
29 EAO determined that the 12 nm territorial limit was adequate for understanding potential
30 effects due to shipping.

31 13.2.3 CLIMATE CHANGE AND IMPACTS FROM UPSTREAM NATURAL GAS 32 EXTRACTION ACTIVITIES

1 During the EA of TMJ, Indigenous Groups including Tsawwassen First Nation, Kwantlen First
2 Nation and Tsleil-Waututh Nation, Maa-nulth First Nations, and Esquimalt First Nation
3 identified concerns about impacts of TMJ to increased GHG emissions, upstream activities
4 related to natural gas extraction and climate change. Kwantlen First Nation provided their
5 concerns about potential TMJ-related impacts to climate change, including fugitive GHG
6 (including methane) emissions and increased demand for extraction of upstream natural gas
7 ([Section 14.4](#) of Part C of this report). Tsleil-Waututh Nation provided their concerns and
8 assessment of potential TMJ-related impacts to climate change to Tsleil-Waututh's Cultural
9 Health and Right to Practice Culture and Tsleil-Waututh Fisheries and Rights to Fish (see [Section](#)
10 [14.9](#) of Part C of this Report). Tsleil-Waututh Nation considers that TMJ-related contributions to
11 climate change would be likely to have very high and irreversible impacts on Tsleil-Waututh
12 Nation's health, cultural practices, cultural health and right to fish. As described in the GHG
13 Management of Part B ([Section 5.2](#)), TJLP is of the view that TMJ would help lower provincial,
14 national and global GHG emissions by supporting the transition from higher carbon intensity
15 fuels used in marine shipping or for power generation to lower carbon intensity. TJLP asserts
16 that TMJ is aligned with provincial CleanBC Roadmap, as it provides critical infrastructure to
17 enable the use of LNG as an alternative to conventional marine fuel and with a ready supply of
18 lower-carbon LNG from B.C., TMJ can support the decarbonization of the shipping industry.

19 Tsleil-Waututh Nation has expressed views that the assessment was inadequate with respect to
20 upstream GHG emissions, cumulative effects assessment and the Application's "No Project
21 Case" Scenario. While outside their territories, Maa-nulth First Nations expressed concern
22 about the environmental impacts of fracking and that upstream and downstream activities
23 should be considered when assessing a project. Esquimalt First Nation and Maa-nulth First
24 Nations expressed concerns about the cumulative effects of GHG emissions from marine
25 shipping and told the EAO that any increase in GHG emissions from a major project such as TMJ
26 is significant, given the current GHG emission levels and their resulting impact on climate
27 change. The EAO understands that Esquimalt First Nation and Maa-nulth First Nations disagree
28 with the EAO's non-significance conclusions for cumulative effects of GHG management for
29 TMJ.

30 Tsawwassen First Nation, Tsleil-Waututh Nation, Maa-nulth First Nations and Malahat First
31 Nation (in addition to the City of Richmond and Metro Vancouver) requested that TMJ offset its
32 GHG emissions. Tsleil-Waututh Nation requested that GHG emissions be compared to
33 municipal, provincial, and federal climate targets and that TJLP provide further information on
34 how it intends to support the IMO targets of reducing GHG emissions. During the EA, Kwantlen
35 First Nation also requested that mitigations be put into place to prevent fugitive emissions of
36 methane, ongoing monitoring for GHG emissions throughout the life of TMJ and for Decision

1 Makers to also consider the potential for impacts to climate change from upstream natural gas
2 extraction activities and incentivizing renewable-energy projects compared to approving fossil
3 fuel projects. During the review of TJLP's BVSA Report and regarding TMJ's BVS, Kwantlen First
4 Nation and Tsawwassen First Nation raised concerns related to the upstream effects from LNG
5 production, and Ts'uubaa-asatx Nation identified a concern that TMJ would lead to an increase
6 in GHG emissions.

7 As described in the GHG Management of Part B ([Section 5.2](#)), the EAO considers upstream GHG
8 emissions outside the scope for TMJ, and the EAO's characterization of effects did not consider
9 upstream GHG emissions as part of a determination of significant adverse environmental
10 effects in federal project reviews nor the EAO's characterization of effects and determination of
11 significance of project effects on GHG emissions. The EAO acknowledges that the IPCC has
12 confirmed that GHG emissions are at levels that are impacting the global climate and has
13 produced several scenarios projecting potential global GHG emissions trajectories and the
14 potential impacts associated with these emissions levels. As such, the EAO did not require
15 TMJ's Application to include a cumulative effects assessment for GHG emissions and the EAO
16 did not conduct a cumulative effects assessment for the same reasons.

17 The EAO recognizes that the impacts of GHG emissions must be addressed globally, and that it
18 is not possible to estimate the impacts of an individual project's emissions on global climate
19 change. However, the EAO also recognizes that B.C.'s GHG reduction targets were established
20 in the context of the best science to reduce global GHG emissions to address impacts on global
21 climate change, and that it is B.C.'s responsibility to contribute to the global reduction. As such,
22 individual projects are considered in relation to their contribution to provincial and national
23 emissions (see [Section 5.2](#) in Part B for more information).

24 In consideration of the EAO's recommended provincial conditions and KMMs recommended
25 under CEAA 2012, as well as the conservative nature of the predicted effects, the EAO
26 concludes in Section 5.2 that TMJ would not have significant adverse effects on GHG
27 Management.

28 The EAO is of the view that the issues discussed are adequately resolved for the purposes of the
29 EA and does not propose any related conditions specific to GHG offsetting. The EAO does not
30 currently require GHG offsetting because the province has legislated GHG reduction targets, a
31 plan for GHG reductions (CleanBC), sectoral emission targets for 2030, and a wide variety of
32 regulatory tools to help achieve these targets. The EAO notes that the IMO is the organization
33 responsible for regulating international shipping GHG emissions. The EAO is also proposing
34 Condition 20: GHG Reduction Plan, and recommending KMM under CEAA 2012 for an Air
35 Quality Management Plan, which would be developed in consultation with, and reviewed by

1 Indigenous Groups CAS, BC OGC, ECCC, Metro Vancouver, and HC (see [Section 5.2](#) of Part B of
2 this report for more information). The EAO is of the view that together, these proposed
3 mitigation measures would help to reduce adverse effects from TMJ to GHG management,
4 which includes triggers and corrective actions.

5 **13.3 ISSUES RAISED BY INDIGENOUS GROUPS AND POTENTIAL** 6 **IMPACTS ON ABORIGINAL INTERESTS**

7 The EAO sought input from Indigenous groups on the nature and scope of their Aboriginal
8 Interests and how they might be impacted by TMJ. The MSA relied on publicly available
9 information through the RBT2 and TMX processes.

10 A summary of potential impacts and issues raised during the EA is provided below. Key issues
11 raised during the EA are described in each Indigenous Group's section of Part C of this Report.

12 The EAO considered the assessment of impacts to the VCs in Part B of this Report that
13 contribute to understanding of effects on Aboriginal Interests (biophysical; geospatial; and
14 social, cultural, and experiential values). How the assessment of relevant VCs was generally
15 considered in relation to impacts on Aboriginal Interests is discussed in the sections below.

16 **13.3.1 POTENTIAL IMPACTS ON FISH, FISH HABITAT AND CONCERNS ABOUT** 17 **FISHING RIGHTS RAISED BY INDIGENOUS GROUPS**

18 The EAO's evaluation of potential effects on fishing rights considers impacts to biophysical
19 components that may result in changes in fish quantity and quality; changes in access to fishing
20 sites; and changes to the experience or cultural and spiritual elements associated with, fishing
21 that are attributable to TMJ, including cumulative effects. The pathways of potential effects to
22 Indigenous Groups fishing rights are outlined below; specific issues raised by each Indigenous
23 Group and the EAO's conclusions on impacts of TMJ to Aboriginal Interests or Treaty Rights of
24 individual Indigenous Groups are included in the sections that follow below ([Section 14](#) for
25 Schedule B Indigenous Groups; [Section 15](#) for Schedule C Indigenous Group; and [Section 16](#) for
26 Schedule D Indigenous Groups).

27 **Biophysical Components:**

28 The EAO concluded that TMJ would result in residual adverse effects to fish, potentially
29 including vulnerable populations of salmon, eulachon and white sturgeon and fish habitat. The
30 residual effects include habitat loss and alteration from the marine facility (i.e., piles), dredging,
31 vibrodensification and scour protection (note the latter would be within the dredge pocket);

1 and potential harm to fish, including change in fish behaviour due to underwater noise during
2 in-water works and injury or mortality due to machinery and vessels during construction and
3 operations. The EAO did not predict residual effects to fish or fish habitat in the MSA area.

4 Indigenous Groups raised concerns that the TMJ site is in an area of the Fraser River that has
5 been impacted by past industrial activity and that many fish species of cultural importance are
6 facing a variety of conservation risks at various life stages. Quw'utsun Nation, Musqueam Indian
7 Band, Tsawwassen First Nation, Kwantlen First Nation, Tsleil-Waututh Nation, Pauquachin First
8 Nation, Esquimalt First Nation, Malahat First Nation, Pacheedaht First Nation, Ditidaht First
9 Nation, Scia'new First Nation, and Maa-nulth First Nations raised concerns about the historical
10 impacts to fish stocks and habitat and some considered the current state of these components
11 insufficient to practice their traditional way of life in their preferred manner. Indigenous Groups
12 raised a variety of concerns including impacts to habitat, concerns about noise, vibrations and
13 entrainment impacts from pile driving and the capital dredge and effects of the maintenance
14 dredge on fish.

15 Indigenous Groups, including Tsawwassen First Nation, Musqueam Indian Band, Tsleil-Waututh
16 Nation, Quw'utsun Nation, Kwantlen First Nation, Ts'uubaa-asatx Nation, Pauquachin First
17 Nation, Scia'new First Nation, Pacheedaht First Nation, T'Sou-ke First Nation, Ditidaht First
18 Nation, Katzie First Nation and Maa-nulth First Nations identified traditionally important food
19 fish that were, and in some cases are currently, fished in the Salish Sea and the South Arm of
20 the Fraser River:

- 21 • **Salmon:** Salmon was identified by Indigenous Groups as an important traditional and
22 principal food source which is connected to their health, wellbeing, life, language,
23 culture, stewardship, economic and governance systems, and that they continue to
24 harvest for FSC purposes as well as commercial harvests. Indigenous Groups raised
25 several concerns regarding salmon and the potential impact TMJ could have on their
26 fishing rights in the Salish Sea and the Fraser River. Indigenous Groups noted that the
27 Fraser River salmon species are declining in spawning population numbers and returning
28 as smaller fish than previous years. Fewer and smaller fish increase their fishing effort
29 and make having an adequate harvest during the limited DFO fisheries openings critical
30 for the success of their FSC and commercial fisheries. Indigenous Groups consider any
31 increase in the potential for injury or mortality of salmon as a result of TMJ activities
32 concerning.
- 33 • Musqueam Indian Band and Tsleil-Waututh Nation stated that TMJ dredging activities
34 would occur in important and productive fish habitat and TMJ could adversely impact
35 habitat for juvenile sockeye and chinook salmon. Additionally, Indigenous Groups noted

1 concern for the potential effects on fish, such as salmon, from underwater noise due to
2 construction and marine shipping. Musqueam Indian Band, Kwantlen First Nation,
3 Squamish First Nation, Malahat First Nation and Tsawwassen First Nation pointed out
4 that anthropogenic noise could affect salmon, and fish generally, in a variety of adverse
5 ways, including behaviour and direct mortality.

6 The EAO is recommending KMMs under CEAA 2012 for Fish Mitigations to Reduce Harm
7 and Mortality. Measures include conducting in-water work activities during reduced risk
8 windows identified by DFO (unless authorized by DFO), undertaking monitoring for fish
9 presence prior to pile driving and dredging, criteria and triggers to modify or stop in
10 water works due to fish presence, and seasonal restrictions during operations on
11 hydraulic suction and clamshell dredging to avoid entrainment of juveniles, including
12 salmonids. To mitigate effects to fish underwater noise during in-water works,
13 mitigations include monitoring underwater noise, use of vibratory pile driving as the
14 primary driving method, the use of sound attenuation devices (e.g. bubble curtains)
15 during impact pile driving when vibratory pile driving is not technically feasible and the
16 use of ramp up technique for pile driving.

17 **Sturgeon:** Kwantlen First Nation, Cowichan Nation Alliance, Ts'uubaa-asatx Nation,
18 Tsawwassen First Nation, Musqueam Indian Band and Tseil-Waututh Nation noted the
19 cultural importance of sturgeon to their communities. Musqueam Indian Band,
20 Tsawwassen First Nation and FLNRORD noted that the TMJ area is used by sturgeon for
21 holding and rearing, and that dredging activities might attract sturgeon and other fish
22 into the area exposing them to higher risk of propeller strikes.

23 In response, TJLP submitted two supplemental reports on sturgeon that reviewed
24 additional literature sources and considered tracking data provided by FLNRORD and
25 provided additional clarification and commitments on mitigation measures for sturgeon.
26 Tsawwassen First Nation also submitted a literature review, providing evidence that
27 vessel movements and dredging can injure and kill sturgeon in riverine environments,
28 such as the Fraser River. Tsawwassen First Nation emphasized that the cumulative
29 effects of threats to sturgeon (including but not limited to habitat loss and degradation,
30 dredging, gravel mining, fisheries bycatch, and vessel strikes) are at best hindering
31 population recovery and at worst causing a population decline. FLNRORD noted vessel
32 strikes were not considered a main threat to sturgeon and that although population-
33 level effects are unlikely, agreed with Indigenous Groups that the loss of a large, sexually
34 mature female would have a greater effect on the population than the loss of a juvenile,
35 and there is limited information with respect to the interaction of sturgeon with vessels
36 and dredge equipment.

1 The EAO is recommending a KMM under CEAA 2012 for a Fish Mitigations to Reduce
2 Harm and Mortality. In addition to the mitigations noted above, The EAO is
3 recommending that side scan sonar surveys of the dredge footprint be conducted
4 immediately prior to dredging and pile driving to determine sturgeon presence and
5 acoustic and vibratory fish deterrent measures (e.g., ramp up – gradual starting of
6 machinery) to reduce risk or entrainment and harm. Additionally, the EAO is
7 recommending that side scan sonar be required once the dredge pocket has been
8 established to inform sturgeon occupancy mitigations. TJLP would also be required to
9 record and report any observations of sturgeon mortality at the Marine Terminal Area,
10 and report to DFO and Indigenous Groups on whether further mitigation is appropriate.

11 • **Eulachon:** Tsawwassen First Nation, Musqueam Indian Band and Ts'uubaa-asatx Nation
12 noted that eulachon might spawn in the lower Fraser River and around the TMJ site.
13 Given eulachon's importance for FSC purposes to Indigenous Groups, Tsawwassen First
14 Nation requested an eulachon spawning study be conducted to inform the EA about if
15 eulachon spawning occurs in the LAA as it does in the RAA as well as further review of
16 literature and field research.

17 In response to the concerns raised, TJLP completed additional eulachon spawning
18 habitat characterization in the spring of 2020 and an in-river eulachon spawning
19 assessment during the 2021 spawning season to address uncertainty in the potential for
20 eulachon spawning habitat within the proposed dredge area. The spawning assessment
21 was conducted in collaboration with Tsawwassen First Nation and Musqueam Indian
22 Band to assess for the presence of eulachon spawning in the dredge area and
23 documented a total of 16 eggs during the 45-day monitoring period. TJLP explained that
24 the eggs were from drift from upstream, as eulachon spawning would be marked by
25 much higher levels of eggs. Based on the physical and biological information collected,
26 TJLP concluded that habitat within the dredge area is low suitability spawning habitat
27 due to the combination of the salt wedge, lack of suitable spawning substrate, elevated
28 flow velocities that can occur during the spawning period, and lack of direct evidence of
29 spawning. Further, TJLP concluded that current usage of the dredge area by adult
30 eulachon is temporary and largely limited to the period of migration movements to
31 upstream spawning locations.

32 The EAO is recommending KMMs under CEAA 2012 for the Fish Mitigations to Reduce
33 Harm and Mortality, and Fish Habitat Offset Plan. In addition to the mitigations noted
34 above, there would be seasonal restrictions during operations on hydraulic suction and
35 clamshell dredging to avoid entrainment of juveniles, including eulachon.

1 TMJ is required to be constructed and operated in accordance with all applicable statutory and
2 regulatory requirements of the *Fisheries Act*, and other federal, provincial, or municipal
3 legislation, regulation, or policies (See the Fish and Fish Habitat (Section 5.6) in Part B). The
4 Application proposed a habitat offset for the direct habitat loss associated with the TMJ
5 footprint. Indigenous Groups requested the offsetting plan aim to exceed the value (amount
6 and quality) of habitat lost and a net gain in fish and invertebrate productivity. Indigenous
7 Groups requested that they be involved in the collaborative development of the plan and that it
8 be reflective of lessons learned from other offset plans in the region. Tsleil-Waututh Nation
9 requested that the offset habitat be compared to existing viable habitat and not to habitat that
10 has already been degraded. The EAO proposes a key mitigation under CEAA 2012 for a Fish
11 Habitat Offset Plan to offset impacts to fish habitat from TMJ.

12 DFO has clarified that dredging and scour protection would result in a harmful alteration,
13 disruption or destruction (“HADD”) of habitat and would likely require authorization under the
14 *Fisheries Act*. The scope of works that would require the authorization and habitat offsetting
15 requirements would be determined during DFO’s regulatory review process, should an EAC be
16 issued. The Fish Habitat Offset Plan would identify means to ensure offsetting habitat would
17 provide a higher value than the fish habitat it is replacing, monitoring to assess effectiveness of
18 the offsetting measures, and contingency measures and associated monitoring measures that
19 would be put into place if the offsetting measures are not successful in offsetting the residual
20 loss or impacts on fish habitat resulting from TMJ.

21 The EAO heard concerns from many Indigenous Groups, including Musqueam Indian Band,
22 Tsleil-Waututh Nation, Tsawwassen First Nation, Quw’utsun Nation, Kwantlen First Nation, the
23 People of the Rivers Office on behalf of the S’ólh Témexw Stewardship Alliance, Malahat First
24 Nation, Pauquachin First Nation, Scia’new First Nation, Pacheedaht First Nation, T’Sou-ke First
25 Nation, Ditidaht First Nation, and Maa-nulth First Nations about TMJ potentially contributing to
26 cumulative effects on fish and fish habitat in the Salish Sea and the Fraser River, and
27 disagreement with TJLP’s conclusion that there would be no residual cumulative effects to fish
28 and fish habitat. The EAO conducted its own cumulative effects assessment based on its own
29 conclusions of predicted residual effects to fish and fish habitat loss and alteration, behaviour
30 disturbances from underwater noise and injury from TMJ. The EAO concluded that with
31 mitigations, there would not be significant cumulative effects from the interaction of TMJ with
32 other existing and reasonably foreseeable projects. The EAO is recommending a KMM under
33 CEAA 2012 for Fish Mitigations to Reduce Harm and Mortality, as described above in this

1 section. These mitigations would contribute to reducing TMJ contribution to cumulative effects
2 to fish and fish habitat.

3 The EAO understands that Indigenous communities have strong connections to the marine
4 environment in the Salish Sea and Fraser River and are stewards of the lands and waters. As
5 described in [Section 13.1.1](#), there are many existing regional Government of Canada initiatives
6 available to support Indigenous groups to undertake stewardship activities and improve the
7 understanding of environmental and cumulative effects in the Salish Sea, and to a relatively
8 lesser extent the lower Fraser River. These programs include the Cumulative Effects of Marine
9 Shipping (CEMS), Whales Initiative, Aquatic Habitat Restoration Fund, the Coastal
10 Environmental Baseline Program, the Aboriginal Fund for Species at Risk, and the Salish Sea
11 Initiative, for example. Additionally, programs that are contributing to our understanding of
12 environmental baseline and environmental and cumulative effects in the Salish Sea include the
13 implementation of the TMX Recommendations 1 and 2, and the Marine Spatial Planning (MSP)
14 process. Although these initiatives are not TMJ-specific, the EAO recognizes that these
15 programs are working towards a better understanding of cumulative effects in the Salish Sea
16 and lower Fraser River as well as taking actions to address cumulative effects and are therefore
17 considered relevant by EAO as important context for understanding regional cumulative effects
18 on the environment. The EAO is aware that TJLP has proposed to contribute up to \$2 million to
19 the First Nations Fisheries Legacy Fund⁷⁴, which is an Indigenous-led program that support
20 recovery programs for chinook salmon, eulachon and sturgeon in the Fraser River and Salish
21 Sea. For more information about the EAO's consideration of TJLP's contribution proposal in see
22 [Section 13.1](#) on Current Context and Cumulative Effects in Part C.

23 **Geospatial Components (places, sites, and access):**

24 The EAO acknowledges that access to the marine terminal area would be disrupted throughout
25 construction and that Indigenous mariners and fishers would avoid entering and remaining in
26 the marine terminal area due to the warning signs and notifications as part of the terminal's
27 marine safety protocol regarding elevated public risk, in particular when vessels would be
28 berthing, loading, or de-berthing at TMJ.

- 29 • Some communal Indigenous fisheries licensed by DFO in the lower Fraser River
30 occurring downstream of the Port Mann Bridge¹⁷⁰ may occur in the marine terminal

¹⁷⁰Fraser River Indigenous fisheries archived reports. <https://www.pac.dfo-mpo.gc.ca/fm-gp/fraser/archive-indigenous-autoch-eng.html>

1 area, including drift and set-net Chinook FSC harvesting.

- 2 • Tilbury Island, including the TMJ site, is considered to be an important fishing area by
3 Indigenous Groups depending on the time of season or other variables that may change
4 year to year.

5 The EAO acknowledges Indigenous Group's concerns regarding existing constraints on access to
6 fishing, not attributable to TMJ, which affect the right to fish such as:

- 7 • DFO prohibitions or limitations on harvesting white sturgeon, eulachon, and Chinook
8 salmon;
- 9 • DFO licensed openings are limited in duration, and Indigenous fishers are given short
10 notice of when openings will occur; and
- 11 • Current vessel traffic levels have the potential to disrupt or stop Indigenous fishing
12 activities.

13 For the purpose of the EA, TJLP's Application scenario estimates a maximum of 137 vessels
14 (LNG carriers and bunker vessels) per year calling on the jetty, resulting in 274 trips (inbound
15 and outbound) annually, equivalent to approximately one vessel call every three days. During
16 Operations, TJLP predicts (based on 2018 projections) that operational LNG carrier and barge
17 vessels for TMJ could increase large vessel traffic transiting the Southern Arm of the Fraser
18 River up to the TMJ site by approximately 6.5 percent. Vessel movements are anticipated to be
19 236 annual vessel movements in the MSA because approximately 19 bunkers would be used
20 regionally for bunkering and would not travel through the shipping lanes. TJLP estimated the
21 increase in vessel traffic associated with TMJ within segments of the MSA, and anticipated that
22 TMJ would only represent an increase of 0.5 percent in Segment A, a 0.2 percent increase in
23 Segment B, and a 1.1 percent increase in Segments C and D of the total vessel movements
24 relative to existing conditions (please see Figure 15 in the Land and Marine Resource Use
25 [Section 8.2](#)). See [Section 13.3.1.1](#) below for more information on the EAO's assessment
26 potential impacts to Aboriginal Interests under the BVS.

27 With respect to the potential effects of TMJ-related vessel traffic, the EAO acknowledges that
28 Indigenous Groups' access to marine harvesting areas (i.e., fishing, crabbing, and other marine-
29 based gathering activities) could be periodically disrupted for short duration by transiting TMJ-
30 related vessels during construction and operations. The EAO agrees with TJLP's assessment that
31 TMJ-related vessel wakes are predicted to be within the natural variation of wave heights in the
32 Fraser River and the Salish Sea.

33 Interactions between TMJ-related vessels and Indigenous fishers that could disrupt access to
34 fishing may include:

- 1 • Periodic requirements to adjust course during transit to and from fishing sites to avoid
2 TMJ-related vessels as per the Collision Regulations in the Fraser River and MSA area;
3 and
- 4 • Potential temporary disruption of fishing activities due to passing vessels and their
5 wake, including removing fishing gear to avoid gear damage or loss, in the Fraser River
6 and to a lesser extent in the MSA area.

7 These effects to access are considered to apply broadly, and to varying degrees, to all
8 Indigenous Groups within the original Application area and the MSA area. As described in the
9 Current Use of Lands and Resources for Traditional Purposes in [Section 11.4](#), the EAO predicts
10 that TMJ-related vessel transits would have negligible-low magnitude effects to access to
11 fishing compared to baseline numbers of vessel transits, that could be experienced as higher in
12 the Fraser River compared to Salish Sea. The EAO also concludes in the cumulative effects
13 assessment section of Part B assessment on Current Use, that it is reasonable to expect that
14 past effects on access to and quality of experience of fishing would combine with TMJ effects to
15 result in significant cumulative effects to these sub-components of current use for Indigenous
16 Groups that fish at the TMJ site or preferentially within the shipping lanes. Please see [Section](#)
17 [13.1](#) of Part C for information about current context and cumulative effects as it relates to the
18 EAO's assessment of potential impacts on Aboriginal Interests.

19 To avoid or reduce disruptions to marine access and use to the TMJ site, Original Application
20 Area and MSA area, the EAO is recommending KMMs under CEAA 2012 for a Marine Access and
21 Transportation Plan from the TMJ site to Sand Heads and a Marine Communication Plan for
22 shipping out to 12 nm. The Marine Access and Transportation Plan would include a description
23 of mitigations to reduce disruptions caused by construction and operations for members of
24 Indigenous Groups to carry out traditional use activities that have been identified and
25 communicated by Indigenous Groups to TJLP in relation to this or other relevant plans. The
26 Marine Communication Plan would include procedures to inform Indigenous Groups of traffic
27 schedules, for Indigenous Groups to submit any feedback on potential adverse effects of TMJ-
28 related vessels and for TJLP to respond in a timely manner.

29 As described in [Section 13.1.1](#), there are current regional Government of Canada programs and
30 initiatives relevant to cumulative impacts to the ability of Indigenous Groups to safely access
31 fishing areas. MSET provides funding to eligible Indigenous communities for equipment to
32 enhance the safety of certain Indigenous vessels and for training to build understanding around
33 safety on the water. EMSA helps coastal Indigenous communities better plan vessel routes,
34 identify sensitive areas, enhance local marine safety, and protect the environment. CEMS
35 Initiative is studying the effects of marine shipping on the environment and coastal

1 communities. The Traffic Separation Scheme Feasibility Study is looking at the impacts of
2 changing the marine shipping lanes and how this has and could affect fishing activities in the
3 Salish Sea. However, the EAO acknowledges that these programs are broad in nature and are
4 not intended to mitigate or accommodate for the specific potential impacts to Indigenous
5 mariners and fishers navigating in proximity to TMJ vessels within the established Traffic
6 Separation Scheme of the Salish Sea or main navigational channel in the lower Fraser River. The
7 Crown is committed to working with Indigenous people in shaping the initiatives to better
8 understand cumulative effects in the Salish Sea, support informed decision-making, and the
9 development of potential measures to manage cumulative effects by the ongoing collection
10 and analyses of targeted data with Indigenous communities.

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1 Social, Cultural, Experiential Values:

2 The EAO heard from Musqueam Indian Band, Tsawwassen First Nation, Tsleil-Waututh Nation,
3 Pauquachin First Nation, Maa-nulth First Nations, Esquimalt First Nation, Tsartlip First Nation¹⁷¹,
4 Kwantlen First Nation, Quw'utsun Nation, Ditidaht First Nation, and the People of the River
5 Referral Office on behalf of their member Nations of the importance of fishing to their cultural
6 identity and the transmission of their culture including language to younger generations. Based
7 on submissions for the RBT2 and TMJ hearings, input during the TMJ EA, and the EAO's
8 previous assessment work, the EAO recognizes the importance of fishing to the culture of all
9 Indigenous Groups.

10 With respect to social, cultural, and experiential values associated with fishing, the EAO
11 understands that many Indigenous Groups are concerned about potential TMJ effects from:

- 12 • Reduced visual quality from TMJ-related vessel presence on the seascape and while at
13 berth;
- 14 • Noise and visual effects from construction such as pile driving and capital dredging and
15 operation activities such as ship transits and maintenance dredging;
- 16 • Concern about potential TMJ contributions of contaminants or invasive species that
17 could affect the quality of harvested foods, resources, and the ecosystem;
- 18 • Reduced opportunities for intergenerational knowledge transfer due to passing vessels
19 disrupting fishing activities;
- 20 • Safety concerns from wake from passing TMJ-related vessels and the potential for
21 accidents with smaller Indigenous fishing vessels; and
- 22 • Concerns around the consequences of an accident or malfunction at the TMJ jetty
23 and/or for LNG carriers and bunker vessels while in transit.

24 As outlined in the Current Use and Noise and Visual Effects sections of Part B of this Report, the
25 EAO is of the opinion that the visual and acoustic changes as a result of TMJ are not likely to be
26 substantially different than the existing acoustic and visual conditions adjacent to the TMJ site
27 (i.e., within the LAA as outlined in the Application). As such, the EAO has concluded that noise
28 and visual effects during construction and operations (when LNG carrier vessels are at berth)
29 would have negligible to low level effects, depending on the location of the viewer/listener.

¹⁷¹ As noted in the WesPac Marine Shipping Assessment.

1 The EAO proposes conditions which include the Lighting Management, Noise and Vibration
2 Management as part of the CEMP and OEMP, an Air Quality Management Plan, a Greenhouse
3 Gas Reduction Plan, and a Water Quality Management Plan, and recommends KMMs under
4 CEAA 2012 for an Air Quality Management Plan and Marine Access and Transportation Plan.
5 Additionally, the EAO proposes provincial Condition 17: Indigenous Cultural Awareness,
6 Recognition and Mitigation. This condition states that TJLP must offer opportunities to
7 Indigenous Groups on Schedule B in the Lower Fraser to lead or support activities such as
8 ceremonies, executing cultural protocols, transmission of knowledge or language, recognizing
9 cultural heritage and providing cultural awareness training to TMJ employees.

10 The EAO appreciates that some Indigenous people may find the presence and sounds of the
11 Jetty or LNG vessels disturbing for safety and/or aesthetic reasons, or for other personal
12 reasons. The EAO acknowledges Indigenous concerns that noise and visual disruptions and
13 concerns about safety could then lead to reduced opportunities for cultural transmission,
14 including Indigenous language acquisition by younger generations while undertaking traditional
15 harvesting activities on land or on the water, and in particular, while fishing. As described in the
16 Land and Marine Use Section of Part B ([Section 8.2](#)), the EAO acknowledges that Indigenous
17 mariners and fishers would avoid entering into and remaining in the marine terminal area due
18 to the warning signs and notifications regarding elevated public risk, in particular when vessels
19 would be berthing, loading, or de-berthing at TMJ.

20 As described in [Section 13.1.1](#), there are current regional Government of Canada initiatives
21 relevant to cumulative impacts to the ability of an Indigenous Group to safely practice fishing
22 and the quality and experience of fishing. For example, MSET initiative provides funding to
23 eligible Indigenous communities for equipment to enhance the safety of certain Indigenous
24 vessels and for training to build understanding around safety on the water. The EMSA initiative
25 helps coastal Indigenous communities better plan vessel routes, identify sensitive areas,
26 enhance local marine safety, and protect the environment. The EAO notes beyond MSET and
27 EMSA, other initiatives including CEMS, CDCR and the OPP's CFPF may collectively reduce
28 effects within the region. However, these initiatives are not intended to mitigate or
29 accommodate for the potential impacts to Indigenous mariners and fishers navigating in
30 proximity to TMJ vessels within the established Traffic Separation Scheme of the Salish Sea or
31 the main navigational channel of the Lower Fraser. The EAO understands that the Crown is
32 committed to working with Indigenous people in shaping the initiatives to better understand
33 cumulative effects in the Salish Sea and lower Fraser River, support informed decision-making,
34 and the development of potential measures to manage cumulative effects by the ongoing
35 collection and analyses of targeted data with Indigenous communities.

1 The potential impact of TMJ on the right to fish for each Indigenous Group is described in
2 Section 14 to 16 of this Report.

3 **13.3.1.1 POTENTIAL IMPACTS ON ABORIGINAL FISHING RIGHTS UNDER THE BUNKERING** 4 **VESEL SCENARIO AND ISSUES RAISED BY INDIGENOUS GROUPS**

5 **13.3.1.1.1 The EAO's methods for assessing potential BVS-related changes to pathways of** 6 **impacts to Aboriginal fishing rights**

7 Using methods consistent with [Section 12.2](#), the EAO assessed for potential impacts associated
8 with the TMJ BVS using the following pathways of effects to impacts for the biophysical,
9 geospatial, and other social, cultural, or experiential components of Aboriginal fishing rights,
10 which were previously identified for TMJ in [Section 13.3.1](#) of Part C:

- 11 • **Biophysical** – residual and cumulative effects, including fish habitat loss and alteration
12 from the marine facility, dredging, vibrodensification and scour protection; change in
13 fish behaviour due to underwater noise during in-water works; and injury or mortality
14 due to machinery and vessels during construction and operations as potential pathways
15 of effects impacts.
- 16 • **Geospatial** – residual and cumulative effects to access, including disruptions to the
17 marine terminal area throughout construction; avoidance of the marine terminal area
18 during operations due to warning signs and notifications regarding elevated public risk;
19 and disruptions to access to fishing during operations due to TMJ-related vessel traffic
20 for those Indigenous Groups that fish at TMJ site or preferentially within the shipping
21 lanes.
- 22 • **Social/Cultural/Experiential values** – residual and cumulative effects to noise and visual
23 quality during construction, or visual quality during operations when vessels are berthed
24 at the jetty and in transit; and the experiential quality of current use for fishing
25 impacting those Indigenous Groups that fish at TMJ site or preferentially within the
26 shipping lanes.

27 For assessment of potential BVS-related impacts to Aboriginal fishing rights from TMJ, the EAO
28 evaluated for any potential changes associated with those residual effects listed directly above,
29 and how those changes would affect the level of EAO's seriousness determination for impacts
30 to Aboriginal Interests. In addition to potential changes to residual effects relevant to the BVS,
31 the EAO also considered potential changes to cumulative effects in its assessment of potential

1 BVS-related impacts to Aboriginal fishing rights. This included consideration of the fishing
2 component of Current Use of Lands and Resources for Traditional Purposes ([Section 11.4](#)),
3 including the EAO conclusions that it is reasonable to expect that past and future effects on fish
4 and fish habitat, access to fishing and the experience of fishing would combine with TMJ effects
5 to result in significant cumulative effects for those Indigenous Groups that fish preferentially at
6 the TMJ site or in the main navigational channel in the South Arm of the lower Fraser River (see
7 [Section 11.5.4.2](#) for details). Also see [Section 13.1](#), or individual Indigenous Group sections of
8 Part C, for more details on the EAO's approach to the consideration for TMJ-related residual
9 effects, combined with the existing significant cumulative effects, in its assessment for potential
10 impacts to Aboriginal Interests, where relevant.

11 In the preparation of the EAO's assessment for the BVS in Part C of this Report, the EAO relied
12 on TJLP's BVSA Report, which considered the additional bunker vessel calls on the jetty, using
13 the same geographic scope as the Application (i.e., jetty to Sand Heads), as well as advice
14 provided by Indigenous Groups and the Working Group on the BVSA report. With respect to the
15 BVSA, the EAO did not assess for potential BVS-related impacts within the MSA area because
16 TJLP identified that the BVS is not anticipated to affect the number of vessels in the MSA (see
17 [Section 2.2.2](#) of Part A for details). Also, with respect to the BVSA, the EAO did not assess for
18 potential BVS-related impacts to Aboriginal Interests that would be expected to result from
19 potential effects to harm to fish due to changes in fish behaviour in response to underwater
20 noise, or to the Noise VC due to TMJ-related vessel activities. These specific residual effects
21 were not included in the Part C assessment for the BVS because the EAO does not anticipate
22 that the BVS would result in any changes to the EAO's conclusions on these specific residual
23 effects from what was assessed in the original Application Scenario. This approach is consistent
24 with the Part B chapters on Fish and Fish Habitat ([Section 5.6](#)) and Noise ([Section 6.2](#))
25 presented in this Report.

26 **13.3.1.1.2 Potential BVS-related changes to pathways of impacts to Aboriginal fishing rights**

27 In the Fish and Fish Habitat chapter of Part B ([Section 5.6](#)), the EAO identified that the BVS may
28 result in potential changes to the residual effect on injury and mortality of fish due to the
29 increased chance of vessel strikes from TMJ-related bunker vessel traffic during operations.
30 With respect to potential harm to fish due to vessel strikes, TJLP stated that an increase in TMJ-
31 related bunker vessel transits may increase the risk of vessel strikes on white sturgeon;
32 however, this effect is not predicted to result in population-level changes to white sturgeon in
33 the Fraser River. TJLP noted that the bunker vessels would have propellers above the bottom of
34 the vessel or shrouded propellers, and would take less time to load (i.e., less time in the dredge

1 pocket) and would have a reduced draft compared to the LNG carriers, thereby reducing
2 potential risk of harm to sturgeon on the riverbed within the navigation channels but may still
3 pose a risk to sturgeon present within the mid-water column and at the surface. The EAO
4 acknowledges there is some uncertainty associated with the potential risk of harm or mortality
5 to white sturgeon due to vessels strikes, including the interaction with vessel class and fish size.
6 The EAO captured this associated uncertainty in the confidence rating in the conclusions in Part
7 B of this Assessment Report (see the Fish and Fish Habitat Section 5.6 for more details).

8 Proposed mitigations for potential residual effects to Fish and Fish Habitat include mitigations
9 to reduce impacts to noise and visual quality in the CEMP and OEMP, as well as the
10 recommended KMMs under CEAA 2012 for the Fish Mitigations to Reduce Harm and Mortality,
11 and Fish Habitat and Offset Plan. In Part B of this Report, the EAO predicts that with mitigations
12 and offsetting measures for TMJ, there would be non-significant residual cumulative effects on
13 Fish and Fish Habitat from the interaction of TMJ with other past, present, and reasonably
14 foreseeable future projects and activities. The EAO acknowledges there is some uncertainty in
15 the significance conclusion related to the absence of established threshold and recovery
16 strategies or action plans in place for the species assessed, and uncertainties around proposed
17 mitigation measures for foreseeable projects capable of contributing to future cumulative
18 adverse effects.

19 In its assessment of potential BVS-related impacts in Part C, the EAO also considered whether
20 the BVS resulted in any changes to residual effects on fisheries resources, access, and quality of
21 experience for the fishing component of Current Use of Lands and Resource for Traditional
22 Purposes, and how any changes to residual effects on the fishing component of Current Use
23 might affect the level of EAO's seriousness determination for TMJ's potential impacts to
24 Aboriginal fishing rights in Part C. To this end, the EAO identified that under the BVS, potential
25 changes to residual effects relevant to access and quality of experience for fishing component
26 of Current Use were related to marine user avoidance of the marine terminal area;
27 interruptions to access to FSC fishing areas in the lower Fraser River; visual quality, and changes
28 to real or perceived safety risks associated with interactions between TMJ-related vessels and
29 Indigenous harvesters in the lower Fraser River, and to a lesser extent out to Sand Heads.

30 For the TMJ site, as described in the Current Use ([Section 11.4](#)) chapter of this Report, the EAO
31 predicts that Indigenous fishers would avoid entering and remaining in the marine terminal
32 area during operations due to the warning signs and notifications regarding elevated public risk
33 due to LNG berthing, loading and de-berthing activities (on average, one vessel call or two
34 vessel movements a day in the BVS). The EAO considered that this would result in a continuous
35 frequency of effect to the avoidance of the marine terminal area. As described in the BVSA,

1 TJLP states that although a greater number of vessels would call to TMJ under the BVS, the
2 bunker vessels would require less time to berth, load, and de berth compared to the LNG
3 carriers. As described in the Land and Marine Resource Use ([Section 8.2](#)) chapter of this Report,
4 at the scale of the LAA and RAA, the EAO predicts the effects to access within the TMJ site
5 would be low in magnitude no matter what operating scenario is considered.

6 For vessels in transit, TJLP's BVSA Report stated that bunker vessels would be self-propelled and
7 more maneuverable resulting in less time obstructing the navigational channel and other
8 portions of the river, compared to the LNG carriers that would require escort tugs. With respect
9 to the BVS, TJLP has identified that because the potential interaction between Indigenous
10 Groups fishing access would occur more frequently, but for shorter periods of time compared
11 to the scenario presented in the Application, TJLP concluded effects from additional bunker
12 vessel traffic are expected to be consistent with the findings of the Application. In its
13 assessment for effects to Current Use of Lands and Resources for Traditional Purposes ([Section](#)
14 [11.4](#)), the EAO concludes that under either of the operating scenarios presented by TJLP
15 (original Application or BVS), the potential for TMJ's residual effect to access for the fishing
16 component of Current Use would be negligible to low in magnitude due to regularly occurring
17 vessel transits (on average one vessel call per day under the BVS) to and from TMJ's marine
18 terminal area. However, as described in the Current Use chapter of this Report ([Section 11.4](#))
19 the EAO predicts that under the original Application Scenario these residual effects would likely
20 result in relatively infrequent and short-duration interruptions to access and quality of
21 experience for fishing, but under the BVS these effects would have a potential for higher
22 frequency of interactions between Indigenous Groups and TMJ-related vessels in the lower
23 Fraser River during some specific FSC fisheries windows.

24 The EAO heard from Indigenous Groups and DFO that some of the DFO-regulated FSC fisheries
25 windows in the Fraser River are only open for extremely short periods of time during the
26 season. For example, the openings for communal FSC fishing for Chinook salmon below the Port
27 Mann Bridge by drift- and set-net ranged between 6-11 hours per opening, with five or six
28 openings occurring during the 2020 season depending on the Indigenous Group¹⁷². In
29 consideration of the current restrictions on, and limited opportunities available for, FSC
30 harvesting in the lower Fraser River by Indigenous Groups, the EAO predicts that under the BVS,
31 potential interactions between TMJ-related vessels in transit and Indigenous Groups conducting

¹⁷² Government of Canada – Fraser River Indigenous fisheries archived reports, Lower Fraser River license opening times (Communal licenses) for “2020”. Available at: <https://www.pac.dfo-mpo.gc.ca/fm-gp/fraser/docs/archiv-reports-rapports/indigenous-autochtone/LFOpenings/2020COM-eng.pdf>. Accessed May 26, 2022.

1 FSC fishing in the lower Fraser River could potentially have a greater effect on access to fishing
2 during FSC fisheries windows (see Section 11.4). Proposed mitigations to avoid or reduce
3 interruptions to in-river FSC fishing activities due to TMJ-related vessels include mitigations to
4 reduce impacts to noise and visual quality in the CEMP and OEMP, as well as the recommended
5 KMMs under CEAA 2012 specifically for Marine Communications, Marine Access and
6 Transportation, and Vessel Traffic Management Plans. These plans would be developed in
7 consultation with Indigenous Groups, and identify procedures of communication with
8 Indigenous Groups, and mitigations to reduce potential disruptions for Indigenous harvesters
9 and mariners to carry out traditional use activities including fishing for FSC purposes.

10 In the BVSA, TJLP stated that the analysis in the Application was based on a larger vessel size
11 with greater potential for visual impacts, and that the reduced frequency of LNG carriers
12 combined with the increased frequency of bunkering vessels is not anticipated to result
13 changes to the assessment of Visual Quality compared to what was originally assessed in the
14 Application. It is also noted that since the bunker vessels are smaller and more maneuverable
15 than the larger LNG carriers; therefore, associated with comparably fewer safety concerns due
16 to the smaller size of the bunker vessels and reduced spatial and temporal disruption to
17 Indigenous fishing vessels.

18 The EAO acknowledges that some Indigenous people may find LNG vessels disturbing for safety
19 and/ or aesthetic reasons or for other personal reasons both at the TMJ site and from TMJ-
20 related vessels in transit. The EAO also notes that under the *Collision Regulations*, FSC
21 harvesters are required to remove nets to allow for larger vessels, including TMJ-related
22 vessels, to transit through the main navigational channel of the Fraser River, and established
23 commercial shipping lanes. The EAO also acknowledges Indigenous concerns that noise, visual
24 disruptions, and concerns about safety could then lead to reduced opportunities for cultural
25 transmission including Indigenous language acquisition by younger generations while
26 undertaking traditional harvesting activities on land or on the water.

27 In the Visual Quality (Section 8.3) chapter of this Report, the EAO predicts that TMJ would have
28 negligible to low level effects on visual quality due to increases in daytime visibility components
29 at the TMJ site and temporary visibility of marine vessel movements, and nighttime visibility of
30 TMJ's lighting at the site and navigation lighting from marine shipping vessels. The EAO predicts
31 that the magnitude of the residual effect on visual quality would depend on the location of the
32 viewer, with it reasonable to expect that the magnitude of effect would increase the closer one
33 is to the terminal area or a vessel in transit. The EAO also concludes that residual visual quality
34 effects would be continuous at the TMJ site, and frequent for vessels in transit, for both the
35 Application scenario and BVS.

- 1 A summary of of pathways of effects to impacts to Aboriginal fishing rights for TMJ and relevant
- 2 residual effects anticipated to change under the BVS is contained in Table 32 below.

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1 **Table 32. Summary of pathways of effects to impacts to Aboriginal fishing rights for Tilbury**
 2 **Marine Jetty and changes under the Bunkering Vessel Scenario.**

The pathways of effects to impacts to Aboriginal fishing rights considered by the EAO in its impacts assessment of the Application scenario for Tilbury Marine Jetty	Potential changes to residual effects relevant to pathways of effects to impacts to Aboriginal fishing rights for Tilbury Marine Jetty that may change under the Bunkering Vessel Scenario
<p>Biophysical – residual and cumulative effects fish habitat loss and alteration from the marine facility, dredging, vibrodensification and scour protection; change in fish behaviour due to underwater noise during in-water works; and injury or mortality due to machinery and vessels during construction and operations as potential pathways of effects impacts.</p>	<p>Biophysical – Harm to fish injury or mortality due to vessels during operations. Under the BVS, the EAO predicts there could be increased chance of vessel strikes from TMJ-related bunker traffic, but the effect is not predicted to result in population-level changes to white sturgeon, and the EAO considered uncertainty in the confidence rating in its conclusions in Section 5.6 of Part B.</p>
<p>Geospatial – residual and cumulative effects to access, including disruptions to the marine terminal area throughout construction; avoidance of the marine terminal area during operations due to warning signs and notifications regarding elevated public risk; and disruptions to access to fishing during operations due to TMJ-related vessel traffic for those Indigenous Groups that fish at TMJ site or preferentially within the shipping lanes.</p>	<p>Geospatial – Under the BVS, there would be a potential for higher frequency of short-duration interactions resulting in disruptions to access to fishing for those Indigenous Groups that fish in the South Arm of the lower Fraser River during operations due to regularly occurring TMJ-related vessel movements (average of one vessel call per day). The EAO does not predict a change in the residual effects to access from avoidance of the marine terminal area during operations due to warning signs and notifications regarding elevated public risk, which was already considered to be a continuous for the life of the project.</p>
<p>Social/Cultural/Experiential values – residual and cumulative effects to noise and visual quality during construction, or visual quality when vessels are berthed at the jetty and in transit; and the experiential quality of current use for fishing impacting those Indigenous Groups that fish at TMJ site or preferentially within the shipping lanes.</p>	<p>Social/Cultural/Experiential values – The EAO did not predict any change in residual effects to visual quality when vessels are berthed at the jetty and in transit; and effects to experiential quality for current use for fishing impacting those Indigenous Groups that fish at TMJ site or preferentially within the shipping lanes compared to what was originally assessed under the Application Scenario.</p>

3

4 While the EAO is of the view that the potential impacts on Aboriginal fishing rights have been
 5 avoided, minimized, and accommodated to the extent possible for the purposes of the EA, the
 6 EAO also recognizes that there are outstanding impacts, in particular cumulative effects, and
 7 these outstanding impacts are reflected in the EAO’s conclusions in this Assessment Report. The
 8 EAO also notes that there is some uncertainty when considering how cumulative effects impact
 9 Aboriginal Interests, especially since the EAO did not conduct a comprehensive regional

1 cumulative effects assessment on all the various existing constraints and pathways of impact to
2 Indigenous Groups, which is considered beyond the scope of the EA for TMJ.

3 ***13.3.1.1.3 Concerns raised by Indigenous Groups during review of TJLP's BVSA report***

4 According to TJLP's ACR-4, Indigenous Groups raised several key issues and concerns during
5 their review of TJLP's draft BVSA Report. Several Indigenous Groups, including Cowichan Nation
6 Alliance member Indigenous Groups, Kwantlen , Kwantlen First Nation, Musqueam Indian Band,
7 Snuneymuxw First Nation, Tsleil-Waututh Nation, and Ts'uubaa-asatx Nation identified a
8 concern with the increased vessel traffic associated with the BVS. Kwantlen First Nation,
9 Musqueam Indian Band, and Ts'uubaa-asatx Nation identified concerns that the increased
10 vessel traffic may have a negative effect on fish, and Kwantlen First Nation identified a concern
11 about long-term cumulative effects on fish and fish habitat in the Fraser River from future
12 expansion of the Project.

13 TJLP also heard from Musqueam Indian Band and Ts'uubaa-asatx Nation concerns about the
14 Project contribution to cumulative effects in the area, and that for Musqueam Indian Band the
15 increased vessel traffic presents potential safety issues and a direct impact on Musqueam's
16 ability to harvest fish and other rights-based activities in the area. Ts'uubaa-asatx Nation raised
17 concerns that TJLP's BVSA Report does not include a socio-economic assessment, and that
18 under the BVS the Project could have effects on vegetation, cultural heritage and archaeology
19 sites, noise, GHGs, and wildlife habitat.

20 ***Concerns related to potential BVS-related changes to fish, fish habitat, and Aboriginal fishing*** 21 ***rights***

22 During the review of TJLP's BVSA Report and at Working Group meetings related to the review
23 of TJLP's BVSA Report, Indigenous Groups raised concerns that under the BVS there would be
24 potential for increased negative effects to fish and fish habitat and juvenile recruitment of
25 white sturgeon and eulachon; increased risk of vessel strikes on sturgeon; and changes in the
26 use of the Fraser River watershed by marine species that are important to their Aboriginal
27 Interests (e.g., salmon). The EAO captured these BVSA-related issues in its assessment on Fish
28 and Fish Habitat in [Section 5.6](#) of this Report.

29 During the review of TJLP's BVSA Report, the EAO also heard concerns from Indigenous Groups,
30 including Tsleil-Waututh Nation, Tsawwassen First Nation, and Snuneymuxw First Nation about
31 the increase in vessels from 137 annual calls at the jetty to up to 365 annual vessel calls, and
32 that under the BVS there would be increased risk of vessel strikes to white sturgeon due to
33 increased bunker vessel traffic associated with TMJ. In their review of the draft federal
34 conditions for TMJ, Snuneymuxw First Nation identified that the proposed mitigation measures
35 in the draft federal conditions for sturgeon seemed limited for mitigating for potential impacts
36 due to vessel strikes during operations. Maa-nulth First Nations also identified concern that the

1 increased vessel traffic associated with the BVS could impact culturally-important species, like
2 SRKW and Salmon, that use the Fraser River watershed. The EAO acknowledges that there is
3 some uncertainty associated with the potential risk of harm or mortality to sturgeon due to
4 vessels strikes, including the interaction with vessel class and fish size, and is of the view that
5 the EAO has adequately captured the uncertainty in the confidence rating in the conclusions in
6 the section on Fish and Fish Habitat in Part B of this Report ([Section 5.6](#)).

- 7 • The draft provincial conditions and recommended KMMs under CEAA 2012 are
8 designed to prevent or reduce potential effects on sturgeon, including monitoring for
9 sturgeon prior to sensitive in-water works (e.g., dredging) using side-scan sonar
10 techniques, and recording/ reporting any observations of sturgeon death, injury or
11 vessels strikes occurring within the Designated Project area (i.e., the Marine Terminal
12 Area shown in Figure 1.0 of the Certified Project Description for TMJ).
- 13 • Also, the EAO considers that the draft provincial conditions and recommended KMMs
14 under CEAA 2012 are adaptive, because for any observed vessel strikes, TJLP would be
15 required to have a qualified professional determine whether modified or additional
16 mitigation measures are necessary to protect sturgeon from vessel strikes related to the
17 Designated Project.

18
19 Indigenous Groups also identified concerns around effects on commercial fishing enterprise of
20 commercial First Nation harvesters and identified interest in better understanding the potential
21 effects that increased bunker vessel traffic would have on the distribution of vessels in the
22 MSA. Through the working group forum, Indigenous Groups also requested further information
23 on the current bunkering scenario in the Port of Vancouver and the VFPA's role in regulation of
24 bunkering activities. In response to this request, the EAO coordinated an information session
25 for the TMJ Working Group on April 12, 2022, where representatives from the VFPA presented
26 information about LNG as a marine fuel and current bunker operations in the Port of
27 Vancouver.

1 **Concerns regarding uncertainty related to assumptions considered in TJLP's BVSA Report**

2 During the review of TJLP's BVSA Report, Indigenous Groups identified concerns related to the
3 uncertainties associated with the assumptions made in the assessment presented in the Report
4 by TJLP. Tsleil-Waututh Nation identified a concern with the approach taken in TJLP's BVSA
5 Report, where in Tsleil-Waututh Nation's view TJLP's assessment for changes relies on
6 subjective criteria (e.g., minor changes, no perceptible changes, no detectable changes). Tsleil-
7 Waututh also requested for more clarification on the level of uncertainty and confidence used
8 in the conclusions of TJLP's BVSA Report. Similarly, Snuneymuxw First Nation identified
9 concerns with the approach used by TJLP where the bunker vessel's smaller size was used to
10 counteract effects from increased vessel frequency. Snuneymuxw First Nation also identified
11 concerns that TJLP's BVSA Report used vague terms to approximate the impacts leading to
12 uncertainty and that TJLP's approach of comparing the BVSA results to what was originally
13 assessed in the Application also increased the uncertainty of the conclusions in TJLP's Report.

- 14 • TJLP concluded that while there would be more bunker vessels calling at the jetty, the
15 increased number of smaller bunker vessels would not restrict movement in shipping
16 lanes to the same extent as the larger LNG carriers assessed in the Application.
- 17 • The EAO also notes that all TMJ-related vessels would be required to conduct
18 operational marine shipping in accordance with the requirements of the *Canada*
19 *Shipping Act* and other relevant navigation regulations and would be piloted by local
20 pilots as required. TJLP stated that the potential interaction is consistent with what was
21 assessed in the Application and did not conduct further assessment on navigation use
22 and navigability (see [Section 8.2](#) on Land and Marine Resource Use).
- 23 • In response to feedback from Indigenous Groups on the BVSA Report, TJLP
24 acknowledged that Appendix B of the BVSA Report did not provide a description of
25 confidence under each VC predicted to be affected by an increase in vessel traffic under
26 the BVS. On the final version of the BVSA Report, TJLP added a description of confidence
27 to the Marine Mammals, GHG, and Human Health VCs.

28 Indigenous Groups also raised concerns regarding the increased vessels associated with the BVS
29 and potential changes in residual effects for Air Quality and GHGs. Snuneymuxw First Nation
30 identified a concern that TJLP's BVSA Report potentially underestimated effects to Air Quality
31 (and underwater noise) because it did not include proper consideration of a range in vessel
32 types, including older models. Following review of TJLP's BVSA Report, Tsleil-Waututh Nation
33 requested for reassessments for potential effects to Air Quality and GHG emissions under the
34 BVS.

- 35 • TJLP noted that the Application was conservative in their Air Quality assessment (i.e.,
36 assessed the worst-case scenario), and as such, accounts for the variability in vessel type
37 in their BVSA Report. For example, the model used to predict annual emissions in TJLP's

1 Air Quality assessment assumed that all bunker vessels will be diesel powered
2 articulated tug barges (Tier 2) as these vessels were calculated to have a higher emission
3 rate than LNG-powered vessels.

- 4 • The EAO understands that TJLP considers that the assumption that all bunker vessels
5 (100%) would be diesel-powered is unlikely because there is already an LNG-powered
6 bunker vessel under development by an operator based in the Port of Vancouver, which
7 show that the sector is moving toward cleaner, quieter, modern vessels. Also, TJLP
8 expects TMJ would be subject to a condition that would limit the number of LNG vessels
9 calling on the jetty that use crude oil-based fuels (such as diesel) as their primary fuel
10 shall not exceed 13 calls annually, excluding LNG barges driven by tugs because there is
11 no LNG-powered alternative available for these vessel types.
- 12 • The EAO proposes Condition 19: Air Quality Management Plan and recommends a KMM
13 under CEAA 2012 for an Air Quality Management Plan, which would include
14 requirements for best management practices to mitigate effects to air quality. The EAO
15 also proposes Condition 20: Greenhouse Gas Reduction Plan, including mitigations
16 designed to reduce GHGs. The EAO is of the view that together, these proposed
17 mitigation measures would help to reduce adverse effects from TMJ to air quality and
18 GHG management, which includes triggers and corrective actions.

19 Also, during review of TJLP's BVSA Report, Indigenous Groups including Tseil-Waututh Nation,
20 Tsawwassen First Nation, and Snuneymuxw First Nation identified concerns related to potential
21 increased risks for spills, or accidents and malfunctions due to the increased frequency of vessel
22 traffic associated with the BVS. The EAO captured these BVSA-related issues in the section on
23 Accidents and Malfunctions ([Section 9.3](#)) in Part B of this report.

24 **Concerns regarding cumulative effects assessment in TJLP's BVSA report**

25 During the review of TJLP's BVSA Report, the EAO heard from Indigenous Groups concerns
26 about industrialization of the lower Fraser River, including cumulative effects to the
27 environment and visual quality of the area from increased vessel traffic. Tsleil-Waututh Nation
28 identified a concern regarding TJLP's approach to cumulative effects assessment in the BVSA
29 Report, and that the analysis done for the BVSA Report did not adequately address the
30 potential for changes in effects resulting from increased vessel calls under the BVS. Maa-nulth
31 First Nations also requested rationale why cumulative effects assessment were not undertaken
32 for the BVSA by TJLP. The EAO heard from Tsawwassen First Nation concern about under-
33 reporting cumulative effects to noise in the BVSA Report. Snuneymuxw First Nation requested
34 that the potential for effects to Visual Quality under the BVS should be re-assessed and that the
35 approach used in the BVSA Report severely undercuts TMJ's potential effects and TMJ's
36 contribution to cumulative effects on Visual Quality. The EAO understands that Snuneymuxw

1 First Nation is of the view that it cannot place any confidence in the accuracy of this Visual
2 Quality assessment as presented in the BVSA Report.

- 3 • The EAO is in agreement with TJLP, that due to the much larger vessel size and escort
4 tug requirement, the LNG Carriers would have potential for greater effect on Visual
5 Quality and Noise compared to bunkering vessels, and that the reduced frequency of
6 LNG carriers combined with the increased frequency of bunkering vessels is not
7 anticipated to result in changes to the assessment for effects on Visual Quality and
8 Noise compared to what was originally assessed in the Application scenario. See the
9 information found directly above ([Section 13.3.1.1](#)) for more details on the EAO's
10 approach to considering changes in residual effects to the Visual Quality and Noise
11 under the BVS in its assessment of potential impacts from TMJ to Aboriginal Interests.
- 12 • While the EAO is of the view that the potential impacts on Aboriginal fishing rights have
13 been avoided, minimized, and accommodated to the extent possible for the purposes of
14 the EA, the EAO also recognizes that there are outstanding impacts, in particular
15 cumulative effects, and these outstanding impacts are reflected in the EAO's
16 conclusions, including the EAO's conclusions on the fishing component of Current Use of
17 Resources and Lands for Traditional Purposes (see [Section 11.4](#) of Part B).

18 **Concerns regarding TJLP's proposed synchronous passage mitigation measure**

19 The EAO heard feedback from some Indigenous Groups regarding TJLP's proposed synchronous
20 passage mitigation for reducing potential interactions between FSC fisheries harvesters and
21 TMJ-related vessels during FSC openings in the lower Fraser River. Tsawwassen First Nation,
22 Tsleil-Waututh Nation and Snuneymuxw First Nation stated that the proposed synchronization
23 is insufficient in minimizing the effects to Indigenous harvesters. The EAO captured these BVSA-
24 related issues in its assessment on the fishing component of Current Use of Lands and
25 Resources for Traditional Purposes in Part B of this Report ([Section 11.4](#)).

- 26 • During development of their BVSA Report, TJLP proposed synchronizing project-related
27 bunker vessel movements with existing traffic on the Fraser River during FSC openings
28 to reduce the frequency of interruptions (e.g., the number of times that nets must be
29 moved or retracted and reset) thereby reducing effects to the critical limited FSC fishing
30 openings. The EAO understands that TJLP proposes to make arrangements to work with
31 other users of the Fraser River that would have regularly scheduled vessel transits (e.g.,
32 cargo ferries) to coordinate synchronous vessel movements were technically and safely
33 feasible.
- 34 • As part of the recommended Marine Access and Transportation Plan KMM, the EAO has
35 recommended additional mitigation measures based on the assessment of TJLP's BVSA
36 Report to help reduce TMJ-related impacts to access for Indigenous Groups that

1 conduct FSC fishing in the lower Fraser River. This KMM would require that, in
2 consultation with Indigenous Groups, TJLP must review annually anticipated locations
3 and timing of FSC fishing activities and develop measures to mitigate the effects of TMJ-
4 related marine shipping on Indigenous traditional use activities from Sand Heads
5 through the Designated Project area, unless not feasible for technical or safety reasons.

- 6
- 7 ● The additional mitigation measures being recommended by the EAO based on the
8 assessment of TJLP's BVSA Report include requirements for TJLP to reduce potential
9 interactions between TMJ-related vessel activity and vessel-based Indigenous fishing
10 activities in the lower Fraser River to Sand Heads during FSC windows by:
 - 11 ○ adjusting the LNG carrier call schedule annually;
 - 12 ○ implementing protocols to adjust LNG carrier arrival and departure times at the
13 marine jetty (while remaining within allotted vessel loading windows);
 - 14 ○ making arrangements to work with other users in the area to synchronize bunker
15 vessel arrivals and departures at the marine jetty with non-TMJ designated
16 marine traffic that has a regularly set schedule; and
 - 17 ○ providing opportunities for safety training for Indigenous Groups related to
18 marine navigation in the marine terminal area.
 - 19 ● The EAO acknowledges that synchronizing bunker vessel traffic with existing traffic does
20 not completely mitigate effects, including impacts on access during FSC openings and
21 other cultural activities. The EAO has also recommended a Cultural Heritage KMM,
22 which would require TJLP to develop nation-specific measures to address the effects on
23 tangible and intangible cultural losses caused by the construction and operation of TMJ,
24 in consultation with those Indigenous Groups experiencing the effects in the lower
25 Fraser River (as described in the this Report), and to consider developing or contributing
26 to Indigenous-led programs to preserve and enhance cultural heritage.
 - 27 ● While the EAO is of the view that the potential impacts on Aboriginal fishing rights have
28 been avoided, minimized, and accommodated to the extent possible for the purposes of
29 the EA, the EAO also recognizes that there are outstanding impacts, in particular
30 cumulative effects, and these outstanding impacts are reflected in the EAO's conclusions
in this Assessment Report.

1 13.3.2 POTENTIAL IMPACTS ON HUNTING, TRAPPING, AND GATHERING 2 RIGHTS AND CONCERNS RAISED BY INDIGENOUS GROUPS

3 The EAO's evaluation of potential effects on the right to hunt, trap, and gather considers
4 impacts to biophysical components that may result in changes in harvestable resource quantity
5 and quality, changes in access to hunting, trapping, and gathering sites, and changes to the
6 experience of hunting, trapping, and gathering that are attributable to TMJ.

7 The potential effects to hunting, trapping, and gathering rights, outlined below, apply broadly
8 to Indigenous Groups; specific issues raised by each Indigenous Group and the EAO's
9 conclusions on project impacts to Aboriginal Interests are discussed in Section 14 for Schedule B
10 Indigenous Groups, Section 15 for Schedule C Indigenous Groups, and Section 16 for Schedule D
11 Indigenous Groups.

12 **Biophysical Effects:**

13 The EAO understands that an Indigenous Group's hunting, trapping and gathering activities
14 depend, in part, on the status of wildlife and vegetation populations within their area of
15 traditional use. Current conditions at the TMJ site are more suitable to species that are very
16 tolerant of industrial development. The Salish Sea contains foraging areas, nutrient-rich
17 upwellings, tidal mudflats, and nesting habitat for marine birds along the shores. The Salish Sea
18 is an important area to many Indigenous Groups for hunting marine birds as a source of food,
19 and some marine birds hold substantial cultural, social and economic importance.

20 Musqueam Indian Band, Tsleil-Waututh Nation, and Maa-nulth First Nations raised concerns
21 about potential impacts to terrestrial species of interest. In response to their concerns and
22 those raised by ECCC, TJLP provided supplementary information on the potential effects to barn
23 owl, migratory birds, and little brown myotis bat at the TMJ site. Based on this assessment, TJLP
24 committed to include suitable mitigations to address potential effects from sensory disturbance
25 for these species in their wildlife, noise and light management plans, applicable at the TMJ site.
26 The EAO understands that Maa-nulth First Nations and Esquimalt First Nation agree with the
27 EAO's residual effects assessment but are uncertain about the EAO's significance determination
28 for potential effects to migratory and marine birds from TMJ.

29 After considering all relevant proposed mitigation measures, the EAO concluded that TMJ
30 would result in loss or alteration of 0.23 ha of marsh and riparian habitat from vegetation
31 clearing and construction of jetty footings in the marsh/mudflat area during construction. TMJ
32 would also result in sensory disturbance from noise and light during all project phases and an
33 increased risk in mortality to wildlife due to site clearing, artificial light and vessel strikes.
34 Noise levels are predicted to be highest during construction activities such as during pile
35 driving, but these activities would be temporary in nature. In the MSA area, the EAO predicted

1 residual effects of mortality to marine birds due to collisions with vessels and disorientation
2 from vessel lighting.

3 Given the negligible to low magnitude of predicted residual effects, the primarily local extent of
4 effects, and the EAO's proposed conditions (Vegetation and Wetland Management and
5 Wetland Offsetting Plan, and wildlife and wildlife habitat management and monitoring, lighting
6 management, and noise and vibration management as part of the CEMP and OEMP which
7 would be developed in consultation with Indigenous Groups), the EAO concludes that the
8 above-mentioned residual effects are not likely to cause significant adverse environmental
9 effects to wildlife and wildlife habitat or marine birds in the region. The EAO is also proposing
10 these mitigations as KMMs under CEAA 2012 which would include the requirements for
11 migratory birds, lighting, noise and wildlife and wildlife habitat management and monitoring,
12 and a Wetland Compensation Plan. The potential impacts to hunting and trapping rights of each
13 Indigenous Group will be discussed in subsequent sections.

14 During construction at the TMJ site, site preparation and ground stabilization would result in
15 direct loss of wetland and riparian ecosystems. Species at risk and traditional use plants were
16 not observed within the Project Disturbance Area; however, baseline field surveys cannot
17 determine their complete absence. As part of the proposed condition for the Vegetation and
18 Wetland Management and Wetland Offsetting Plan, pre-construction surveys for rare,
19 culturally significant plants and those protected under SARA would be undertaken. Methods to
20 protect, salvage and transplant those plants and invasive species management would be
21 outlined in the Vegetation and Wetland Management and Wetland Offsetting Plan, which
22 would require consultation with Indigenous Groups. The EAO also proposes KMMs under CEAA
23 2012 which would include the requirements for a Wetland Compensation Plan. TJLP also
24 expects the wetland and riparian enhancement and restoration to expand the available habitat
25 for these species. Vegetation was not considered in the MSA because it is not expected to be
26 adversely affected by TMJ-related shipping.

27 After considering the proposed mitigation measures, the EAO concluded that TMJ would result
28 in a potential low magnitude loss of wetland and riparian ecosystems. Considering the
29 proposed mitigation measures and conditions outlined above, the EAO is satisfied that TMJ is
30 not likely to result in significant adverse residual effects to the Vegetation VC. The potential
31 impacts to gathering rights of each Indigenous Group will be discussed in subsequent sections.

32 **Geospatial Components (places, sites, and access):**

33 For the original Application area, the EAO notes that traditional plant gathering areas were not
34 identified on Tilbury Island and no traditional use plants were observed within the TMJ site. The
35 EAO acknowledges there is a potential for traditional use plants to be present on Tilbury Island
36 in the future. Given the current levels of harvestable resources for hunting, trapping, and

1 gathering within the TMJ site, which is situated on fee simple (private) land, the EAO cannot
2 discern a measurable effect of TMJ on access to areas used for hunting, trapping, and gathering
3 by Indigenous Groups beyond the existing cumulative impact of prior development at the site
4 and in the adjacent area.

5 For the Marine Shipping Assessment area (MSA), the EAO is of the view that TMJ-related
6 shipping may cause infrequent, short-term disruptions to marine-based hunting along the
7 proposed LNG vessel route, negligible effects on Indigenous access to terrestrially based
8 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
9 Heads to the 12 nm territorial limit, and no anticipated disruption to access to terrestrial-based
10 activities.

11 **Social, Cultural, Experiential Values**

12 Indigenous Groups noted that terrestrial and marine harvesting is influenced by numerous
13 factors, including the visual condition of the site, noise levels, and confidence in the quality of
14 the harvested animals or plants.

15 The EAO considers that TMJ is unlikely to materially affect the experience of hunting, trapping,
16 and gathering at the TMJ site because the site provides a very limited existing opportunity for
17 these activities. Where opportunities exist along the shipping route, the relatively small number
18 of TMJ-related vessels compared to current levels of traffic, are predicted to have negligible
19 effects on visual quality and noise in the MSA. Nevertheless, the EAO acknowledges that some
20 Indigenous people may have existing concerns about consuming harvested resources from their
21 territory and that additional development would likely increase those concerns with potential
22 effects to the experience of hunting, trapping, and gathering. The EAO is proposing conditions
23 for a CEMP and an OEMP, which would include lighting and noise management, and Air Quality
24 Management and Greenhouse Gas Reduction Plans to reduce the impacts of visual, noise and
25 air quality impacts at the TMJ site.

26 ***Potential impacts on hunting, trapping and gathering under the Bunkering Vessel Scenario:***

27 As described in the section on Wildlife and Wildlife Habitat and Marine Birds in Part B ([Section](#)
28 [5.9](#)), the EAO predicts that the residual effect of sensory disturbance on wildlife and wildlife
29 habitat would be continuous for both the Application scenario and BVS. Although the number
30 of TMJ-related vessels transits under the BVS is increased, the EAO concludes in Section 5.9 that
31 despite the potential increased risk of mortality under the BVS compared to the Application
32 scenario, the overall residual effect of mortality would be infrequent for both operating
33 scenarios. Consistent with those conclusions in Part B, the EAO is therefore of the view that
34 there would not be any BVS-related changes to the pathways of effects to impacts to Aboriginal
35 hunting, gather, or trapping rights associated with TJLP's BVSA, compared to what was
36 originally assessed in the Application scenario.

1 During the review of TJLP's BVSA Report, the EAO heard concerns from Indigenous Groups
2 regarding potential changes in the residual effects to marine birds due to increased frequency
3 of vessel transits under the BVS. Tsawwassen First Nation identified concerns regarding
4 uncertainty for thresholds for avoidance resulting in changes of behaviour or the distribution of
5 marine birds in response to increased vessel traffic under the BVS. Tsawwassen First Nation also
6 identified a concern that changes in the distribution and use of habitats in the lower Fraser
7 River by aquatic birds could potentially affect Tsawwassen First Nation's stewardship values
8 related to aquatic birds in these areas. During the review of the BVSA Report, Snuneymuxw
9 First Nation identified that in their view, the assessment presented in TJLP's Report lacked
10 established thresholds for effects to aquatic birds due to behavioural disturbances from greater
11 frequency of vessel transits under the BVS.

- 12 • In the BVSA Report, TJLP acknowledge that the risk of interaction with aquatic birds is
13 increased under the BVS; however, TJLP does not expect that mortalities to aquatic birds
14 would be more frequent than once a year under the BVS given the infrequency of
15 reported collision-related mortality and the limited aquatic bird abundance in the LAA.
- 16 • As described in the section on Marine birds in Part B (Section 5.9), the EAO concludes
17 that during operations TMJ-related vessel activities could result in a negligible to low
18 magnitude effects to marine birds due to sensory disturbances from vessel lighting, and
19 increased risk of mortality. Since the EAO does not anticipate that the BVS would result
20 in any changes to the EAO's Part B conclusions on the residual effects to marine birds
21 from what was originally assessed in the Application scenario, the EAO does not predict
22 any changes to the pathways of effects to impacts to Aboriginal hunting, gathering, or
23 trapping rights in Part C for TMJ. This approach is consistent with the EAO's conclusion
24 in the section on Wildlife and Wildlife Habitat and Marine Birds (Section 5.9).

25 During the review of TJLP's BVSA Report, Musqueam Indian Band Identified that increased
26 vessel traffic associated with the BVS has potential to impact Musqueam's ability to undertake
27 rights-based activities, including hunting, trapping, and gathering in the area.

- 28 • As described in the Part B section on Land and Marine Use ([Section 8.2](#)), regularly
29 occurring TMJ-related vessel traffic (average of one vessel call per day) would result in
30 negligible to low magnitude, relatively infrequent and short-duration interruptions to
31 access for marine users from the jetty to Sand Heads. The EAO is of the view that,
32 compared to what was originally assessed in the Application scenario, the increased
33 frequency of bunkering vessels under the BVS would not be expected to result in
34 increased magnitude of effects to access for Aboriginal hunting, gathering, or trapping
35 activities for those Indigenous Groups that access hunting, gathering, or trapping areas
36 through the South Arm of the lower Fraser River.

37

1 The potential impact of TMJ on rights to hunt, trap and gather for each Indigenous Group is
2 described in Sections 14 (Schedule B Indigenous Groups), 15 (Schedule C Indigenous Groups),
3 and 16 (Schedule D Indigenous Groups) of this Report.

4 **13.3.3 POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL** 5 **INTERESTS AND CONCERNS RAISED BY INDIGENOUS GROUPS**

6 The EAO's evaluation of potential effects on other traditional and cultural interests considers
7 project impacts that could result in impacts to cultural heritage resources and sites; changes in
8 access and use of cultural sites; and potential impacts to the experience of cultural practices.

9 The potential effects to other traditional and cultural interests, outlined below, apply broadly to
10 the Indigenous Groups whereas unique issues raised by each Indigenous Group and the EAO's
11 conclusions on project impacts to Aboriginal Interests are discussed in [Section 14](#) for Schedule B
12 Indigenous Groups, [Section 15](#) for Schedule C Indigenous Groups, and [Section 16](#) for Schedule D
13 Indigenous Groups.

14 **Biophysical Components:**

15 TMJ would be located in the Fraser River across from a former Indigenous village site
16 recognized as an important site for the Tsawwassen First Nation in the Tsawwassen Final
17 Agreement, Musqueam Indian Band, Cowichan Nation Alliance, Kwantlen First Nation, and
18 Tsleil-Waututh Nation among others. Cowichan Nation Alliance, Tsawwassen First Nation,
19 Musqueam Indian Band, and Tsleil-Waututh Nation raised concerns about construction
20 activities (including pile driving and dredging) as well as wake and propeller wash effects in the
21 Fraser River during operations that could affect the integrity of heritage sites. Cowichan Nation
22 Alliance stated that archaeological assessments previously completed on the former Indigenous
23 village site indicated ship wake has already degraded the site and has washed away
24 archaeological materials. Cowichan Nation Alliance and Tsleil-Waututh Nation have expressed
25 concerns that TMJ vessels turning directly across from the former Indigenous village site will
26 further the already existing adverse effects on the site.

27 After considering the proposed mitigation measures outlined in the Heritage Resources section
28 of Part B of this Report, the EAO found no residual effects to physical heritage or Heritage
29 Resources. TJLP have undertaken archaeological studies that did not identify evidence of
30 archaeological resources in the TMJ area. The EAO is satisfied that further archaeological
31 studies undertaken prior to construction at the TMJ site would reduce the uncertainty of
32 unexpectedly encountering historical or archaeological resources in the LAA, and combined
33 with the proposed mitigation measures, would reduce the probability of adverse effects.
34 Heritage resources are protected under the HCA and mitigations for potentially affected sites

1 would be determined in consultation with FLNRORD's Archaeology and Heritage Branch and
2 Indigenous Groups. A Chance Find Management Procedure, included as part of the proposed
3 Cultural and Archaeological Resources Management Plan provincial condition and key
4 recommendation measure under CEAA 2012 developed in consultation with Indigenous
5 Groups, would outline the process for ensuring the preservation and proper management of
6 heritage resources should any be encountered during TMJ activities. Similarly, the EAO
7 concluded that TMJ would have no residual effects on Heritage Resources from erosion due to
8 wake effects/propeller wash along the shorelines of the Fraser River or in the MSA area.

9 In the Part B section on Marine Mammals, the EAO concludes there is an existing significant
10 adverse cumulative effect on SRKWs due to their endangered status under SARA and significant
11 risks to the recovery of this population, and cumulative underwater sound activities from
12 marine shipping that are expected to exceed established underwater sound behavioural
13 disturbance criteria. Considering the residual effects from TMJ in combination with other past,
14 present and reasonably foreseeable projects, the cumulative effects on SRKWs due to
15 underwater noise would be significant.

16 Concerns about the health and recovery of SRKWs were raised during the EA for both the
17 Original Application Area and the MSA area by several Indigenous Groups. As described in the
18 Marine Mammal section in Part B, the EAO recommends the Marine Mammal Management
19 Plan as well as the Vessel Traffic Management Plan as KMMs under CEAA 2012. The Marine
20 Mammal Management Plan would include identification of the activities that could cause injury
21 or behavioural change to marine mammals, the time periods when elevated marine mammal
22 occupancy is anticipated as well as identification of the TMJ activities that must cease or not
23 start where marine mammals are identified in the area. The Vessel Traffic Management Plan
24 would include identification of how TMJ is participating, where possible, in regional
25 environmental management measures to protect SRKWs, such as the federal OPP Whales
26 Initiative. The EAO notes the Government of Canada's commitment to protecting and
27 supporting the recovery of endangered whales, including implementing measures to better
28 understand and manage cumulative effects on the recovery of SRKWs (as described in the
29 Marine Mammals section of Part B).

30 **Geospatial Components (places, sites, and access):**

31 Cowichan Nation Alliance, Kwantlen First Nation, Musqueam Indian Band, and Tsleil-Waututh
32 Nation raised concerns about TMJ effects on access to and use of cultural sites, in particular the
33 former Indigenous village site. The EAO notes that temporary interruptions or changes to
34 Indigenous access to the former Indigenous village site and other known heritage resources
35 along the lower Fraser are possible during operations from TMJ-related vessels transiting in
36 front of the site and to other known heritage sites during transit of TMJ-related vessels through

1 the Salish Sea. To ensure access to cultural and archaeological sites at the TMJ site is not
2 disrupted during construction and operations, the EAO proposes a condition for a Cultural and
3 Archaeological Resources Management Plan which would involve TJLP addressing Indigenous
4 concerns around access, both in terms of ensuring Indigenous access to sites during
5 construction and prohibiting unauthorized access by the public. The Heritage Resources section
6 of Part B provides further details on the Cultural and Archaeological Resources Management
7 Plan.

8 The EAO understands that the continued use of the Fraser River, including at the TMJ site, for
9 navigation and other cultural and traditional uses is important to Indigenous Groups. The EAO
10 acknowledged that access to the marine terminal area would be disrupted throughout
11 construction and that Indigenous mariners would avoid entering into and remaining in the
12 marine terminal area due to the warning signs and notifications regarding elevated public risk,
13 in particular when vessels would be berthing, loading, or de-berthing at TMJ. The EAO also
14 recognizes that a number of Indigenous Groups use the MSA area for other cultural and
15 traditional purposes, including canoe journeys. The EAO acknowledges that Indigenous Groups'
16 access to the Fraser River and Salish Sea for other cultural and traditional purposes could be
17 periodically disrupted for short duration by transiting TMJ-related vessels during construction
18 and operations. The EAO is not aware of geospatial factors associated with cultural Interests in
19 SRKWs such as preferred locations to see SRKWs or areas where ceremonies or other
20 traditional practices related to SRKWs are held.

21 **Social, Cultural, Experiential Values:**

22 Quw'utsun Nation, Ts'uubaa-asatx Nation, Musqueam Indian Band, Tsleil-Waututh Nation,
23 Kwantlen First Nation, Maa-nulth First Nations and Tsawwassen First Nation raised concerns
24 about the potential TMJ impacts to visual quality, noise, air quality, and water quality on their
25 sense of peace and enjoyment of their territory. The EAO concluded that noise effects would be
26 limited to construction and decommissioning of the marine jetty and are anticipated to be most
27 pronounced during pile driving. As outlined in the EAO's Noise assessment in Part B, TMJ
28 construction activities would be limited to occurring only during the day. Negligible to low
29 magnitude visual quality effects would be possible throughout construction and operations
30 depending on the presence of construction equipment and/or TMJ-related vessels at the TMJ
31 jetty during operations. The EAO proposes several conditions to mitigate these effects, such as
32 the lighting, noise and vibration management components of the CEMP and OEMP, the Water
33 Quality Management, Air Quality Management, and Greenhouse Gas Reduction Plans, which
34 must be developed in consultation with Indigenous Groups.

35 The Application stated that Musqueam Indian Band, Tsawwassen First Nation, Ts'uubaa-asatx
36 Nation, Tsleil-Waututh Nation, Squamish First Nation, Lyackson First Nation, and Kwantlen First

1 Nation raised concerns that development in their territories and throughout the Salish Sea was
2 impeding their cultural continuity and their efforts at revitalizing cultural practices. Proposed
3 conditions to mitigate impacts to cultural continuity include Condition 14 for development of a
4 Cultural and Archaeological Resource Management Plan, and Condition 17: Indigenous Cultural
5 Awareness, Recognition and Mitigation.

6 Although it was not raised in the TMJ EA, the EAO understands that there are efforts to re-
7 establish a traditional reef net fishing practice in certain parts of the Salish Sea, raising concerns
8 about the impact that transiting ships would have on the future success of such endeavours.
9 The EAO also heard from some Indigenous Groups that the current conditions in the lower
10 Fraser River, and in some areas of the Salish Sea, do not currently support the practice of
11 cultural activities in their preferred manner and that intergenerational knowledge transfer is
12 particularly vulnerable to disturbances from commercial marine shipping activities. Musqueam
13 Indian Band stated that development can lead to rapid changes to sites, which then can make
14 the transfer of knowledge difficult because new knowledge needs to be acquired about the
15 area (e.g., if it was a traditional fishing spot, the Indigenous Group or individual would need to
16 re-learn about how to fish there).

17 With respect to the marine terminal area, the EAO assumed that Indigenous mariners would
18 avoid entering and remaining in the marine terminal area due to the warning signs regarding
19 elevated public risk, in particular when vessels would be berthing, loading, or de-berthing at
20 TMJ. To avoid or reduce disruptions to marine access and use to the TMJ site, original
21 Application Area and MSA area, the EAO is recommending KMMs under CEAA 2012 for a
22 Marine Access and Transportation Plan from the TMJ site to Sand Heads and a Marine
23 Communication Plan for shipping activities out to 12 nm. The Marine Access and Transportation
24 Plan would include a description of mitigations to reduce disruptions caused by construction
25 and operations for members of Indigenous Groups to carry out traditional use activities that
26 have been identified and communicated by Indigenous Groups to TJLP in relation to this or
27 other relevant plans. The Marine Communication Plan would include procedures to inform
28 Indigenous Groups of traffic schedules, for Indigenous Groups to submit any feedback on
29 potential adverse effects of TMJ-related vessels and for TJLP to document and respond to any
30 feedback received respond in a timely manner.

31 Many Indigenous Groups raised concerns about potential TMJ effects to SRKWs. The EAO
32 understands there is a strong spiritual and cultural connection to Orca or Killer Whales
33 (including SRKWs), which Indigenous Groups hold in the highest of esteem. In Part B section on
34 Current Use, the EAO concluded that TMJ would have significant adverse cumulative effects on
35 intangible cultural heritage, primarily due to cumulative effects to SRKWs, for Indigenous
36 Groups that have a cultural and spiritual connection to SRKWs. The EAO notes that the
37 Government of Canada is committed to protecting and supporting the recovery of endangered

1 whales and is implementing measures to better understand and manage cumulative effects on
2 the recovery of SRKWs. The Whales Initiative is underway to support the recovery of SRKWs by
3 addressing imminent threats to SRKWs by improving prey availability and reducing disturbances
4 from underwater vessel noise. The VFPA-led ECHO Program seasonal slowdown initiatives aim
5 to better understand and reduce acoustic impacts of commercial vessels in key foraging areas
6 in SRKWs critical habitat through a range of projects, including implementing and evaluating the
7 effectiveness of both voluntary vessel slow down initiatives and inshore lateral displacement
8 for tugboat operators transiting the Strait of Juan de Fuca. The Government of Canada will
9 continue working with Indigenous Peoples, members of the ECHO Program, the marine
10 industry, and other governments to adaptively manage the recovery of SRKWs.

11 ***Potential impacts on other traditional and cultural Aboriginal Interests under the Bunkering***
12 ***Vessel Scenario:***

13 As described in the sections on Noise ([Section 6.2](#)) and Marine Mammals in Part B ([Section 5.7](#)),
14 the EAO is of the view that compared to what was originally assessed for the Application
15 scenario (in the original Application area), the increased frequency of bunkering vessels under
16 the BVS would not be expected to result in increased magnitude of residual or effects to
17 disturbance / behavioural changes or mortality risks to marine mammals. Consistent with those
18 conclusions in Part B of this Report, the EAO is therefore of the view that there would not be
19 any BVS-related changes to the pathways of effects to impacts to Aboriginal Interests related to
20 the cultural interest in SRKWs associated with TJLP's BVSA, compared to what was originally
21 assessed in the Application scenario.

22
23 During the review of TJLP's BVSA Report, Indigenous Groups, including Tsleil-Waututh Nation
24 and Snuneymuxw First Nation identified concerns related to increase frequency of vessel traffic
25 and potential changes to effects to SRKWs. Snuneymuxw First Nation identified a key cultural
26 interest in SRKW and concern about the potential disproportionate increase in bunker vessels,
27 which in Snuneymuxw First Nation's view should require a re-assessment of significance for
28 potential impacts to SRKW. The EAO also understands that Snuneymuxw First Nation is
29 currently in disagreement with TJLP's residual effects conclusions in the BVSA Report, that TMJ-
30 related effects to marine mammals would be 'not significant'. Tsleil-Waututh Nation also
31 identified concerns related to potential increases to the residual and cumulative effects to
32 marine mammals by vessel strikes and underwater noise under the BVS, and disagreement with
33 TJLP's conclusions that find underwater noise to marine mammals resulting in behavioural
34 disturbances would not be significant.

- 35
- 36 • The EAO acknowledges that SRKW have important cultural and spiritual value to Coast
37 Salish people, including Snuneymuxw First Nation and Tsleil-Waututh nation. As
38 described in the section of Part B on Marine Mammals ([Section 5.7](#)) the EAO concludes
39 that TMJ in combination with other past, present, and reasonably foreseeable projects,
may result in significant cumulative effects on SRKW due to underwater noise.

1 Consistent with those conclusions in Part B, the EAO did not identify any changes in
2 potential pathways of effects to other cultural and traditional Aboriginal Interests
3 related to SRKW under the BVS, compared to what as originally Assessed in the
4 Application.

5 **14 SCHEDULE B: IMPACTS TO ABORIGINAL** 6 **INTERESTS BY INDIGENOUS GROUP**

7 **14.1 QUW'UTSUN NATION**

8 **14.1.1 COMMUNITY PROFILES**

9 Cowichan Tribes, Halalt First Nation, Lyackson First Nation, Penelakut Tribe, and Stz'uminus
10 First Nation are members of the Quw'utsun Nation. The Cowichan Nation Alliance is a group of
11 Central Coast Salish First Nations whose membership includes Cowichan Tribes, Halalt First
12 Nation, Penelakut Tribe, and Stz'uminus First Nation¹⁷³. Cowichan Nation Alliance members,
13 and Lyackson First Nation, are descendants of the same historic Quw'utsun Nation. The
14 Quw'utsun Nation members speak the *Hul'qumi'num* (pronounced "Hul-ka-MEE-num")
15 language.

16 Cowichan Tribes, Halalt First Nation, Lyackson First Nation, and Penelakut Tribe are also
17 members of the Hul'qumi'num Treaty Group, along with Ts'uubaa-asatx Nation (see Section
18 14.2 this Report). The Hul'qumi'num Treaty Group identify a traditional territory in the
19 Statement of Intent submitted to the BC Treaty Commission, as generally including parts of
20 south-eastern Vancouver Island, the southern Gulf Islands, a portion of the Lower Mainland,
21 and the waters of the Salish Sea to the Sunshine Coast including the lower portion of Howe
22 Sound, Haro Strait, the Strait of Juan de Fuca and the South Arm of the Fraser River up to
23 Yale¹⁷⁴.

¹⁷³ Technical reviews for EA of TMJ were conducted separately by Cowichan Nation Alliance on behalf of its member Indigenous Groups and Lyackson First Nation, but the EAO has included together in the Quw'utsun Nation Section, at the request of Quw'utsun Nation member Indigenous Groups.

¹⁷⁴ Hul'qumi'num Treaty Group Statement of Intent. BC Treaty Commission website.
http://www.bctreaty.ca/sites/default/files/Hul-qumi-num_Treaty_Group_SOI_Map2.pdf, accessed May 28, 2019.

1 Identified by the Hul'qumi'num Treaty Group within that area, is a Core Traditional Territory
2 within which Aboriginal title and the related traditional governance over lands is asserted, and
3 a broader Marine Traditional Territory within which an Aboriginal right to fish and to have
4 jurisdiction in fisheries management based in traditional law are asserted. Of particular
5 relevance to TMJ is the portion of the Core Traditional Territory described as including "the
6 south arm of the Fraser River, including Canoe Pass, up to and including Douglas Island, with
7 lands on the north shore of the south arm up to Sapperton Channel (New Westminster), the
8 islands in the south arm of the Fraser River and the south bank of the Fraser River along Canoe
9 Pass up to Deas Island". The Hul'qumi'num Treaty Group also describes its Traditional Fishing
10 Territory as including the "Fraser River, from Strait of Georgia up Sawmill Creek, north of Yale"
11 ¹⁷⁵.

12 Locations of importance to Quw'utsun Nation member Indigenous Groups include but are not
13 limited to areas of the South Arm of the Fraser River in the vicinity of TMJ. *Tl'uqtinus* refers to a
14 long stretch of the bank of the South Arm of the Fraser River, from Lion Island downstream to
15 around Woodward's Landing. The village site at *Tl'uqtinus* spans the north shore from
16 approximately opposite Tilbury Island and downstream towards Deas Island. According to
17 Cowichan Nation Alliance's occupation and use study, Cowichan Nation Alliance's traditional
18 name for Tilbury Island is *Xupixunum* and Cowichan Nation Alliance First Nations members also
19 refer to Tilbury Island as *shtl'q'uth* or *shtl'q'ath* (on the other side) of the river from
20 *Tl'uqtinus*¹⁷⁶. *Hwlhits'um* or *Xwulit'sum* is also a location of importance to Cowichan Nation
21 Alliance and is located on Canoe Pass on Westham Island. These areas are considered by
22 Cowichan Nation Alliance member Indigenous Groups to be ancestral village and resource sites.
23 A Cowichan Nation Alliance Declaration for Reconciliation was endorsed by Cowichan Tribes,
24 Stz'uminus First Nation, Penelakut Tribe, and Halalt First Nation in 2016, asserting that together
25 descendants of the historic Quw'utsun Nation are pursuing overdue reconciliation of Crown
26 sovereignty with Quw'utsun Nation Aboriginal rights, including title, on the south arm (i.e.,
27 main channel) of the Fraser River (including the mouth), including village lands and surrounding
28 areas of *Tl'uqtinus*.

29 In November 2014, the Cowichan Nation Alliance member bands filed an *Amended Notice of*
30 *Civil Claim* in the British Columbia Supreme Court (BCSC) seeking a declaration of Aboriginal
31 title to an area described as the *Tl'uqtinus* Lands, which include the foreshore and submerged

¹⁷⁵ Hul'qumi'num Treaty Group Statement of Intent. BC Treaty Commission website.
<http://www.bctreaty.ca/sites/default/files/hul%27qumi%27num%202.pdf>, accessed May 28, 2018.

¹⁷⁶ Candace Charlie for Cowichan Tribes, on behalf of the Cowichan Nation Alliance. 2019. STL'ULNUP a Cowichan Nation Use and Occupancy Study for Tilbury Island. Confidential report.

1 lands and right to fish in the South Arm of the Fraser River¹⁷⁷. The *Tl'uq̓tinus* Lands on Lulu
2 Island on the South Arm of the Fraser River are directly across the river from TMJ. The trial
3 commenced in the BCSC in September 2019.

4 On September 14, 2021, the provincial government and Quw'utsun Nation formalized the
5 Cowichan Nation / British Columbia Government to Government Agreement¹⁷⁸. This agreement
6 is intended to advance reconciliation and commits the parties to work collaboratively on key
7 priorities and support self-determination and self-government.

8 **14.1.1.1 COWICHAN TRIBES**

9 Cowichan Tribes is a Central Coast Salish group, a “band” under the *Indian Act*, and a member
10 of the Quw'utsun Nation, Cowichan Nation Alliance and Hul'qumi'num Treaty Group. Cowichan
11 Tribes' main community is in Duncan on the east coast of Vancouver Island, about 50 km south
12 of Nanaimo, and a cluster of their nine reserves are located southeast of Duncan. Cowichan IR 1
13 is adjacent to the City of Duncan, IRs 2, 3, and 9 are in Cowichan Bay, IR 4 is in Cobble Hill, and
14 Cowichan Tribes' IRs 5, 6, 7 and 8 are located west of Duncan. The largest band in BC, Cowichan
15 Tribes' registered population as of November 2021 was 5,258, which includes 2,584 living on
16 reserve.¹⁷⁹

17 Cowichan Tribes has engaged directly with TJLP and the EAO on the TMJ EA and collectively as a
18 member of the Cowichan Nation Alliance.

19 **14.1.1.2 HALALT FIRST NATION**

20 Halalt First Nation is a Central Coast Salish group, is a “band” under the *Indian Act*, and is a
21 member of the Quw'utsun Nation, Cowichan Nation Alliance, and Hul'qumi'num Treaty Group.
22 Halalt First Nation's main community is located in Chemainus on southeast Vancouver Island.
23 Of Halalt First Nation's 213 registered members, 81 live on reserve¹⁸⁰.

¹⁷⁷ The action was also supported by Lyackson First Nation via Band Council Resolution.

¹⁷⁸ Cowichan Nation British Columbia Government to Government Agreement. September 14, 2021. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/consulting-with-first-nations/agreements/cowichan_nation_bc_g2g_agreement_may_17_2021_final.pdf

¹⁷⁹ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Cowichan. https://fnp-ppn.aadnc-aadnc.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=642&lang=eng, accessed December 9, 2021.

¹⁸⁰ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Halalt. https://fnp-ppn.aadnc-aadnc.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=645&lang=eng, accessed December 9, 2021.

1 Halalt First Nation has engaged directly with TJLP and the EAO on TMJ and collectively as a
2 member of the Cowichan Nation Alliance.

3 **14.1.1.3 PENELAKUT TRIBE**

4 Penelakut Tribe is a Central Coast Salish group, a “band” under the *Indian Act*, and a member of
5 the Quw’utsun Nation, Cowichan Nation Alliance, and Hul’qumi’num Treaty Group. Penelakut
6 Tribe is split into four different reserve locations: Penelakut Island, Tent Island, North end of
7 Galiano Island, and Tsussie Road. The Penelakut Tribe is governed by ten elected Councillors,
8 one of whom is Chief Councillor. As of November 2021, Penelakut Tribe has 1,060 registered
9 members with 520 of those members residing on reserve¹⁸¹.

10 Penelakut Tribe has engaged directly with TJLP and the EAO on TMJ and collectively as a
11 member of the Cowichan Nation Alliance.

12 **14.1.1.4 STZ’UMINUS FIRST NATION**

13 Stz’uminus First Nation is a Central Coast Salish group, a “band” under the *Indian Act*, and a
14 member of the Quw’utsun Nation and Cowichan Nation Alliance. Stz’uminus First Nation
15 territory is understood to be represented by the Hul’qumi’num Treaty Group Statement of
16 Intent, although Stz’uminus First Nation is not a member of the Hul’qumi’num Treaty Group.
17 Stz’uminus First Nation’s main community is in Ladysmith on southeast Vancouver Island. Of
18 Stz’uminus First Nation’s 1,400 registered members, 747 live on reserve¹⁸².

19 Stz’uminus First Nation has engaged directly with TJLP and the EAO on TMJ and collectively as a
20 member of the Cowichan Nation Alliance.

21 **14.1.1.5 LYACKSON FIRST NATION**

22 Lyackson First Nation is a *Hul’qumi’num*-speaking Central Coast Salish group. Lyackson First
23 Nation has three reserves, all on Valdes Island (*Le’eyqsun*), which lies approximately 47 km west

¹⁸¹ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Penelakut Tribe. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=650&lang=eng, accessed December 9, 2021.

¹⁸² Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Stz’uminus First Nation. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=641&lang=eng, accessed December 9, 2021.

1 of the TMJ site on the west side of the Strait of Georgia, directly opposite the mouth of the
2 Fraser River. Of the 225 registered members, 14 live on Lyackson First Nation reserve lands¹⁸³.

3 Lyackson First Nation is a member of the Quw'utsun Nation, and the Hul'qumi'num Treaty
4 Group.

5 Lyackson First Nation have previously reported that they, along with other Hul'qumi'num
6 speaking groups, traditionally utilized the lands and waters on both sides of the Strait of
7 Georgia as part of a seasonal round. Lyackson First Nation reported that they had a house at
8 the former Indigenous village site at *Tl'uqtinus* along with each of the other Hul'qumi'num
9 Treaty Group member bands. Lyackson First Nation Elders and knowledge holders have
10 described *Tl'uqtinus* as having been a powerful and permanent *Hul'qumi'num Mustimuhw*
11 trading centre for several commodities. Lyackson First Nation reported that they traveled
12 between *Le'eyqsun* and the mouth and south arm of the Fraser River year-round for visiting and
13 resource-harvesting purposes, as well as up and down the Northwest Coast. Lyackson First
14 Nation reported that important economic activity was linked in particular to two Lyackson First
15 Nation villages, *th'hwumqsun* and *T'ee't'qe'*¹⁸⁴.

16 Lyackson First Nation reports that members travelled and fished in the lower Fraser River area
17 well into the 1900s and participated in the commercial fisheries¹⁸⁶. Lyackson First Nation
18 underscore that their participation in modern fishing efforts was a connection or adaptation of
19 ancestral practice to modern circumstances, and that they advance reconciliation and commits
20 the parties on the Fraser River while participating in the evolution of fishing efforts subsequent
21 to contact.

¹⁸³ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Lyackson First Nation. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=646&lang=eng, accessed December 13, 2021.

¹⁸⁴ Lyackson First Nation. 2017. Lyackson First Nation Traditional Land Use and Mapping Study for the South Coast British Columbia Transportation Authority's Pattullo Bridge Replacement Project, prepared by Ursula Abramczyk with Lyackson First Nation, referenced in MoTI. 2018. Pattullo Bridge Replacement Project EAC Application, Part C Section 12.0 Aboriginal Consultation. https://www.projects.eao.gov.bc.ca/api/public/document/5b7343562400e50024428f13/download/Section%2012.0_Aboriginal%20Consultation.pdf

1 14.1.2 QUW'UTSUN NATION INVOLVEMENT IN THE CONSULTATION PROCESS

2 The EAO is of the view that it has approached consultation with Quw'utsun Nation Indigenous
3 Groups at the deeper level, with the intent to identify potential impacts and consider ways to
4 address potential impacts to any Aboriginal Interests in the project area identified by
5 Quw'utsun Nation. As described in the EAO-led Consultation Activities with Indigenous Groups
6 section of this Report, the EAO invited Quw'utsun Nation member Indigenous Groups to
7 participate in the Working Group.

8 The EAO set out its approach to consultation, including an initial assessment of strength of
9 claim and potential impacts on Cowichan Nation Alliance's Aboriginal Interests in a letter to
10 Cowichan Nation Alliance representatives, and a letter to Lyackson First Nation dated June 18,
11 2015. Based on the Province's initial strength of claim assessment, Quw'utsun Nation member
12 Indigenous Groups were consulted at the deeper end of the spectrum as set out in Schedule B
13 of the July 24, 2015 Section 11 Order for TMJ.

14 The EAO invited Quw'utsun Nation representatives to review and provide comments on the
15 draft Section 11 Order, the draft VC Selection document, the draft AIR, TJLP's Aboriginal
16 Consultation Plan and Reports, the screening of the Application and on the Application and
17 supplemental material, as well as the opportunity to review and comment on several iterations
18 of the EAO's draft decision materials, including the draft provincial ToCs, recommended KMMs
19 under CEAA 2012, and the CPD. As part of the EA Working Group, Quw'utsun Nation
20 participated in technical meetings, teleconferences, and a site visit (February 2016) during the
21 Pre-Application and Application Review stages.

22 During the EA process, the EAO and Quw'utsun Nation discussed concerns related to TMJ and
23 sought to understand, address, and resolve issues. Prior to Application Review, the EAO met in
24 person and by teleconference to provide an update on TMJ and discuss next steps. At the
25 beginning of Application Review, the EAO met directly with Quw'utsun Nation to understand
26 Cowichan Nation Alliance's and Lyackson First Nation's desired approach to consultation on the
27 EA, as well as overall concerns related to the project and Quw'utsun Nation's interests. The EAO
28 and Quw'utsun Nation also discussed collaborative opportunities and developed a joint
29 workplan that identified key meetings throughout the EA process. The EAO provided additional
30 funding to support this work.

31 The EAO and Quw'utsun Nation had regular teleconferences and meetings during Application
32 Review to follow up on action items, provide updates on the TMJ EA process, discuss and seek
33 solutions to outstanding issues or concerns related to proposed provincial conditions and
34 KMMs recommended under *CEAA 2012*. During the EA, the EAO sought the views of Quw'utsun
35 Nation member Indigenous Groups on whether the potential for adverse effects on the

1 Aboriginal Interests has been avoided, minimized, or otherwise accommodated to an
2 acceptable level, and whether the EAO has fulfilled its obligations for consultation and
3 accommodations relating to the issuance of an EAC for TMJ. The EAO understands that
4 Cowichan Tribes does not agree with the EAO's draft conclusion statement that impacts have
5 been "avoided, minimized or otherwise accommodated" when the actual mitigation measures
6 (which are future 'plans') have not yet been drafted or agreed to by First Nations to be an
7 effective mitigation and requested greater Indigenous oversight to be specified in the draft
8 provincial conditions and KMMs recommended under *CEAA 2012*.

9 The EAO met with Quw'utsun Nation member Indigenous Groups and sought to better
10 understand the feedback received on the proposed provincial conditions and KMMs
11 recommended under *CEAA 2012* and the EAO's conclusions for TMJ. Based on the information
12 provided and discussions, the EAO updated the referral materials to reflect the views of
13 Quw'utsun Nation. As outlined in the Section 11 Order for TMJ Quw'utsun Nation Indigenous
14 Groups may also provide a separate submission to the EAO for inclusion into the referral
15 package to decision makers, should Quw'utsun Nation disagree with the EAO's conclusions or
16 the way the EAO has presented Quw'utsun Nation's perspectives in the referral materials.

17 During meetings, Lyackson First Nation requested greater Indigenous oversight to be specified
18 in the provincial conditions and KMMs recommended under *CEAA 2012*, including being clear in
19 both *what* and *how* the EAO requires certificate holders to engage with Lyackson First Nation.
20 Lyackson First Nation also view that the proposed conditions for TMJ included language that
21 raises divisiveness among Indigenous Groups and could be clearer about what constitutes a
22 'material change' with respect to updates to plans.

23 The EAO appreciates Lyackson First Nation feedback on the draft mitigation measures for TMJ,
24 including requests for more Indigenous oversight to be included in the proposed EAC
25 conditions. The EAO understands that, if the certificate holder does not address all
26 requirements of the EAC with respect to the development of plans, programs, and other
27 document, then the EAO would not accept those plans, programs, and other documents. The
28 EAO is of the view that for those conditions requiring the certificate holder to consult with
29 Lyackson First Nation or other Indigenous Groups, the EAO would confirm that consultation has
30 taken place before undertaking a review of the submitted materials.

31 In response to feedback on the proposed mitigation measures received during the EA for TMJ,
32 the EAO revised the draft provincial conditions and KMMs recommended under *CEAA 2012*,
33 including requirements for an Indigenous Monitor and a schedule for engagement on plans to
34 be developed in consultation with Indigenous Groups. The EAO acknowledges that the
35 proposed mitigations for TMJ may not completely mitigate all effects and recognizes that there

1 are outstanding impacts, in particular cumulative effects, and these outstanding impacts are
2 reflected in the EAO's conclusions in this Assessment Report. The EAO is of the view that the
3 potential impacts on Quw'utsun Nation's Aboriginal interests have been avoided, minimized,
4 and accommodated to the extent possible for the purposes of the EA, and that the proposed
5 mitigation measures would help to address and reduce the potential residual effects and
6 cumulative effects to VCs and the potential impacts to Quw'utsun First Nation's Aboriginal
7 Interests..

8 TJLP initiated consultation with the Cowichan Nation Alliance in 2015, before entering the EA
9 process. A summary of TJLP's engagement activities with the Cowichan Nation Alliance
10 members was provided in TJLP's Aboriginal Consultation Reports. TJLP reported that
11 consultation and information-sharing events have included in-person meetings, letters, email
12 exchanges and phone calls.

13 TJLP began consulting with Lyackson First Nation in early 2014 before entering the EA process,
14 through a letter introducing WMPV and the proposed project. A summary of TJLP's
15 engagement activities with the Lyackson First Nation was provided in TJLP's Aboriginal
16 Consultation Reports. TJLP reports that consultation and information-sharing events have
17 included face-to-face meetings, letters, and email exchanges. During the MSA for TMJ, TJLP
18 provided the EAO, Cowichan Nation Alliance, and Lyackson First Nation with information about
19 the Marine Safety Protocol that would be in place to manage public safety risk in the marine
20 terminal area. The EAO is aware that during the review of TJLP's BVSA Report, TJLP met with
21 Lyackson First Nation and Cowichan Nation Alliance to discuss the project and capacity funding
22 agreements for the BVSA and since then TJLP has offered capacity funding and signed
23 agreements with Lyackson First Nation and Stz'uminus First Nation to provide capacity funding
24 to support participation in the review of TJLP's BVSA Report.

25 **14.1.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

26 The following sections focus on potential impacts of TMJ to Quw'utsun Nation Indigenous
27 Groups' Aboriginal Interests. A discussion of the EAO's assessment approach is provided in the
28 Impact Assessment Methods section of Part C. The EAO considered information available,
29 including from public sources as well as relevant issues raised by the Quw'utsun Nation during
30 the EA process (in meetings, letters and Working Group comments), in the following
31 assessments of the potential impacts of TMJ on the Quw'utsun Nation's Aboriginal Interests.
32 The following sections focus on the potential impacts of TMJ to fishing; hunting, trapping, and
33 gathering; other cultural and traditional interests; mitigations; and accommodations to address
34 potential impacts.

1 A. POTENTIAL IMPACTS ON FISHING

2 Cowichan Nation Alliance identifies salmon as fundamental to the life of Central Coast Salish
3 peoples, both as a resource and spiritually, and that salmon of any species found in the waters
4 of the lower Fraser River region have been, and continue to be, integral to the Cowichan
5 Nation¹⁸⁵. The Cowichan Nation Alliance reports that sockeye and pink salmon, sturgeon,
6 eulachon, and flounder (*P'uwí'*) were predominantly obtained in the lower Fraser River as an
7 integral part of the Cowichan Nation Alliance's traditional economy because they were not
8 available in any abundance in other parts of their traditional territory¹⁸⁵. The Cowichan Nation
9 Alliance reports that the predictability and abundance of the runs allowed Central Coast Salish
10 people to maintain permanent villages, as they could return annually to the same fisheries and
11 depending on the technology, harvest thousands of fish in a day¹⁸⁵. The Cowichan Nation
12 Alliance's preferred traditional means of fishing included drift netting and set netting along the
13 shoreline water of Tilbury Island, making access to the shoreline of Tilbury Island important to
14 the Cowichan Nation Alliance¹⁷⁶.

15 Cowichan Nation Alliance assert that they have Aboriginal rights to fish within the MSA area LSA
16 and have identified many fishing sites within the Fraser River and Salish Sea as sites for the
17 harvesting of salmon (including coho, chum, jack spring, chinook and sockeye). Cowichan
18 Tribes' current FSC licence allows them to harvest all five species of salmon, herring, herring
19 spawn and all species of groundfish in the PFMA which overlaps with the MSA area LSA and
20 RSA. Cowichan Tribes, Halalt First Nation and Stz'uminus First Nation note that the increase in
21 vessel traffic related to TMJ would pass through their fishing areas.

22 Lyackson First Nation stated that, within the past few years, it has not been feasible for
23 Lyackson First Nation to fish for food on the lower Fraser River and its foreshore areas¹⁸⁶.

24 Lyackson First Nation stated that the lack of fishing in the Fraser River is due to reasons outside

¹⁸⁵ Marshall, D. 2017. Pattullo Bridge Replacement Project, Cowichan Nation Alliance Strength of Claim Report, Pacific Reach Consulting Ltd., referenced in MoTI. 2018. Pattullo Bridge Replacement Project EAC Application, Part C Section 12.0 Aboriginal Consultation.

https://www.projects.eao.gov.bc.ca/api/public/document/5b7343562400e50024428f13/download/Section%2012.0_Aboriginal%20Consultation.pdf.

¹⁸⁶ Lyackson First Nation. 2018. Lyackson review of draft Aboriginal Interests summary for the Pattullo Bridge Replacement Project EAC Application, referenced in MoTI. 2018. Pattullo Bridge Replacement Project EAC Application, Part C Section 12.0 Aboriginal Consultation.

https://www.projects.eao.gov.bc.ca/api/public/document/5b7343562400e50024428f13/download/Section%2012.0_Aboriginal%20Consultation.pdf.

1 of their control, such as regulatory constraints, and fish population declines¹⁸⁴. Lyackson First
2 Nation reports that commercial-scale fishing by members ceased in the TMJ area in the early
3 1900s. While members reported going up the Fraser River as far as the Pattullo Bridge for
4 commercial fishing, most recalled fishing largely at the mouth of the Fraser River¹⁸⁶.

5 Lyackson First Nation reported that they have historically and continue to use the TMJ MSA
6 area including the shipping lanes for fishing and other harvesting activities. Lyackson First
7 Nation reported fishing for salmon in the Salish Sea (specifically the Georgia Strait) relying
8 heavily on their salmon fisheries for their traditions, health, and for economic reasons. Salmon
9 forms a critical component of their food supply and they are concerned that the increase in
10 vessel traffic would limit their ability to access salmon for FSC purposes.

11 The EAO notes the RBT2 Panel report (2020) stated that the Cowichan Nation Alliance indicated
12 that they used the shipping lanes for fishing and harvesting activities¹⁸⁷. They informed the
13 RBT2 process that their Aboriginal communal fishing license overlapped with Segment A of the
14 RBT2 marine shipping area (which is the same as the TMJ MSA segments) and that they had
15 shellfish harvesting locations in segment B, mainly off the coasts of Tumbo and Saturna Islands.
16 The Cowichan Nation Alliance expressed concern about existing cumulative activities in the
17 Salish Sea that were impacting their ability to achieve their FSC fish quota due to low levels of
18 fish and having to move from larger vessels when they were out fishing. In the RBT2 Panel
19 report it is noted that Lyackson First Nation members avoided or were unable to travel on the
20 Salish Sea using their preferred mode of transportation, due to the risk of interactions with
21 larger vessels and large wakes. Lyackson First Nation noted that existing marine traffic was
22 preventing Lyackson First Nation from accessing preferred harvesting sites in their traditional
23 territory.

24 The EAO evaluated the potential effects on fishing rights attributable to TMJ which are
25 summarized in [Section 13.3.1](#). The EAO is satisfied that the key impacts to biophysical
26 components resulting in changes to fish quantity and quality, changes in access to fishing
27 resources, and changes to social, cultural, and spiritual values associated with traditional fishing
28 activities summarized in [Section 13.3.1](#) apply to Quw'utsun Nation. The EAO is also satisfied
29 that with respect to the BVS, any potential changes to relevant pathways of effects on the
30 biophysical, geospatial, and other social, cultural, experiential sub-components of Aboriginal
31 fishing rights summarized in [Section 13.3.1.2](#) apply to Quw'utsun Nation. Additional issues

¹⁸⁷ The Review Panel for the RBT2 Project. 2020. Federal Review Panel Report for the RBT2 Project. <https://iaac-aeic.gc.ca/050/documents/p80054/134506E.pdf>.

1 raised by Quw'utsun Nation are outlined below and include a discussion of EAC conditions and
2 recommended key mitigations under CEAA 2012.

3 Cowichan Nation Alliance have advised that they are demanding to resume harvesting of
4 traditional food and material resources as formerly on the lower Fraser River, including in the
5 TMJ area, as part of their culturally integral Aboriginal rights¹⁸⁵. The Cowichan Nation Alliance
6 member Indigenous Groups currently fish for FSC purposes outside the Fraser River, however
7 the timing, frequency, and duration of that fishing, number of fish caught, and participation
8 levels of community boats and members in FSC fishing, was not reported by the Cowichan
9 Nation Alliance. Member communities of the Cowichan Nation Alliance fish for commercial
10 purposes in the Fraser River under licences held by the Hul'qumi'num Fisheries Limited
11 Partnership. Cowichan Nation Alliance member Indigenous Groups indicated to the EAO that
12 for generations, they have been advocating for reflection of their right to fish in the south arm
13 of the Fraser River in licensing decisions by DFO, including in the vicinity of TMJ. Cowichan
14 Nation Alliance has informed the EAO that its member Indigenous Groups have recent one-off
15 DFO FSC licences in the Fraser River near the former Indigenous village site. The EAO
16 understands that Cowichan Nation Alliance is consulting with DFO on establishing a long-term
17 FSC license for this area as they wish to re-establish regular fishing in the Lower Fraser.

18 Cowichan Nation Alliance raised the following concerns regarding potential impacts on the right
19 to fish due to TMJ:

- 20 • Concern regarding: the declining trends of sturgeon population in the Fraser River; the
21 importance of the Tilbury Island shoreline as a place where sturgeon gather and a prime
22 fishing spot; potential impacts to spawning habitat as sturgeon have cultural importance
23 to the Cowichan Nation Alliance; the potential effects of underwater noise on fish; and
24 cumulative effects on fish and fish habitat in the Fraser River.
 - 25 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
26 concerns related to impacts to sturgeon, underwater noise and cumulative
27 effects. The EAO concluded that sturgeon spawning in the Fraser River occurs
28 mainly in large side channel habitats with gravel, cobble and sand substrates and
29 that the habitat at the TMJ site is not known to contain critical habitat features
30 such as spawning habitat for anadromous or resident fish species, including
31 White Sturgeon.
 - 32 ○ As discussed in [Section 13.3.1](#), the proposed mitigation measures to address
33 concerns about sturgeon are included in KMMs under CEAA 2012 recommended
34 by the EAO for a Fish Mitigation to Reduce Harm and Mortality and Fish Habitat
35 Offset Plan, and follow-up programs, including monitoring for sturgeon presence
36 prior to construction and applying additional mitigations if sturgeon is found to

1 be present and undertaking mitigations, as specified by a QP, if works are to be
2 conducted outside of the FLNRORD sturgeon least-risk window. It would also
3 include specific mitigations for underwater noise, including the use of bubble
4 curtains at all times during impact pile driving where feasible and during
5 vibratory pile driving if noise levels exceed thresholds.

- 6 • Concern regarding potential impacts to Cowichan Nation Alliance’s current and future
7 access to the shoreline of Tilbury Island to practice their traditional means of fishing.
8 Cowichan Nation Alliance stated that their preferred fishing method includes use of the
9 shoreline and that TMJ, if approved, will block access to one of the last available
10 stretches of Tilbury Island shoreline. Cowichan Nation Alliance told the EAO that the
11 TMJ infrastructure and the perceived safety concerns associated with the marine
12 terminal area (including boats turning) would result in an impact that could not be
13 mitigated given that the site is important and cannot be replaced.
 - 14 ○ The EAO is recommending as KMMs under CEAA 2012 for a Marine
15 Communication Plan, a Marine Access and Transportation Plan and a Vessel
16 Traffic Management Plan. These plans would identify the procedures of
17 communication to Indigenous Groups and identification of mitigations to reduce
18 disruptions caused by Construction and Operations for members of Indigenous
19 Groups to carry out traditional use activities including fishing for FSC purposes.
 - 20 ○ The EAO has incorporated this information about access to preferred fishing
21 areas and cumulative effects into the impact assessment section below.
- 22 • Concern regarding the liability on the part of third-party shipping companies in the
23 event of an accident or malfunction which results in damage to Cowichan Nation
24 Alliance interests, property at *Tl'uqtinus* or fishing gear and consequently impacting
25 their right to fish in the area.
 - 26 ○ The EAO liaised with TC to respond to Cowichan Nation Alliance’s concern.
 - 27 ○ TC confirmed that compensation for damage as the result of collision is sought
28 through a civil claim in the courts. In the event of an accident or malfunction that
29 resulted in damage to fishing gear for example, the liability of the shipowner
30 would depend on the circumstances under which the fishing gear was damaged
31 and therefore whether a vessel is deemed to be at fault (as described in Section
32 3 of the *Marine Liability Act*). Depending on the circumstances, the other vessel
33 may or may not be liable for damage to fishing equipment.
 - 34 ○ Cowichan Nation Alliance confirmed that this addressed their question, but the
35 concern that Cowichan Nation Alliance would have to expend time and financial
36 resources trying to recover from loss caused by a third-party shipping company

1 was not addressed.

2 Lyackson First Nation raised the following concerns regarding potential impacts on the right to
3 fish due to TMJ:

4 • Concern regarding potential effects of TMJ on fish habitat and the effectiveness of the
5 proposed mitigation measures. It was noted that room should be made for re-
6 establishing fish in the area.

7 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
8 concerns related to impacts to fish and fish habitat. As discussed in [Section](#)
9 [13.3.1](#), the proposed mitigation measures to address concerns about fish and
10 fish habitat are included in the proposed KMMs under *CEAA 2012* for a fish and
11 fish habitat monitoring and mitigation plan and a fish habitat offset plan to offset
12 impacts to fish habitat from TMJ. The fish habitat offset plan, which would be
13 developed in consultation with Indigenous Groups, would identify offsets that
14 are greater and of higher fisheries value (higher productivity) than the habitat
15 that would be directly lost by TMJ. It would also include monitoring program to
16 assess and evaluate the effectiveness of offsetting measures and would require
17 the incorporation of Indigenous traditional knowledge and the effectiveness of
18 the proposed fish habitat offset.

19 • Concern regarding potential effects on Lyackson First Nation from increased vessel
20 traffic due to TMJ that could impact Lyackson First Nation's use or access of the area in
21 the future. The EAO heard from Lyackson First Nation that marine shipping issues are a
22 concern, including potential impacts on access due to already reduced fishing windows
23 and potential safety concerns of fishers.

24 ○ In the Current Use for Lands and Resources for Traditional Purposes and Cultural
25 Heritage section of Part B, the EAO concludes that it is reasonable to expect that
26 past and future effects on fish and fish habitat, access to fishing and the
27 experience of fishing would combine with TMJ effects to result in significant
28 cumulative effects for those Indigenous Groups that fish preferentially at the
29 TMJ site. The EAO acknowledges that Lyackson First Nation expressed a strong
30 interest in fishing regularly in the lower Fraser River in the future, and should
31 they do so, the EAO would conclude potential for significant cumulative effects
32 to current use for fishing in the RAA for Lyackson First Nation.

33 ○ The EAO is recommending as KMMs under *CEAA 2012* for a Marine
34 Communication Plan and Marine Access and Transportation Plan to identify the

1 procedures of communication to Indigenous Groups and identification of
2 mitigations to reduce disruptions caused by Construction and Operations for
3 members of Indigenous Groups to carry out traditional use activities, including
4 fishing for FSC purposes.
5

- 6 • The EAO heard that Lyackson First Nation view TJLP's proposed \$2 million contribution
7 for non-conventional offset for project-related residual and cumulative effects as
8 narrowly inclusive of a few Indigenous Groups and exclusive to other groups, such as
9 Lyackson. Additional information related to TJLP's proposed contribution is provided at
10 the end of [section 13.1](#) of this report.

11 The EAO heard that Quw'utsun Nation member Indigenous Groups anticipate fishing in the
12 south arm of the Fraser River again soon, and that Quw'utsun Nation did not agree with the
13 EAO's conclusions about significance of potential impacts to Quw'utsun Nation's Aboriginal
14 Interests. Quw'utsun Nation have advised that they are wanting to resume harvesting of
15 traditional food as formerly on the lower Fraser River; however, Quw'utsun Nation have not yet
16 identified any specific timing related to their future FSC harvesting at the TMJ site, or in the
17 lower Fraser River. Furthermore, Cowichan Tribes told the EAO that blocking access to areas of
18 the shoreline of Tilbury Island, which is a location for one of their preferred means of fishing,
19 has not been accommodated, and that Cowichan Tribes still do not have any sense of security
20 around whether TJLP will actually avoid disrupting their FSC fisheries around the project site.

- 21 • The EAO's view is that the KMM recommended under CEAA 2012 for a Marine Access
22 and Transportation Plan requiring the development of measures to project effects on
23 Quw'utsun Nation member Indigenous Groups' traditional use activities, including DFO-
24 licensed fishing for FSC purposes, would help to address and reduce the potential
25 residual effects due to disruptions from TMJ vessel traffic to FSC fishing by Quw'utsun
26 Nation in the Lower Fraser River.
- 27 • The EAO acknowledges that the proposed mitigation measures may not completely
28 mitigate effects, including impacts on access during FSC openings (should Quw'utsun
29 engage in these activities in the future) and other cultural activities in the lower Fraser
30 River. The EAO has also recommended a new Cultural Heritage KMM, which would
31 require TJLP to develop nation-specific measures to address the effects on tangible and
32 intangible cultural losses caused by the construction and operation of TMJ, in
33 consultation with those Indigenous Groups experiencing the effects in the lower Fraser
34 River, as described in the EAO's Assessment Report
- 35 • While the EAO is of the view that the potential impacts on Quw'utsun's Aboriginal

1 fishing rights have been avoided, minimized, and accommodated to the extent possible
2 for the purposes of the EA, the EAO also recognizes that there are outstanding impacts,
3 in particular regarding cumulative effects, and these outstanding impacts are reflected
4 in the EAO's conclusions in Part B and Part C for TMJ.

5 **14.1.3.1.1 Conclusion**

6 The EAO predicts that TMJ alone would have a minor-to-moderate impact to the fishing rights
7 of Cowichan Nation Alliance Indigenous Groups (Cowichan Tribes, Halalt First Nation,
8 Penelakut Tribe, and Stz'uminus First Nation). In consideration of the available information, the
9 EAO's consultation with Cowichan Nation Alliance member Indigenous Groups, Cowichan
10 Nation Alliance member Indigenous Groups' engagement with TJLP, TJLP's commitments, the
11 EAO's proposed EAC conditions if an EAC is issued and the recommended KMMs under *CEAA*
12 *2012*, the EAO concludes that TMJ-related effects combined with cumulative effects is expected
13 to result in a moderate impact on the fishing rights of Cowichan Tribes, Halalt First Nation,
14 Penelakut tribe, and Stz'uminus First Nation.

15 The EAO predicts that TMJ alone would have a minor impact to Lyackson First Nation's fishing
16 rights. In consideration of the available information, the EAO's consultation with Lyackson First
17 Nation, Lyackson First Nation's engagement with TJLP, TJLP's commitments, the EAO's
18 proposed EAC conditions if an EAC is issued and the recommended KMMs under *CEAA 2012*,
19 the EAO concludes that TMJ-related effects combined with cumulative effects is expected to
20 result in a minor-to-moderate impact on Lyackson First Nation's right to fish, if Lyackson First
21 Nation should resume regularly FSC fishing activities in the lower Fraser River in the future.

22 The EAO predicts that TMJ would interact with current baseline levels of cumulative effects that
23 already have a combined negative impact to Quw'utsun Nation's availability of resources,
24 access to fishing areas and the experience of fishing in the lower Fraser River and to a lesser
25 extent the Salish Sea. These cumulative effects are compounded by the importance of this area
26 of the Lower Fraser to Quw'utsun Nation and the importance of fish harvesting in this area to
27 Quw'utsun Nation's cultural and traditional interests and that TMJ-related vessels would
28 operate in a relatively confined and heavily utilized marine environment, which increase the
29 seriousness of impact of on Quw'utsun Nation's right to fish.

30 The EAO considered Quw'utsun Nation's perspectives on cumulative effects and Quw'utsun
31 Nation's concern about existing cumulative activities in the Salish Sea that were impacting their
32 ability to achieve their FSC fish quota due to low levels of fish and having to move from larger
33 vessels when they were out fishing. The EAO acknowledges that there are already vessels
34 transiting the lower Fraser River which can impact Indigenous fishers' access to and quality of
35 experience of fishing. While the EAO recognizes there is some uncertainty when considering

1 how cumulative effects impact Aboriginal Interests, the EAO agrees with Quw'utsun Nation,
2 that any increase in vessel traffic at the lower Fraser River would potentially be more serious
3 when combined with past, present and reasonably foreseeable activities.

4 The EAO understands, as of October 2021 Cowichan Tribes Chief and Council has decided to
5 withhold consent to TMJ proceeding. Although negotiations are ongoing between TJLP and
6 Cowichan Tribes, Cowichan Tribes is of the view that, in terms of accommodation, what is being
7 offered is not sufficient to mitigate the infringements of the TMJ project on Cowichan Nation
8 Aboriginal rights. The EAO understands that Cowichan Tribes are in early negotiations but have
9 not yet signed a benefit agreement with TJLP for TMJ.

10 The key factors that were considered in support of the EAO's conclusion on the impacts to the
11 right to fish are summarized as follows:

12 **Biophysical:**

- 13 • The EAO's conclusions in the Fish and Fish Habitat chapter in Part B that TMJ
14 construction (just over three years in duration) and operations (annual dredging) are
15 likely to result in low to moderate magnitude adverse residual effects to fish habitat and
16 potential behavioural responses by fish species at the TMJ site, and low magnitude and
17 frequency impacts to harm and mortality of sturgeon due to potential vessel strikes. No
18 residual effects are predicted to fish and fish habitat in the MSA area; and
- 19 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed. The
20 MSA area is a heavily utilized marine environment. These factors increase the
21 seriousness of impact of TMJ on the right to fish.
- 22 • Quw'utsun Nation have stated that they had previously fished in the area, but their
23 current use has been constrained and impacted by other past and present activities and
24 projects on the south arm of the Fraser River as well as within the Salish Sea.

25 **Geospatial (places, sites and access):**

- 26 • During construction, access to the TMJ site would be restricted for three years. During
27 operations, Indigenous mariners and fishers would avoid entering and remaining in the
28 marine terminal area due to the warning signs and notifications regarding elevated
29 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ.
30 At the scale of the LAA and RAA this would amount to a low magnitude impact to access
31 from impacts at the TMJ site;
- 32 • The EAO's conclusions in the Current Use chapter in Part B of this Report found that
33 TMJ-related vessel transits would have negligible to low magnitude effect to access to
34 fishing compared to baseline numbers of vessel transits, that could be experienced as

1 higher in the Fraser River as a change from baseline compared to Salish Sea. This effect
2 would be due to the regularly occurring (i.e., an average of one vessel call per day under
3 the BVS) and short-duration vessel movements to pass through known fishing areas in
4 the Fraser River and Salish Sea;

5 • Cowichan Nation Alliance Indigenous Groups fish intermittently around Tilbury island
6 and seek to resume more regular fishing in the Fraser River; Lyackson First Nation seeks
7 to resume fishing in the Fraser River;

8 • Specific to the BVS there is potential for higher frequency of interactions to occur
9 between TMJ-related vessels and Indigenous Groups engaging in vessel-based FSC
10 fishing in the lower Fraser River during FSC fishing windows. This effect would apply to
11 Quw'utsun Nation should member Indigenous Groups engage in vessel based FSC fishing
12 activities in the lower Fraser River in the future.

13 • Access by boat and foot is important to the shorelines of Tilbury Island and access to
14 other sites would not be able to replace the loss of access to the proposed jetty
15 location;

16 • Quw'utsun Nation stated that their preferred fishing method includes use of the
17 shoreline and that TMJ, if approved will block access to one of the last available
18 stretches of Tilbury Island shoreline; and

19 **Social, Cultural and Experiential:**

20 • As outlined in the noise and visual quality assessments in Part B, potential negligible to
21 low magnitude impacts due to a change in noise and visual quality during construction
22 and to changes in visual quality during operations and potential concerns about safety
23 during operations;

24 • The area around TMJ is important to Quw'utsun Nation as the former village site is
25 located across the river from the TMJ site and Quw'utsun Nation would like to establish
26 their rights and title to the area, including Tilbury Island;

27 • Quw'utsun Nation have told the EAO that the presence of large LNG vessels at Tilbury
28 would have a negative impact to the experience of traditional use in the area; and

29 • Quw'utsun Nation have noted that the area around TMJ is already experiencing visual
30 and auditory impacts under existing conditions.

31 **Mitigations:**

32 • Proposed mitigations for potential impacts to Quw'utsun Nation member Indigenous
33 Groups' fishing rights, include mitigations to reduce impacts to noise and visual quality

1 in the CEMP and OEMP as well as the recommended KMMs under CEAA 2012,
2 specifically the Fish Mitigations to Reduce Harm and Mortality, Fish Habitat and Offset
3 Plan, Marine Communications Plan, Marine Access and Transportation Plan and Vessel
4 Traffic Management Plan.

5 **B. POTENTIAL IMPACTS ON HUNTING, TRAPPING, AND GATHERING**

6 The Cowichan Nation Alliance reported that they traditionally harvested animals along the
7 banks of the lower Fraser River main stem and in tributaries through the region, including the
8 TMJ areas during both the pre-contact and historical period¹⁸⁵. While residing on the lower
9 Fraser River, the Cowichan Nation Alliance reported traditionally hunting game such as deer,
10 bear, elk, mountain goat and beaver¹⁷⁶. Cowichan Nation Alliance reported that the areas in the
11 vicinity of TMJ were intensive harvesting sites and were an important resource for the village at
12 *Tl'uqtinus*.

13 Lyackson First Nation did not report on hunting in the Lyackson Study¹⁸⁴. Lyackson First Nation
14 reported that they historically traveled between *Le'eyqsun* and the mouth and south arm of the
15 Fraser River year-round for visiting and resource-harvesting purposes, as well as up and down
16 the Northwest Coast. The EAO is aware that Lyackson is a member of the Hul'qumi'num Treaty
17 Group, as described above. Lyackson First Nation, along with other Island Halkomelem speaking
18 groups, traditionally utilized the lands and waters on both sides of the Strait of Georgia as part
19 of a seasonal round, which included hunting for wildlife. Lyackson First Nation reported that
20 they do not currently use the TMJ area to harvest plants for traditional purposes given existing
21 availability, quality and access conditions, but there is interest in expanding their hunting and
22 trapping activities within the vicinity of TMJ.

23 The Cowichan Nation Alliance reported that they traditionally harvested plants along the banks
24 of the lower Fraser River main stem and in numerous stream tributaries through the region,
25 including the TMJ site and beyond during both the pre-contact and historical period¹⁸⁵. The
26 Cowichan Nation Alliance reported that there were plant resources predominantly found in the
27 lower Fraser River that were not available in any abundance in other parts of Cowichan Nation
28 territory but were integral to their traditional economy . In the 2017 Cowichan Nation Alliance
29 Report there is also information about the traditional practice of burning of underbrush as a
30 plant management technique, which is reported to have likely been practiced prescribed
31 burning around the FortisBC upland property on Tilbury Island. In 2013, elders from Stz'uminus
32 First Nation participated in a traditional burning ceremony at *Tl'uqtinus*.

33 Cowichan Nation Alliance reported that Tilbury Island was a site often used for hunting geese
34 and ducks as well as other species¹⁷⁶. Cowichan Nation Alliance reported historically harvesting
35 marine mammals such as harbor porpoise, humpback whale, sea lion, harbor seal and sea otter
36 at confidential locations as well as waterfowl such as ducks and geese in their asserted

1 territory. Cowichan Nation Alliance identified hunting waterfowl in sites such as the Chemainus
2 River and estuary as well as Porlier Pass, Galiano Island, Tent Island and Shoal Island including
3 Wiley Island. Cowichan Nation Alliance member groups reported harvesting marine vegetation,
4 specifically seaweed, in the Strait of Georgia around the Southern Gulf and San Juan Islands.

5 Lyackson First Nation reported that they historically participated in traditional seal, whale and
6 sea lion hunts in the Salish Sea (Georgia Strait) and enjoyed the exclusive Aboriginal right to
7 harvest seal and sea lions in Porlier Pass. This is a practice Lyackson First Nation is striving to
8 revitalize. Lyackson First Nation also hunted ducks for subsistence at Roberts Bank and geese,
9 duck eggs and seagulls as well as flora harvesting for food and medicinal purposes at or near
10 *Le'eyqsun* (Valdes) Island as well as other areas within their asserted territory.

11 Cowichan Nation Alliance report that they do not currently hunt or trap within the TMJ area but
12 they are seeking to reestablish traditional practices there, particularly on the *Tl'uqtinus* lands.
13 The Cowichan Nation Alliance stated that they are demanding to resume harvesting of
14 traditional food and material resources as formerly on the lower Fraser River, including in the
15 TMJ area, as part of their culturally integral Aboriginal rights¹⁸⁵.

16 The EAO evaluated the potential effects on hunting, trapping, and gathering rights attributable
17 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
18 [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical components resulting in
19 changes to wildlife and vegetation quantity and quality, changes in access to hunting, trapping
20 and gathering areas, and changes to social, cultural, and spiritual values associated with
21 traditional hunting, trapping and gathering activities summarized in that section apply to the
22 Quw'utsun Nation. Quw'utsun Nation did not raise specific issues and concerns with potential
23 impacts of TMJ relating to hunting, trapping, and gathering.

24 **14.1.3.1.2 Conclusion**

25 In consideration of the available information, consultation with Quw'utsun Nation, Quw'utsun
26 Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC conditions if an
27 EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected to result in a
28 negligible impact on Quw'utsun Nation's right to hunt, trap and gather.

29 The EAO understands, as of October 2021 Cowichan Tribes Chief and Council has decided to
30 withhold consent to TMJ proceeding. Although negotiations are ongoing between TJLP and
31 Cowichan Tribes, Cowichan Tribes is of the view that, in terms of accommodation, what is being
32 offered is not sufficient to mitigate the infringements of the TMJ project on Cowichan Nation
33 Aboriginal rights.

34 The key factors that were considered in support of the EAO's conclusion on the impacts to the
35 right to hunt, trap and gather are summarized as follows:

1 Biophysical:

- 2 • The EAO's conclusions at the TMJ site on adverse residual effects to Wildlife and Wildlife
3 Habitat and Vegetation (see respective sections in Part B) indicate negligible to low
4 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
5 from noise and light, and mortality; as well as low magnitude residual effects on
6 wetland and riparian ecosystems;
- 7 • The EAO's conclusions in the MSA area on adverse residual effects to Marine Birds (see
8 the Wildlife chapter in Part B) indicate negligible to low magnitude residual effects
9 related to mortality; and
- 10 • Terrestrial wildlife species of cultural importance to Cowichan Nation Alliance member
11 Indigenous Groups have either not been found within the TMJ site or are not anticipated
12 to be affected by TMJ-related activities.

13 Geospatial (places, sites and access):

- 14 • Quw'utsun Nation do not currently harvest at the TMJ site but seek to re-establish
15 harvesting practices in the area;
- 16 • Quw'utsun Nation have noted that TMJ effects on vegetation and wildlife would be
17 acute for their members due to their strong interest at Tilbury island and its proximity to
18 the village site across the river;
- 19 • Construction (just over three years in duration) and operations (30 years) are unlikely to
20 cause disruptions to Quw'utsun Nation access to areas traditionally used for hunting,
21 trapping, and gathering activities at the TMJ site or in the MSA area; and
- 22 • The upland portion of the TMJ site is situated on fee simple (private) land.

23 Social, Cultural and Experiential:

- 24 • Potential impacts to experience in the vicinity of the TMJ site and along the shipping
25 route due to a change in noise and visual quality, as described in Part B, during
26 construction and operations which are anticipated to be negligible to low in magnitude
27 in the Fraser River and Salish Sea; and
- 28 • Traditional plant management practices involved prescribed burning and Cowichan
29 Nation Alliance's 2019 report that Stz'uminus First Nation elders held a burning
30 ceremony at the village site at *Tl'uqtinus*.

31 Mitigations:

- 32 • Proposed conditions to mitigate impacts to Quw'utsun Nation's right to hunt, trap and

1 gather are the Vegetation and Wetland Management and Offsetting Plan, and wildlife
2 and wildlife habitat management, light management, and noise management
3 components of the CEMP and OEMP, all of which would require consultation with
4 Indigenous Groups. The EAO is also proposing these mitigations as KMMs under CEAA
5 2012 which would include the requirements for migratory birds, lighting, noise and
6 wildlife and wildlife habitat management and monitoring, and a Wetland Compensation
7 Plan; and

- 8 • All vessels would adhere to the Marine Regulations and Legislation regulating vessel
9 noise and lighting.

10 C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS

11 Members of the Quw'utsun Nation identify the Fraser River as both the home of the Quw'utsun
12 Nation permanent village at *Tl'uqtinus*, which is located on the north shore opposite of the TMJ
13 site on Tilbury Island, and the abundant and lucrative salmon resource that was critical to their
14 social and economic success¹⁸⁵. Cowichan Nation Alliance reported that *Tl'uqtinus* served as the
15 basis for harvesting of fish and other resources; their trade in camas, clams, and other products
16 for salmon and other resources, including mountain goat wool that Cowichan used in
17 ceremonial regalia; and for providing an opportune time for families of high status to meet and
18 arrange marriages, which were economic unions, and to engage in other ceremonial occasions
19 (for example, feasts) that acknowledged and escalated the wealth of these high status
20 families¹⁸⁵.

21 Lyackson First Nation reported that the lower Fraser River estuary has been an integral part of
22 Lyackson Mustimuhw and Hul'qumi'num cultures, traditional practice, identity, well-being, and
23 economy, from potentially as far back as 2,500 years ago to the present day¹⁸⁴. Lyackson First
24 Nation participants visiting the area as part of the Lyackson Study remarked at the scale of
25 landscape change since they had been last on the river in their youth, 50 to 60 years ago.

26 The Cowichan Nation Alliance reported that the activities of the Cowichan Nation while
27 resident at *Tl'uqtinus* ensured that their permanent winter villages on Vancouver Island and the
28 Gulf Islands, and their trans-Georgia Strait culture and traditions, continued to be supported
29 and maintained¹⁸⁵. Cowichan Nation Alliance reported that *Tl'uqtinus* was most populated
30 during the summer. This was the time for family gatherings, visiting among other villages,
31 celebrations, weddings, naming ceremonies and potlatches¹⁸⁵. TMJ would be located across the
32 Fraser River from *Tl'uqtinus*. As described above, the descendants of the Quw'utsun Nation,
33 which include Cowichan Nation Alliance member Indigenous Groups and Lyackson First Nation,
34 are seeking to reconnect and reestablish their presence within the lower Fraser River. The
35 Cowichan Nation Alliance identified the Fraser River as important to traditional and cultural
36 interests of the group and have informed the EAO that the re-establishment of the Cowichan

1 Nation Alliance's village at *Tl'uqtinus* is of extremely high priority. Cowichan Nation Alliance
2 informed the EAO that their members use this area as much as possible given the
3 circumstances and that some members currently travel to, fish, and plan cultural events in the
4 area.

5 The Cowichan Nation Alliance raised the following concerns regarding potential impacts on
6 other traditional and cultural interests due to TMJ:

- 7 • Concerns regarding the potential negative impacts to the Cowichan Nations Alliance
8 member communities' use and enjoyment of the *Tl'uqtinus* Lands and their territory,
9 including Cowichan Nation Alliance's desired and intended future use of the area,
10 including an outstanding issue with respect to TJLP's refusal to assess visual impacts to
11 the village site at *Tl'uqtinus* should Cowichan Nation Alliance's members establish
12 residential use of the area. The EAO understands that CNA disagrees with the EAO's
13 conclusions regarding potential effects to access to the village site at *Tl'uqtinus* for
14 Cowichan Nation Alliance member Indigenous Groups current use of lands and
15 resources and traditional purposes and cultural heritage.
- 16 • The EAO has also proposed Condition 17: Indigenous Cultural Awareness, Recognition
17 and Mitigation to mitigate effects of TMJ on cultural resources and practices in the
18 Marine Terminal Area. The EAO recommends a Cultural Heritage KMM under CEAA
19 2012, to address the effects on tangible and intangible cultural losses caused by the
20 construction and operation of TMJ, in consultation with those Indigenous Groups
21 experiencing the effects in the lower Fraser River. As part of the measures, TJLP would
22 be required to consider developing or contributing to Indigenous-led programs to
23 preserve and enhance cultural heritage.
- 24 • Cowichan Nation Alliance noted that they also plan in the future to construct and
25 operate a dock or small marina on the north bank of the river channel and worry that
26 turning ships in the channel may impact their ability to carry out these plans (such as
27 erosion of the north bank due to wake effects), and that effects such as light and noise
28 would potentially interfere with the enjoyment of activities at *Tl'uqtinus* Lands.
29 Cowichan Nation Alliance told the EAO that the village at *Tl'uqtinus* would be
30 particularly affected by visual and auditory disruptions due to its close proximity to the
31 TMJ site and that existing baseline cumulative impacts on the visual and auditory
32 context should not "count against" the assessment of any additional disruption directly
33 from TMJ.
 - 34 ○ In the EAO's assessment of Current Use of Land and Resources for Traditional
35 Purposes in Part B, the EAO concluded potential for negligible to low magnitude
36 adverse residual effects from interruptions in access to heritage due to TMJ-

- 1 related shipping during operation (30 years in duration).
- 2 ○ In the Noise assessment in Part B, the EAO concluded potential for low
3 magnitude and short-term noise effects in the LAA near the TMJ site, including at
4 the First Nations village of *Tl'uqtinus*, during construction and decommissioning
5 of TMJ.
- 6 ○ TJLP completed a visual quality assessment at the former Indigenous village site
7 at *Tl'uqtinus* along Dyke Road as a key viewpoint and nighttime viewing location
8 for TMJ ("Viewpoint 2") in its original Application. TJLP's visual quality
9 assessment was consistent with best practices for visual impact assessment as
10 described in the AIR for TMJ, which was based on the current viewing conditions
11 at the site and reasonably foreseeable development in the study area.
- 12 ○ In the Visual Quality assessment in Part B, the EAO concluded that for former
13 Indigenous Village site at *Tl'uqtinus* the daytime viewing impacts would be
14 negligible to low, and nighttime viewing impacts would be negligible with the
15 implementation of the proposed mitigation measures for operations. TJLP
16 identified that it would be expected that the level of visual impact may increase
17 if permanent residences were located at Viewpoint 2 as they would have
18 increased visual exposure to the Project than current users.
- 19 ○ The EAO is recommending a KMM under CEAA 2012 which states that where
20 lighting is not standardized based on navigational and safety requirements,
21 strategies to minimize glare such as direction, timing and intensity would be
22 employed by TJLP.
- 23 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution to
24 concerns regarding cultural interests, including access and use of the *Tl'uqtinus*
25 Lands. As described in that section, the EAO proposes the Marine
26 Communication Plan and the Marine Access and Transportation Plan as part of
27 key mitigations under CEAA 2012, a Water Quality Management Plan condition,
28 as well as the Lighting Management, Noise Management and Air Quality
29 Management as part of the CEMP and OEMP which would require consultation
30 with Indigenous Groups.
- 31 ○ The EAO has also proposed a Condition 17: Indigenous Cultural Awareness,
32 Recognition and Mitigation to mitigate effects of TMJ on cultural resources and
33 practices in the Marine Terminal Area. The EAO understands the Agency has
34 developed a condition to address potential effects to tangible and intangible
35 cultural heritage as part of the proposed Cultural Heritage federal condition.

- 1 • During Application Review, Cowichan Nation Alliance provided comments on the
2 Navigational Study and requested more details on the analysis and maps showing the
3 affected areas. Please see the Accidents and Malfunctions Chapter of Part B ([Section](#)
4 [9.3](#)) for more details about the variety of memos and technical information that was
5 exchanged over the course of the EA on the topic of navigational safety and societal risk.
6 Cowichan Nation Alliance noted that the capacity funding provided was insufficient to
7 engage the technical expertise to review the additional analysis on societal risk.
- 8 • Cowichan Nation Alliance also identified a concern that, in the event of an accident or
9 malfunction resulting in damages to cultural or heritage resources, a potential burden
10 could be created on CNA as they would likely have to prove in court the loss of culture
11 and heritage resources which are not normally covered (e.g., compensation would only
12 cover costs associated with loss of income, gear, vessel or property damages).
- 13 ○ As described in the Accidents and Malfunctions and Effects of the Environment
14 section in Part B of this Report, Canada has a comprehensive liability and
15 compensation regime covering different types of marine risks involving ships,
16 including oil pollution, the release of HNS, collisions, and wreck removal. Refer to
17 the Accidents and Malfunctions chapter ([Section 9.3](#)) for more details.
- 18 ○ The EAO is recommending a Marine Shipping Emergency Response Outreach
19 Program as a KMM under CEAA 2012 to facilitate the integration of plans for
20 responding to incidents in transit into existing emergency response systems,
21 primarily the CCG's Incident Integrated Response Plans.
- 22
- 23 • Cowichan Nation Alliance have reported that journeys for their members in the U.S.A.
24 have been affected by shipping traffic and are concerned about the safety of their
25 community members undertaking traditional practices on the water.
- 26 ○ The EAO does not dispute the Cowichan Nation Alliance's worldview and
27 perspective that effects have already occurred due to vessel traffic has disrupted
28 members from being able to travel to the U.S.A and that there is concern about
29 the safety of members undertaking traditional practices in marine area. As
30 described in the Current Use assessment in Part B, the EAO concluded that that
31 regular TMJ-related vessel transits during operations (30 years minimum) could
32 cause relatively infrequent and short-duration interruptions to access and quality
33 experience.
- 34 ○ The EAO acknowledges that there is uncertainty in the relationship between
35 incremental increases in shipping and the availability of cultural resources;
36 however, as described in the Current Use of Lands and Resources for Traditional

1 Purposes section of Part B, the EAO found it is reasonable to expect that past
2 effects would combine with effects from TMJ-related marine shipping to result in
3 significant cumulative effects to current use for fishing and other cultural use of
4 marine areas for Indigenous Groups that preferentially use or rely on sites
5 located at TMJ or within and adjacent to shipping lanes.

- 6 ○ Marine shipping associated with TMJ would be required to meet the
7 international standards and Canadian regulations set out by Canada's
8 compliance-based marine safety and security system, which is designed to
9 protect life, property, and the marine environment. The EAO is recommending a
10 KMM under CEAA 2012 for a Marine Shipping Emergency Response Outreach
11 Program to facilitate the integration of plans for responding to incidents in
12 transit into existing emergency response systems, primarily the CCG's Incident
13 Integrated Response Plans.

- 14 ○ The EAO is proposing a KMM under CEAA 2012 for a Vessel Traffic Management
15 Plan for the shipping route until 12 nm. The Vessel Traffic Management Plan
16 would include speed limits, where safe, within the Fraser River and MSA area,
17 and commit TMJ-related vessels to following established shipping routes and
18 maintaining a constant course.

- 19 ● Members of the Cowichan Nation Alliance have identified SRKWs as having cultural
20 importance and are concerned about the potential effects of vessel movements in the
21 Salish Sea may have on this species as well as on ecosystem integrity, cultural values and
22 knowledge transmission. Additional issues and concerns with potential impacts related
23 to SRKWs were raised by Cowichan Nation Alliance member Indigenous Groups during
24 the Roberts Bank Terminal 2 Panel process. Here Cowichan Nation Alliance indicated
25 that the cultural importance of SRKWs to Cowichan people cannot be overstated.
26 Lyackson First Nation raised concerns regarding underwater noise related to marine
27 shipping to whales, including SRKW's implications on the food chain and that SRKWs
28 were a part of Lyackson First Nation's origin story. Through the RBT2 process, the
29 Government of Canada heard that Penelakut First Nation was concerned about
30 potential impacts to SRKWs, which have a cultural relevance to Penelakut First Nation
31 related to the concept of 'family'.

32 The EAO acknowledges that SRKWs are of great cultural and ecological importance to Cowichan
33 Nation Alliance member Indigenous Groups. See [Section 13.3.3](#) for a detailed discussion of the
34 analysis and resolution of concerns related to the effects on whales. As discussed in that
35 section, the EAO concluded that TMJ would not result in significant residual effects to marine
36 mammals; however, the EAO notes that the current baseline of cumulative effects to SRKWs is

1 already high and that TMJ would contribute additional residual effects from shipping noise and
2 potential avoidance behaviour by SRKW to ships, such that cumulative effects to SRKW are
3 considered significant.

4 The EAO is recommending a KMM under *CEAA 2012* for a Vessel Traffic Management Plan that
5 would require TJLP to incorporate contractual measures to support participation of TMJ-related
6 vessels in the VFPA-led ECHO Program seasonal slowdown initiatives (as amended) or a future
7 equivalent and annual reporting on TJLP's participation in regional environmental management
8 measures and cumulative effects monitoring to protect SRKW, where feasible. The seasonal
9 slowdown initiatives currently request vessels to slow down in key SRKW foraging areas such as
10 Swiftsure Banks, Haro Strait and Boundary Pass. The EAO notes several regional initiatives and
11 measures have been implemented by the Government of Canada to better understand and
12 manage cumulative effects on the recovery of SRKWRKWs (listed in [Section 13.1.1](#)).

13 Lyackson First Nation identified five "interactions" values, consisting of three sites of "family
14 relations" and two sites of "trade." The two sites of trade are described as intersecting the TUS
15 Area while the three family relations sites are said to be dispersed up and down the Fraser
16 River¹⁸⁴. Lyackson First Nation provided maps that depict this "interactions" area as the entire
17 stretch of the Fraser River from its mouth to upstream of Barnston Island, an area that overlaps
18 the Project Boundary. Lyackson First Nation also identified locations considerably downstream
19 of the TMJ site with important values. Three "small-craft transportation" values are identified
20 as fishing routes to the Fraser River across the Salish Sea from *Le'eyqsun*. One "story-history"
21 value is identified as taking in the lower portion of the South Arm, from *Tl'uqtinus* down to the
22 Salish Sea. Two "habitation" values are also identified, corresponding to the Deas Island and
23 Steveston areas.

24 Lyackson First Nation identified foreshore and intertidal areas as of critical importance to
25 subsistence and knowledge transmission. Lyackson First Nation reported Tumbo Island reef
26 areas as of particular importance as a fishing area and as a refuge area in bad weather. Areas of
27 archaeological potential along the waterfront were identified as important and reported
28 concern that erosion related to the increase in vessel traffic would affect these sites.

29 Lyackson First Nation identified potential impact on archaeological and heritage resources as
30 being a key concern and highlighted the importance of cultural continuity to
31 Lyackson First Nation. Lyackson First Nation would like to see enhanced public awareness of the
32 Fraser River as a shared First Nations place that is important to Central Coast Salish
33 communities.

34 Lyackson First Nation also identified an opportunity to increase public awareness of First
35 Nations history and connections to the Fraser River generally through development of
36 interpretive information, which could include a narrative of the Fraser River.

1 Lyackson First Nation reported SRKWRKWs as important to their culture. Killer whales are
2 depicted in visual art, stories, and songs.

3 The Application stated that Lyackson First Nation raised the following concerns regarding
4 potential impacts on other traditional and cultural interests due to TMJ:

- 5 • Concern regarding the potential impact TMJ would have on TI'uqtinus, a former village
6 site, which is located across from the TMJ site.
 - 7 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution to
8 concerns regarding access and use of the TI'uqtinus Lands. Proposed provincial
9 conditions to mitigate impacts to cultural heritage are the development of the
10 Cultural and Archaeological Resources Management Plan for the TMJ site, the
11 Lighting Management, Noise and Vibration Management and Air Quality
12 Management as part of the CEMP and OEMP as well as the Water Quality
13 Management Plan and the Indigenous Cultural Awareness and Recognition
14 Condition, and the recommended KMMs under CEAA 2012 for the Marine Access
15 and Transportation and Marine Communications Plans.
 - 16 ○ The Marine Access and Transportation Plan would include a description of
17 mitigations to reduce disruptions caused by construction and operations for
18 Indigenous Groups to carry out traditional use activities. The Vessel Traffic
19 Management Plan would include speed limits, where safe, within the Fraser
20 River and MSA area, and commit TMJ-related vessels to following established
21 shipping routes and maintaining a constant course.

22 **14.1.3.1.3 Conclusion**

23 The EAO predicts the TMJ-related marine shipping effects alone would have minor impacts on
24 Quw'utsun Nation's other cultural and traditional interests, although the EAO acknowledges
25 that there is uncertainty in the relationship between incremental increases in shipping and the
26 availability of cultural resources, such as SRKW. However, in consideration of the available
27 information, the EAO's consultation with Quw'utsun Nation, Quw'utsun Nation's engagement
28 with TJLP, TJLP's commitments and the EAO's proposed EAC conditions if an EAC is issued, TMJ,
29 combined with existing conditions, is expected to result in a moderate-to-serious impact on
30 Quw'utsun Nation's other traditional and cultural interests. The EAO's conclusions of significant
31 cumulative effects to SRKWRKW was a major key factor considered in the EAO's seriousness
32 determination. The EAO notes several regional initiatives and measures have been
33 implemented by the Government of Canada to better understand and manage cumulative
34 effects on the recovery of SRKWs (listed in [Section 2.13.1](#)).

1 The EAO understands, as of October 2021 Cowichan Tribes Chief and Council has decided to
2 withhold consent to TMJ proceeding. Although negotiations are ongoing between TJLP and
3 Cowichan Tribes, Cowichan Tribes is of the view that, in terms of accommodation, what is being
4 offered is not sufficient to mitigate the infringements of the TMJ project on Quw'utsun Nation
5 Aboriginal rights.

6 The key factors that were considered in support of the EAO's conclusion on the impacts to
7 other traditional and cultural interests are summarized as follows:

8 **Cultural and Heritage Resources:**

- 9 • The EAO's conclusions in the Heritage Resources section of Part B did not predict
10 residual effects to Heritage Resources ([Section 7.1](#)) from erosion due to wake effects
11 along the shorelines of the Fraser River in the RAA or in the MSA area;
- 12 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
13 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
14 cumulative effects to SRKWRKWs due to underwater noise; and
- 15 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed. The
16 MSA area is a heavily utilized marine environment. These factors increase the
17 seriousness of impact of TMJ.

18 **Geospatial (places, sites, and access):**

- 19 • Construction and operation are unlikely to cause disruptions to
20 Quw'utsun Nation members' access to cultural sites, such as the village site at
21 *Tl'uqtinus*, and uses identified by Quw'utsun Nation in the Fraser River area. The EAO
22 understands that Quw'utsun Nation disagrees with the EAO's conclusions regarding
23 potential effects to access to the village site at *Tl'uqtinus*.
- 24 • During construction, access to the TMJ site would be restricted for three years. During
25 operations, Indigenous mariners and fishers would avoid entering and remaining in the
26 marine terminal area due to the warning signs and notifications regarding elevated
27 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ;
- 28 • The small number of TMJ-related vessels relative to current vessel traffic are predicted
29 to have a negligible to low effect on cultural activities in the MSA area in terms of access
30 from regularly occurring (i.e., an average of one vessel call per day under the BVS) vessel
31 transits to and from TMJ's marine terminal area could cause relatively infrequent and
32 short-duration interruptions to access and quality of experience; and
- 33 • Quw'utsun Nation member communities' future desired use of the *Tl'uqtinus* Lands
34 across from the TMJ site.

1 **Social, Cultural, Experiential:**

- 2 • The EAO's conclusions in the Noise assessment in Part B found sensory disturbances
3 from noise are anticipated to be negligible to low magnitude, temporary and short-
4 term, including up to low magnitude during construction and decommissioning at the
5 village site at *Tl'uqtinus*.
- 6 • The EAO's conclusions in the Visual Quality chapter in Part B found a negligible to low
7 impact to the existing visual landscape character in the Fraser River, and for the village
8 site at *Tl'uqtinus* daytime viewing impacts would be negligible to low, and nighttime
9 viewing impacts would be negligible with the implementation of the proposed
10 mitigation measures. The EAO understands that Quw'utsun Nation disagrees with this
11 conclusion and considers that the visual quality impacts to the village site will be higher.
12 The EAO understands that the level of visual impact may increase if permanent
13 residences were located at Viewpoint 2 due to potential increased visual exposure to
14 the Project compared to current users.
- 15 • Quw'utsun Nation have told the EAO that the presence of large LNG vessels at Tilbury
16 would negatively impact the experience of traditional use in the area, including
17 potential concerns regarding safety during operations in the Fraser River and Salish Sea.
- 18 • Quw'utsun Nation have noted that the area around TMJ is already experiencing visual
19 and auditory impacts under existing conditions.
- 20 • Quw'utsun Nation's cultural and spiritual interest in SRKWSRKW.

21 **Mitigations:**

- 22 • Proposed provincial conditions to mitigate impacts to cultural heritage are the
23 development of the Cultural and Archaeological Resources Management Plan for the
24 TMJ site, the Lighting Management, Noise and Vibration Management and Air Quality
25 Management as part of the CEMP and OEMP as well as the Water Quality Management
26 Plan and the Indigenous Cultural Awareness and Recognition Condition.
- 27 • *Heritage Conservation Act* (RSBC 1996, c. 182).
- 28 • Proposed mitigations for potential impacts to traditional and cultural interests are the
29 recommended KMMs under CEAA 2012 for a Marine Communications, and Vessel
30 Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
31 Program.

32 The EAO understands that Cowichan Tribes does not agree with the EAO that impacts have
33 been "avoided, minimized or otherwise accommodated", Cowichan Tribes is of the view that

1 the assessment under-represented the potential for visual impacts and access to the village site
2 at *Tl'uqtinus* with respect to Cowichan Nation Alliance's plans for the area (i.e., residential use),
3 and that Quw'utsun Nation did not agree with the conclusions in the Application or the EAO's
4 conclusions about significance of potential impacts to Quw'utsun Nation's Aboriginal Interests.

- 5 • The EAO is of the view that the proposed mitigation measures for TMJ would help to
6 address and reduce potential impacts to Quw'utsun Nation's other traditional and
7 cultural interests. Proposed EAC conditions requiring Construction and Operational
8 Environmental Management Plans, including measures to specifically address noise and
9 lighting management and specify how Indigenous use information has been
10 incorporated into the plans, would help to reduce potential impacts to visual quality and
11 noise to the village site at *Tl'uqtinus*.
- 12 • Also, the EAO considers that the recommended KMM under CEAA 2012 for a Marine
13 Access and Transportation Plan, would include a requirement to identify procedures for
14 safety training for Indigenous Groups, which could help reduce potential impacts related
15 to safety concerns if training is completed by Quw'utsun Nation members should TMJ
16 be allowed to proceed. The EAO also recommends a Cultural Heritage KMM under CEAA
17 2012 [to address the effects on tangible and intangible cultural losses caused by the](#)
18 [construction and operation of TMJ](#). The EAO is of the view that the potential adverse
19 effects on Quw'utsun Nation's other cultural and traditional interests have been
20 avoided, minimized and accommodated to the extent possible but the EAO also
21 recognizes that there are outstanding impacts, in particular regarding cumulative
22 effects, and these outstanding impacts are reflected in the EAO's conclusions in Part B
23 and Part C for TMJ.

24 **D. POTENTIAL IMPACTS ON TITLE**

25 The assessment of impacts to Aboriginal title was informed by the relevant information
26 presented above and below. It is also informed by the EAO's assessment of effects to VCs that
27 informed the discussion of impacts to vegetation, wildlife, fishing, hunting, trapping and
28 gathering, and other traditional and cultural interests.

29 Quw'utsun Nation raised the following concerns regarding potential impacts on Aboriginal title
30 due to TMJ:

- 31 • Inadequate consideration of the impacts to Cowichan Nation Alliance's right to obtain
32 economic benefit from the land, or to manage and make decisions about how those
33 lands are used. Cowichan Nation Alliance's Declaration for Reconciliation specifies that
34 land and resource use objectives will be consistent with the recovery, restoration, re-

- 1 establishment of permanent residents and river access, re-establishment of culturally
2 integral practices, and realization of compatible revenue, economic and employment
3 opportunities and benefit related to the village and surrounding lands at Tl'uqtinus and
4 south arm of the Fraser River and mouth.
- 5 ○ The EAO notes that TMJ would be located on fee simple private land that were
6 used for industrial purposes. However, the EAO understands that TJLP is exploring
7 potential economic opportunities for Indigenous groups.
 - 8 ● Concern regarding impact from the large ships maneuvering and docking directly across
9 from the Quw'utsun Nation's village lands, interfering with use and enjoyment of these
10 lands.
 - 11 ○ In the Current Use of Lands and Resources for Traditional Purposes and Cultural
12 Heritage in Part B, the EAO concluded negligible to low magnitude adverse
13 residual effects due to TMJ-related vessel traffic, would include interruptions in
14 access to marine use areas, changes in noise and visual quality, and affects to both
15 safety and perception of safety due to TMJ-related vessel traffic during operations
16 (30 years in duration).
 - 17 ● Concern regarding the assessment of adverse impacts to Aboriginal title with respect to
18 usage of title lands and adjacent fisheries; and potential conflicts between the TMJ jetty
19 construction and operations with the Quw'utsun Nation's goal of developing a dock or
20 marina at the village site at *Tl'uqtinus* Lands or having permanent residence there.
 - 21 ○ The EAO concludes in Current Use of Lands for Traditional Purposes in Part B that
22 regularly occurring vessel transits (i.e., an average of one vessel call per day under
23 the BVS) could cause negligible to low magnitude effects to access due to short-
24 duration vessel movements to pass through known fishing areas in the Fraser
25 River and Salish Sea.
 - 26 ○ During operations the EAO assumed that Indigenous mariners and fishers would
27 avoid entering and remaining in the marine terminal area due to the warning signs
28 and notifications regarding elevated public risk, in particular when vessels would
29 be berthing, loading, or de-berthing at TMJ.
 - 30 ○ In the Noise assessment in Part B of this Report, the EAO concluded negligible to
31 low magnitude and short-term noise effects in the LAA near the TMJ site, including
32 at the First Nations village of *Tl'uqtinus*, during construction and decommissioning
33 of TMJ.
 - 34 ○ In the Current Use of Lands and Resources for Traditional Purposes and Cultural
35 Heritage assessment in Part B, potential negligible to low magnitude impacts to

1 the experiential aspects of site use in the vicinity of the TMJ site due to a change in
2 noise and visual quality during construction and to changes in visual quality and
3 potential concerns regarding safety during operations.

4 ○ The EAO is of the view that the proposed provincial conditions requiring
5 Construction and Operational Environmental Management Plans, including
6 measures to specifically address noise and lighting management and specify how
7 Indigenous use information has been incorporated into the plans, would help to
8 reduce potential impacts to visual quality and noise to the village site at *Tl'uqtinus*.

9 Quw'utsun Nation raised concerns regarding the EAO's analysis that access would not be
10 limited if the TMJ were to be approved because these lands are private. Quw'utsun Nation
11 states that they assert Aboriginal title to Tilbury Island and incidental to these rights is the
12 ability to access, manage and obtain the benefit of those lands.

13 • The EAO recognizes that Quw'utsun Nation identified that historical exclusion from the
14 area, combined with cumulative impacts should be weighed in the assessment for
15 potential impacts due to future exclusion from the foreshore area. Cowichan Nation
16 Alliance is in active litigation and seeking a declaration of Aboriginal title to the private
17 lands where TMJ is located.

18 ○ As private lands were specifically excluded by the *Tsilhqot'in Nation in*
19 *Tsilhqot'in Nation v. BC, 2014 SCC 44*, the relationship between Aboriginal title
20 and private property has not been resolved to date, so the EAO will be guided
21 by future developments in the common law in this area.

22 • For the purposes of consultation and assessing the potential impacts of the proposed
23 TMJ project, the current limitations on access to the fenced upland portions of the
24 project site is a relevant factor.

25 **14.1.3.1.4 Conclusion**

26 In consideration of the available information, the EAO's consultation with Quw'utsun Nation,
27 Quw'utsun Nation's engagement with TJLP, TJLP's commitments and the EAO's proposed EAC
28 conditions if an EAC is issued, and recommended KMMs under CEAA 2012 TMJ is expected to
29 result in a minor impact on Quw'utsun Nation's Aboriginal title.

30 Quw'utsun Nation disagreed with the EAO's assessment that the impacts to Quw'utsun
31 Nation's title would be minor. Quw'utsun Nation considers that TMJ is a major project located
32 on asserted Quw'utsun Nation Aboriginal title lands and directly across the river from an
33 important Quw'utsun Nation village site. Quw'utsun Nation told the EAO that the approval of
34 TMJ would adversely impact Quw'utsun Nation's ability to use, manage, and benefit from those

1 lands for many decades. The EAO understands, as of October 2021 Cowichan Tribes Chief and
2 Council has decided to withhold consent to TMJ proceeding. Although negotiations are ongoing
3 between TJLP and Cowichan Tribes, Cowichan Tribes is of the view that, in terms of
4 accommodation, what is being offered is not sufficient to mitigate the adverse impacts of TMJ
5 on Quw'utsun Nation Aboriginal title.

6 The key factors that were considered in support of the EAO's conclusion on the impacts to
7 Aboriginal title are summarized as follows:

8 **Use and Occupation:**

- 9 • The access restrictions to the area surrounding the jetty during construction would be
10 limited in area (to a maximum of area of 23 ha during dredging over 50 days; and then a
11 smaller area for work on the jetty thereafter);
- 12 • The EAO assumed that Indigenous mariners and fishers would avoid entering and
13 remaining in the marine terminal area due to the warning signs and notifications
14 regarding elevated public risk, in particular when vessels would be berthing, loading, or
15 de-berthing at TMJ. The increase in vessel traffic along the Fraser River would be a small
16 percentage increase from traffic already present; and
- 17 • Low magnitude noise effects at the village site at *Tl'uqtinus* which is anticipated to be
18 short-term in duration.
- 19 • Cowichan Nation Alliance Declaration for Reconciliation, endorsed by Cowichan Tribes,
20 Stz'uminus First Nation, Penelakut Tribe, and Halalt First Nation, specifies land and
21 resource objectives related to recovery, restoration, re-establishment of permanent
22 residents and river access, and re-establishment of culturally integral practices related
23 to the village and surrounding lands at *Tl'uqtinus* and south arm of the Fraser River and
24 mouth.

25 **Control of Area:**

- 26 • The area of development for the TMJ is crown land (submerged);
- 27 • Quw'utsun Nation asserts the right to manage and make decisions about how lands
28 are used as an aspect of their Aboriginal title and have identified an expectation for
29 opportunities to participate in and inform management and planning for the TMJ
30 site and lower Fraser River generally;
- 31 • The EAO acknowledges the ongoing litigation in the British Columbia Supreme Court
32 in *Cowichan Tribes v. AG Canada et al.*, regarding Cowichan Nation Alliance's
33 assertions of Aboriginal rights and title to *Tl'uqtinus* and the south arm of the Fraser
34 River;

- 1 • The upland portion of TMJ is located on fee simple private land that are used for
2 industrial purposes; and
- 3 • Cowichan Nation Alliance Declaration for Reconciliation recognizes and affirms land
4 and resource objectives related to the realization of compatible revenue, economic
5 and employment opportunities and benefit related to the village and surrounding
6 lands at *Tl'uqtinus* and south arm of the Fraser River and mouth.

7 **Economic Benefits:**

- 8 • The construction and operation of the TMJ jetty and the vessel traffic to and from TMJ
9 in the Fraser River is unlikely to affect Quw'utsun Nation's economic development
10 aspirations for *Tl'uqtinus* Lands and the adjacent area now and in the future;
- 11 • TMJ is located on private land already zoned and developed for industrial usage; and
- 12 • The construction and operation of the TMJ jetty and the vessel traffic to and from TMJ
13 in the Fraser River may have minor economic impacts Quw'utsun Nation's harvesting of
14 fish.

15 **Mitigations:**

- 16 • Several conditions are proposed to mitigate impacts to Aboriginal title, including a
17 Cultural and Archaeological Resource Management Plan, Indigenous Monitors,
18 Engagement and Reporting, and an Indigenous Training, Employment and Procurement
19 Plan. The EAO is also recommending a Marine Access and Transportation Plan and
20 Marine Communication Plan as KMMs under CEAA 2012 to reduce impacts to access
21 from construction and operations.

22 **14.2 TS'UUBAA-ASATX NATION (LAKE COWICHAN)**

23 **14.2.1 COMMUNITY PROFILE**

24 Ts'uubaa-asatx Nation (formerly Lake Cowichan First Nation) is a Hul'qumi'num-speaking
25 Central Coast Salish group. Ts'uubaa-asatx Nation's membership takes descent from Ditidaht
26 ancestors and *Hul'qumi'num'* ancestors known as the Somenos (or Saumni, Samena, Saumina,
27 and other variations). Their community is based on a single reserve on the northeastern shore
28 of Cowichan Lake, approximately 30 km west of Duncan (on the east coast of Vancouver Island),
29 and less than 20 km east of Nitinat Lake (on the west coast of Vancouver Island). In 1860, the
30 community was significantly affected by a smallpox epidemic. As of November 2021, Ts'uubaa-

1 asatx Nation has 26 registered members, 14 of which live on Ts'uubaa-asatx Nation reserve
2 lands.¹⁸⁸

3 Ts'uubaa-asatx Nation is part of the Hul'qumi'num Treaty Group, which also includes
4 Cowichan Tribes, Halalt First Nation, Penelakut Tribe, Stz'uminus First Nation, and
5 Lyackson First Nation. The Hul'qumi'num Treaty Group identify a traditional territory in the
6 Statement of Intent submitted to the BC Treaty Commission, as generally including parts of
7 south-eastern Vancouver Island, the southern Gulf Islands, a portion of the Lower Mainland,
8 and the waters of the Salish Sea to the Sunshine Coast including the lower portion of Howe
9 Sound, Haro Strait, the Strait of Juan de Fuca and the South Arm of the Fraser River up to Yale
10 ¹⁸⁹. Identified by the Hul'qumi'num Treaty Group within that area, is a Core Traditional Territory
11 within which Aboriginal title and the related traditional governance over Hul'qumi'num lands is
12 asserted, and a broader Marine Traditional Territory within which an Aboriginal right to fish and
13 to have jurisdiction in fisheries management based in traditional law are asserted.

14 Of particular relevance to TMJ is the portion of the Core Traditional Territory described as
15 including "the south arm of the Fraser River, including Canoe Pass, up to and including Douglas
16 Island, with lands on the north shore of the south arm up to Sapperton Channel (New
17 Westminster), the islands in the south arm of the Fraser River and the south bank of the Fraser
18 River along Canoe Pass up to Deas Island". The Hul'qumi'num Treaty Group also describes its
19 Traditional Fishing Territory as including the "Fraser River, from Strait of Georgia up Sawmill
20 Creek, north of Yale"¹⁹⁰.

21 Ts'uubaa-asatx Nation, along with other *Hul'qumi'num'* speaking groups, is understood to have
22 traditionally utilized the lands and waters on both sides of the Strait of Georgia as part of a
23 seasonal round. Ts'uubaa-asatx Nation have previously reported that they historically travelled
24 to the Fraser River delta area to fish, hunt, and gather food every year. They maintain that they
25 have an Aboriginal right to camp, fish, hunt, and gather food there based on historic use but
26 they do not currently use the area due to pollution. Ts'uubaa-asatx Nation reported to the EAO
27 that they are guests to the territory in lower Fraser River. They report that members historically
28 accessed the area for trade, fishing, weddings, seal hunting, and crab trapping. Traditional

¹⁸⁸ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Ts'uubaa-asatx, https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=643&lang=eng, accessed December 9, 2021.

¹⁸⁹ Hul'qumi'num Treaty Group Statement of Intent. BC Treaty Commission website. http://www.bctreaty.ca/sites/default/files/Hul-qumi-num_Treaty_Group_SOI_Map2.pdf, accessed May 29, 2019.

¹⁹⁰ Hul'qumi'num Treaty Group Statement of Intent. BC Treaty Commission website. <http://www.bctreaty.ca/sites/default/files/hul%27qumi%27num%202.pdf>, accessed May 28, 2019.

1 fishing practices exercised historically and currently include following the fish run from
2 Johnston Strait down through Georgia Strait and into the Fraser River¹⁹¹.

3 **14.2.2 TS'UUBAA-ASATX NATION'S INVOLVEMENT IN THE CONSULTATION** 4 **PROCESS**

5 The EAO is of the view that it has approached consultation with Ts'uubaa-asatx Nation at the
6 deeper end of the spectrum, with the intent to identify potential impacts and consider ways to
7 address potential impacts to any Aboriginal Interests in the project area identified by Ts'uubaa-
8 asatx Nation. As described in the EAO-Led Consultation Activities with Indigenous Groups
9 section of this Report, the EAO invited Ts'uubaa-asatx Nation to participate in the Working
10 Group.

11 The EAO set out its approach to consultation, including initial assessments of strength of claim
12 and potential impacts on Ts'uubaa-asatx Nation's Aboriginal Interests in a letter to
13 Ts'uubaa-asatx Nation dated June 18, 2015. Based on the Province's initial assessments,
14 Ts'uubaa-asatx Nation was consulted at the deeper end of the spectrum as set out in Schedule
15 B of the Section 11 Order for TMJ.

16 The EAO invited the Ts'uubaa-asatx Nation to review and provide comments on the draft
17 Section 11 Order, the draft VC Selection document, the draft AIR, TJLP's Aboriginal Consultation
18 Plan and Reports, the screening of the Application and on the Application and supplemental
19 material, as well as the opportunity to review and comment on several iterations of the EAO's
20 draft decision materials. As part of the EA Working Group, Ts'uubaa-asatx Nation was invited to
21 participate in technical meetings, teleconferences and site visits during the Pre-Application and
22 Application Review stages. During the review of TJLP's BVSA Report, Ts'uubaa-asatx Nation
23 participated in three Working Group meetings and raised concerns about potential effects of
24 additional bunker vessel calls on fish and fish habitat in the lower River, management of GHGs,
25 and cumulative effects to wildlife. Ts'uubaa-asatx Nation also indicated interest in the air
26 quality improvements that result from transitioning ships to LNG as a fuel from marine diesel.
27 Ts'uubaa-asatx Nation requested further information on the Port of Vancouver process
28 regarding bunkering regulations and where bunkering is occurring now and requested a
29 presentation from Port of Vancouver. Although Ts'uubaa-asatx Nation were unable to attend,

¹⁹¹ As reported to the EAO at a meeting with Lake Cowichan First Nation on July 6, 2018.

1 the Port of Vancouver gave a presentation to the Working Group on April 12, 2022, and the
2 meeting notes and presentation were shared with the Working Group.

3 The EAO met directly with Ts'uubaa-asatx Nation several times throughout the EA to
4 understand Ts'uubaa-asatx Nation's desired approach to consultation on the EA.
5 Ts'uubaa-asatx Nation shared information about their draft policy on the south arm of the
6 Fraser River, which identifies Ts'uubaa-asatx Nation's vision, goals, and approaches to the area,
7 noting that this does not replace the requirement for consultation.

8 TJLP began consulting with Ts'uubaa-asatx Nation in 2014 before entering the EA process,
9 through a letter introducing TJLP and TMJ. TJLP reports that consultation and information-
10 sharing events have included face-to-face meetings, letters, email exchanges and phone calls.
11 The EAO is aware that TJLP provided funding for
12 Ts'uubaa-asatx Nation for a TMJ-specific study regarding their Aboriginal Interests in the area of
13 TMJ, and also provided additional funding to support Ts'uubaa-asatx Nation's review of the
14 Application and other review stage consultation activities (e.g., review of TJLP's BVSA Report),
15 including participation in EAO-led Working Group meetings.

16 A summary of TJLP's engagement activities with the Ts'uubaa-asatx Nation members is
17 provided in the Application and in TJLP's Aboriginal Consultation Reports.

18 **14.2.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

19 The following sections focus on potential impacts of TMJ to Ts'uubaa-asatx Nation's Aboriginal
20 Interests. A discussion of the EAO's assessment approach is provided in the Impact Assessment
21 Methods section of Part C. The EAO considered the information available, including from public
22 sources as well as relevant issues raised by Ts'uubaa-asatx Nation and members during the EA
23 process (in meetings, letters and Working Group comments), in the following assessments of
24 the potential impacts of TMJ on Ts'uubaa-asatx Nation's Aboriginal Interests. The following
25 sections focus on potential impacts of TMJ to Ts'uubaa-asatx Nation's Aboriginal right to fish,
26 hunt, trap and gather, and mitigations and accommodations to address potential impacts.

27 **A. POTENTIAL IMPACTS ON FISHING**

28 Ts'uubaa-asatx Nation reported to the EAO that they are guests to the territory in lower Fraser
29 River¹⁹¹. Ts'uubaa-asatx Nation reported that that they used to travel to the Fraser River delta
30 to gather food, fish, and hunt every year, which would include where the TMJ site is proposed

1 today. During the Pattullo Bridge Replacement EA, Ts'uubaa-asatx Nation reported that their
2 members have not used the area since about 1960¹⁹².

3 In regard to the MSA area, Ts'uubaa-asatx Nation previously reported that one of their FSC
4 fishers harvested fish at the mouth of the Fraser River and Roberts Bank in two of the last three
5 years (as of 2015). Ts'uubaa-asatx Nation reported that two species of salmon have been
6 targeted at Roberts Bank; sockeye and spring with approximately 20-50 of each species
7 harvested annually (spring through fall).

8 Ts'uubaa-asatx Nation reported that members felt that it is not safe to harvest resources in the
9 Fraser River delta because of pollution¹⁹². Ts'uubaa-asatx Nation maintains that members have
10 an Aboriginal right to camp, fish, hunt and gather food there based on historic use. Ts'uubaa-
11 asatx Nation report that while they are not currently using the area to harvest resources, they
12 wish to exercise their rights in the area in the future, if the area was to be cleaned up and made
13 safe again. Ts'uubaa-asatx Nation describe the TMJ area as being too populated and polluted,
14 thus making it unsafe to fish, hunt or gather food.

15 Ts'uubaa-asatx Nation raised the following concerns regarding potential impacts on the right to
16 fish due to TMJ:

- 17 • Concern regarding the effect of TMJ on fish (including juvenile recruitment) and fish
18 habitat in the area, particularly juvenile sturgeon and eulachon, and concerns that the
19 DFO reduced-work window does not consider sturgeon.
20 Ts'uubaa-asatx Nation note that it often gets fish or fishes with the other Indigenous
21 Groups on the Fraser River and has a share in a commercial license.
 - 22 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of concerns
23 related to impacts to fish, including sturgeon. As discussed in section 2.3.1, the
24 proposed mitigation measures to address concerns about fish, including sturgeon,
25 are included in the recommended KMM under CEAA 2012 for Fish Mitigations to
26 Reduce Harm and Mortality, a Fish Habitat Offset Plan, and a follow-up program for
27 effectiveness of fish and fish habitat mitigations. Fish Mitigations to Reduce Harm
28 and Mortality, includes use of reduced-risk work windows, identification of, and

¹⁹² Ts'uubaa-asatx Nation. 2017. Pattullo Bridge Replacement Project, prepared by Haa'yuups, November 28, 2017, referenced in MoTI. 2018. Pattullo Bridge Replacement Project EAC Application, Part C Section 12.0 Aboriginal Consultation. [https://www.projects.eao.gov.bc.ca/api/public/document/5b7343562400e50024428f13/download/Section%2012.0 Aboriginal%20Consultation.pdf](https://www.projects.eao.gov.bc.ca/api/public/document/5b7343562400e50024428f13/download/Section%2012.0%20Aboriginal%20Consultation.pdf).

1 justification for, any work that would occur outside of the windows, monitoring for
2 fish presence during in-water works with criteria and triggers to modify or stop in
3 water works, and underwater noise monitoring and mitigation activities. The Fish
4 Habitat Offset Plan requires offsetting habitat to provide a higher value than the fish
5 habitat it is replacing, contingency measures and associated monitoring measures to
6 be put into place if the offsetting measures are not successful in offsetting the
7 residual loss or impacts on fish habitat resulting from TMJ, and monitoring measures
8 to assess effectiveness of the offsetting measures, until offset habitat meets
9 performance standard.

- 10 ● Concern regarding the effect of TMJ on eulachon in the area.
 - 11 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of concerns
12 related to impacts to eulachon. The EAO is recommending KMMs under CEEA 2012
13 for Fish Mitigations to Reduce Harm and Mortality, a Fish Habitat Offset Plan, and a
14 follow-up program as described above. The Fish and Fish Habitat Monitoring and
15 Mitigation Plan would also require monitoring outside of the DFO least risk window
16 (which includes eulachon) and additional mitigations measures.
 - 17 ● Concern regarding the reduction of access to the Fraser river and TMJ's marine terminal
18 area due to the warning signs and notifications regarding elevated public risk, in
19 particular when vessels would be berthing, loading, or de-berthing at TMJ.
 - 20 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of concerns
21 related to access to the fish harvesting areas in the lower Fraser River.
 - 22 ○ The EAO is recommending as KMMs under CEEA 2012 for a Marine Communications
23 Plan, a Marine Access and Transportation Plan and a Vessel Traffic Management
24 Plan. These plans would identify the procedures of communication to Indigenous
25 Groups and identification of mitigations to reduce disruptions caused by
26 Construction and Operations for members of Indigenous Groups to carry out
27 traditional use activities including fishing for FSC purposes.
- 28 ● As described in [Section 13.3.1.1.3](#), Ts'uubaa-asatx Nation raised concerns that TJLP's BVSA
29 Report does not include a socio-economic assessment, and that under the BVS the Project
30 could have effects on vegetation, cultural heritage and archaeology sites, noise, GHGs, and
31 wildlife habitat. The EAO also heard from Ts'uubaa-asatx Nation there is concern regarding
32 how the additional bunker vessel calls may affect juvenile recruitment of white sturgeon
33 and eulachon in the lower Fraser River. Ts'uubaa-asatx Nation has noted that Indigenous
34 people are voluntarily not fishing sturgeon to conserve the stock.

- 1 ○ The EAO evaluated the potential for BVS-related changes to relevant pathways of
2 effects on the biophysical, geospatial, and other social, cultural, experiential sub-
3 components of Aboriginal fishing rights summarized in [Section 13.3.1.2](#) and is
4 satisfied that those findings would apply to Ts'uubaa-asatx Nation. The EAO's
5 response to concerns and issues raised by Indigenous Groups regarding the BVSA can
6 be found in the Fish and Fish habitat section of Part B ([Section 5.6](#)) as well as in
7 [Section 13.3.1.1.3](#) of Part C.
- 8 ○ As described in [Section 13.3.2](#) and [Section 13.3.3](#) of Part C the EAO did not identify
9 any changes to relevant pathways of effects to Aboriginal interests related to any
10 socio-economic VCs, vegetation, cultural heritage, archeology sites, noise, GHG
11 management, and wildlife, marine birds, or wildlife habitat.

12 **14.2.3.1.1 Conclusion**

13 In consideration of the available information, the EAO's consultation with Ts'uubaa-asatx
14 Nation, Ts'uubaa-asatx Nation's engagement with TJLP, TJLP's commitments, the EAO's
15 proposed EAC conditions if an EAC is issued and recommended KMMs under CEAA 2012, TMJ is
16 expected to result in a minor impact on Ts'uubaa-asatx Nation's right to fish.

17 The key factors that were considered in support of the EAO's conclusion on the impacts to the
18 right to fish are summarized as follows:

19 **Biophysical:**

- 20 • The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would have
21 potential to result in low to moderate magnitude residual effects to fish and fish habitat
22 at the TMJ site, and low magnitude residual effects to sturgeon from vessel strikes. The
23 EAO did not predict residual effects to fish in the MSA area; and
- 24 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed. The
25 MSA area is a heavily utilized marine environment.

26 **Geospatial (places, sites and access):**

- 27 • During construction, access to the TMJ site would be restricted for three years. During
28 operations, Indigenous mariners and fishers would avoid entering and remaining in the
29 marine terminal area due to the warning signs and notifications regarding elevated
30 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ.
31 At the scale of the LAA and RAA this would amount to a low magnitude impact to access
32 from impacts at the TMJ site;

- 1 • The EAO's conclusions in the Current Use chapter in Part B found that TMJ-related
2 vessel transits would have negligible to low magnitude effect to access to fishing
3 compared to baseline numbers of vessel transits, that could be experienced as higher in
4 the Fraser River as a change from baseline compared to Salish Sea. This effect would be
5 due to and the regularly occurring (i.e., average of one vessel call per day under the
6 BVS), short-duration vessel movements to pass through known fishing areas in the
7 Fraser River and Salish Sea; and
- 8 • Ts'uubaa-asatx Nation seeks to resume fishing in the Fraser River.
- 9 • Specific to the BVS there is potential for higher frequency of interactions to occur
10 between TMJ-related vessels and Indigenous Groups engaging in vessel-based FSC
11 fishing in the lower Fraser River during FSC fishing windows. This effect would apply to
12 Ts'uubaa-asatx Nation should members engage in vessel based FSC fishing activities in
13 the lower Fraser River in the future.

14 **Social, Cultural and Experiential:**

- 15 • As outlined in the Current Use of Lands and Resources for Traditional Purposes and
16 Cultural Heritage assessment in Part B, potential negligible to low magnitude impacts to
17 the experiential aspect of fishing in the vicinity of the TMJ site and Salish Sea due to a
18 change in noise and visual quality during construction and to changes in visual quality
19 and potential concerns regarding safety during operations in the Fraser River and Salish
20 Sea.

21 **Mitigations:**

- 22 • Proposed mitigations for potential impacts to Ts'uubaa-asatx Nation's right to fish
23 include mitigations to reduce impacts to noise and visual quality in the CEMP and OEMP
24 as well as the recommended key mitigations under CEAA 2012, specifically the Fish and
25 Fish Habitat Monitoring and Mitigation Plan, the Fish Habitat Offset Plan, the Marine
26 Communication Plan, the Marine Access and Transportation Plan and the Vessel Traffic
27 Management Plan.

28 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

29 During the EA for the Pattullo Bridge Replacement Project, Ts'uubaa-asatx Nation reported to
30 the EAO that they are guests to the territory in lower Fraser River¹⁹¹. Ts'uubaa-asatx Nation
31 reported that that they used to travel to the Fraser River delta to gather food, fish, and hunt
32 every year, which would include where the TMJ site is proposed today. Ts'uubaa-asatx Nation
33 reported that members do not hunt in the area because population density and proximity make
34 the use of firearms patently unsafe, and because of industrial pollution¹⁹².

1 Ts'uubaa-asatx Nation maintained that they have an Aboriginal right to camp, fish, hunt, and
2 gather food in the Fraser River delta area based on historic use¹⁹². Ts'uubaa-asatx Nation
3 reported that, while they are not currently using the area to harvest resources, they wish to
4 exercise their rights in the area in the future if the area was to be cleaned up and made safe
5 again. In regard to the MSA area, Ts'uubaa-asatx Nation members reported harvesting eelgrass
6 at Roberts Bank in the intertidal zone as well as harvesting ducks, specifically mallards and
7 coots. They have previously expressed concern regarding the diminishing numbers of these and
8 other marine birds.

9 Ts'uubaa-asatx Nation expressed the desire to guard, maintain, and protect
10 Ts'uubaa-asatx Nation's traditional historical access and rights to the Fraser River delta area
11 into the future. They also raised the issue that they would like to see the areas restored to a
12 healthy state.

13 Ts'uubaa-asatx Nation raised the following concerns regarding potential impacts on the right to
14 hunt, trap and gather due to TMJ:

- 15 • Concerns regarding noise disturbance and light pollution acting as a stressor to wildlife,
16 weakening their immune systems, disturbing migration patterns, and disorienting them
17 during daily activities.
- 18 ○ See [Section 13.3.2](#) for a detailed discussion of the analysis and resolution of concerns
19 related to effects of noise and light on wildlife. As discussed in that section, the
20 proposed mitigation measures to address the effects of noise and light on wildlife
21 include the Wildlife Habitat Management Plan, and light and noise management
22 components of the CEMP and OEMP, all of which would require consultation with
23 Indigenous Groups. The EAO is also proposing these mitigations as KMMs under
24 CEAA 2012 which would include the requirements for lighting, noise and wildlife and
25 wildlife habitat management and monitoring.

26 The EAO evaluated the potential effects on hunting, trapping, and gathering rights attributable
27 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
28 [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical components resulting in
29 changes to wildlife and vegetation quantity and quality, changes in access to hunting, trapping
30 and gathering areas, and changes to social, cultural, and spiritual values associated with
31 traditional hunting, trapping and gathering activities summarized in that section apply to
32 Ts'uubaa-asatx Nation.

1 **14.2.3.1.2 Conclusion**

2 In consideration of the available information, consultation with Ts'uubaa-asatx Nation,
3 Ts'uubaa-asatx Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
4 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
5 to result in a negligible impact on Ts'uubaa-asatx Nation's right to hunt, trap and gather.

6 The key factors that were considered in support of the EAO's conclusion on the impacts to the
7 right to hunt, trap and gather are summarized as follows:

8 **Biophysical:**

- 9 • The EAO's conclusions at the TMJ site on adverse residual effects to Wildlife and Wildlife
10 Habitat and Vegetation (see respective sections in Part B) indicate negligible to low
11 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
12 from noise and light, and mortality; as well as low magnitude residual effects on
13 wetland and riparian ecosystems;
- 14 • The EAO's conclusions in the MSA area on adverse residual effects to Marine Birds (see
15 Wildlife section in Part B) indicate negligible to low magnitude residual effects related to
16 mortality;
- 17 • Terrestrial wildlife species of cultural importance to Ts'uubaa-asatx Nation have either
18 not been found within the TMJ site or are not anticipated to be affected by the TMJ-
19 related activities; and
- 20 • In the MSA area, Ts'uubaa-asatx Nation members reported harvesting eelgrass as well
21 as harvesting ducks, specifically mallards and coots.

22 **Geospatial (places, sites and access):**

- 23 • Ts'uubaa-asatx Nation do not currently harvest in the TMJ area but seek to re-establish
24 harvesting practices in the area;
- 25 • In the MSA area, Ts'uubaa-asatx Nation members reported harvesting eelgrass as well
26 as ducks, specifically mallards and coots, at Roberts Bank;
- 27 • Construction (just over three years in duration) and operation (30 years) is unlikely to
28 cause disruptions to Ts'uubaa-asatx Nation's access to areas traditionally used for
29 hunting, trapping, and gathering activities at the TMJ site or in the MSA area; and
- 30 • The upland portion of the TMJ site is situated on fee simple (private) land.

31 **Social, Cultural and Experiential:**

- 1 • Potential impacts to experience in the vicinity of the TMJ site and along the shipping
2 route due to a change in noise and visual quality, as described in Part B, during
3 construction and operations which are anticipated to be negligible to low in magnitude
4 in the Fraser River and Salish Sea.

5 **Mitigations:**

- 6 • Proposed conditions to mitigate impacts to Ts'uubaa-asatx Nation's right to hunt, trap
7 and gather are the vegetation and wetland management, wildlife and wildlife habitat
8 management, light management, and noise management components of the CEMP and
9 OEMP, all of which would require consultation with Indigenous Groups. The EAO is also
10 proposing these mitigations as KMMs under CEEA 2012 which would include the
11 requirements for vegetation and wetland creation and restoration, lighting, noise and
12 wildlife and wildlife habitat management and monitoring; and
- 13 • All vessels would adhere to the Marine Regulations and Legislation regulating vessel
14 noise and lighting.

15 **C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS**

16 Ts'uubaa-asatx Nation reported to the EAO that they are guests to the territory in lower Fraser
17 River¹⁹¹. Ts'uubaa-asatx Nation stated that they historically enjoyed a right to visit the area of
18 the Fraser River delta on an annual basis. These annual visits are said to have involved setting
19 up camps to fish, hunt and visit relatives in the area.

20 Ts'uubaa-asatx Nation reported that that they are locating members that dispersed in the wake
21 of the residential school era, and well over 100 individuals with Ts'uubaa-asatx ancestry have
22 been located to date¹⁹². Several of these individuals have expressed interest in returning to the
23 community on Cowichan Lake. Ts'uubaa-asatx Nation expects that the community will grow
24 and have expressed their desire for their returning members to learn about and be able to
25 exercise their rights in the Fraser River delta area.

26 Ts'uubaa-asatx Nation raised the following concerns regarding potential impacts on other
27 traditional and cultural interests due to TMJ:

- 28 • Concern regarding the potential impact TMJ would have on *Tl'uqtinus* which is located
29 across from the TMJ site. Ts'uubaa-asatx Nation notes that there were historically
30 houses on both sides of the river and Ts'uubaa-asatx Nation used to travel there for
31 trade. This was, and continues to be, an important area to Ts'uubaa-asatx Nation.
- 32 ○ See [Section 2.3.3](#) for a detailed discussion of the analysis and resolution to concerns
33 regarding access and use of the *Tl'uqtinus* Lands. Proposed provincial conditions to

- 1 mitigate impacts to cultural heritage are the development of the Cultural and
2 Archaeological Resources Management Plan for the TMJ site, the Lighting
3 Management, Noise and Vibration Management and Air Quality Management as part
4 of the CEMP and OEMP as well as the Water Quality Management Plan and the
5 Indigenous Cultural Awareness and Recognition Condition, and the recommended
6 KMMs under CEAA 2012 for the Marine Access and Transportation and Marine
7 Communications Plans.
- 8 ○ The Marine Access and Transportation Plan would include a description of
9 mitigations to reduce disruptions caused by construction and operations for
10 members of Indigenous Groups to carry out traditional use activities. The Vessel
11 Traffic Management Plan would include speed limits, where safe, within the Fraser
12 River and MSA area, and commit TMJ-related vessels to following established
13 shipping routes and maintaining a constant course.

14 The cultural importance and role of SRKW as an indicator of cultural health of the ecosystem
15 was identified by Ts'uubaa-asatx Nation during the Robert's Bank Terminal 2 Panel process.
16 Through the RBT2 process, Ts'uubaa-asatx Nation described SRKW as culturally important,
17 including being featured in stories, legends, cultural transmission through teaching stories.

18 **14.2.3.1.3 Conclusion**

19 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
20 impacts Ts'uubaa-asatx Nation's other cultural and traditional interests, although EAO
21 acknowledges that there is uncertainty in the relationship between incremental increases in
22 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
23 the available information in [Section 13.3.3](#), the EAO's consultation with Ts'uubaa-asatx Nation,
24 Ts'uubaa-asatx Nation's engagement with TJLP, TJLP's commitments and the EAO's proposed
25 EAC conditions if an EAC is issued, the EAO concludes that TMJ-related marine shipping effects
26 combined with cumulative effects in the MSA area is expected to result in a moderate-to-
27 serious impact on Ts'uubaa-asatx Nation's other traditional and cultural interests. The EAO's
28 conclusions of significant cumulative effects to SRKW was a major key factor considered in the
29 EAO's seriousness determination. The EAO notes several regional initiatives and measures have
30 been implemented by the Government of Canada to better understand and manage cumulative
31 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

32 The key factors that were considered in support of the EAO's conclusion on the impacts to
33 other traditional and cultural interests are summarized as follows:

1 Cultural and Heritage Resources:

- 2 • The EAO's conclusions in the Heritage Resources section of Part B found no residual
3 effects to Heritage Resources ([Section 7.1](#)) from erosion due to wake effects along the
4 shorelines of the Fraser River in the RAA or in the MSA area;
- 5 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
6 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
7 cumulative effects to SRKWs due to underwater noise; and
- 8 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed. The
9 MSA area is a heavily utilized marine environment. These factors increase the
10 seriousness of impact of TMJ.

11

12 Geospatial (places, sites, and access):

- 13 • Construction and operation are unlikely to cause disruptions to Ts'uubaa-asatx Nation's
14 access to *Tl'uqtinus* Lands identified by Ts'uubaa-asatx Nation in the Fraser River area;
- 15 • During construction, access to the TMJ site would be restricted for three years. During
16 operations, Indigenous mariners and fishers would avoid entering and remaining in the
17 marine terminal area due to the warning signs and notifications regarding elevated
18 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ;
- 19 • The small number of TMJ-related vessels relative to current vessel traffic are predicted
20 to have a negligible to low effect on cultural activities in the MSA area in terms of access
21 from relatively infrequent and short duration transit of vessels to and from TMJ's marine
22 terminal area.

23 Social, Cultural, Experiential:

- 24 • The EAO's conclusions in the Noise assessment in Part B found sensory disturbances
25 from noise are anticipated to be negligible to low magnitude, temporary and short-
26 term, including up to low magnitude noise effects during construction and
27 decommissioning at the village site at *Tl'uqtinus*;
- 28 • The EAO's conclusions in the Visual Quality assessment in Part B found a negligible to
29 low impact to the existing visual landscape character in the Fraser River and in the MSA
30 area;
- 31 • Potential negligible impacts from TMJ-related vessel traffic during operations affecting
32 visual quality, noise, and vessel wake (with an increasing magnitude of effect the closer
33 one is to the vessels); and

- 1 • The cultural importance of SRKWs to
2 Ts'uubaa-asatx Nations.

3 **Mitigations:**

- 4 • Proposed provincial conditions to mitigate impacts to cultural heritage are the
5 development of the Cultural and Archaeological Resources Management Plan for the
6 TMJ site, the Lighting Management, Noise and Vibration Management and Air Quality
7 Management as part of the CEMP and OEMP as well as the Water Quality Management
8 Plan and the Indigenous Cultural Awareness and Recognition Condition;
- 9 • *Heritage Conservation Act* (RSBC 1996, c. 182); and
- 10 • Proposed mitigations for potential impacts to traditional and cultural interests are the
11 recommended key mitigations under CEAA 2012 for a Marine Communications, and
12 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
13 Program.

14 **D. POTENTIAL IMPACTS ON TITLE**

15 The assessment of impacts to Aboriginal title was informed by the relevant information
16 presented above and below. It is also informed by the EAO's assessment of effects to VCs that
17 informed the discussion of impacts to vegetation, wildlife, fishing, hunting, trapping, and
18 gathering, and other traditional and cultural interests. The Ts'uubaa-asatx Nation raised a
19 concern regarding potential impacts on Aboriginal title due to TMJ did not give adequate
20 consideration of ability of the impacts to impact Ts'uubaa-asatx Nation's right to obtain
21 economic benefit through commercial fishing.

22 Potential TMJ impacts on Ts'uubaa-asatx Nation title are assessed below, including the
23 following information.

- 24 ○ The EAO's conclusions on Current Use of Lands for Traditional Purposed in Part B of
25 this Report ([Section 11.4](#)), that regularly occurring (i.e., an average of one vessel call
26 per day under the BVS) vessel transits with shortduration to pass through known
27 fishing areas in the Fraser River and Salish Sea would likely cause negligible to low
28 magnitude effects to access to fishing.
- 29 ○ TJLP has stated that TJLP's influence on TMJ-related vessel operations would be
30 limited beyond TMJ's marine terminal area, but TJLP is committed to adjusting their
31 shipping schedule when safe and feasible to do so in order to reduce the likelihood
32 of TMJ-related vessels interrupting FSC openings in the lower Fraser River through
33 the Marine Access and Transportation Plan.

- 1 ○ The EAO is recommending KMMs under CEAA 2012 for the Marine Access and
2 Transportation Plan and the Marine Communications Plan from Sand Heads out to 12
3 nm that would be developed in consultation with Schedule B and D Indigenous
4 Groups and include a communication procedure for TJLP to inform Indigenous
5 Groups of vessel schedules and provide a complaint submission process.

6 **14.2.3.1.4 Conclusion**

7 In consideration of the available information, the EAO's consultation with Ts'uubaa-asatx
8 Nation, Ts'uubaa-asatx Nation's engagement with TJLP, TJLP's commitments and the EAO's
9 proposed EAC conditions if an EAC is issued, TMJ is expected to result in a minor impact
10 Ts'uubaa-asatx Nation's Aboriginal title.

11 The key factors that were considered in support of the EAO's conclusion on the impacts to
12 Aboriginal title are summarized as follows:

13 **Use and Occupation:**

- 14 • The access restrictions to the area surrounding the jetty during construction would be
15 limited in area (to a maximum of area of 23 ha during dredging over 50 days; and then a
16 smaller area for work on the jetty thereafter);
- 17 • The EAO assumed that Indigenous mariners and fishers would avoid entering and
18 remaining in the marine terminal area due to the warning signs and notifications
19 regarding elevated public risk, in particular when vessels would be berthing, loading, or
20 de-berthing at TMJ. The increase in vessel traffic along the Fraser River would be a small
21 percentage increase from traffic already present; and
- 22 • The increase in vessel traffic along the Fraser River would be a small percentage
23 increase from traffic already present.

24 **Control of Area:**

- 25 • The area of development for the TMJ jetty is crown land (intertidal submerged).

26 **Economic Benefits:**

- 27 • TMJ is located on private land already zoned and developed for industrial usage; and
- 28 • The construction and operation of the TMJ jetty and the vessel traffic to and from TMJ
29 in the Fraser River is unlikely to affect Ts'uubaa-asatx Nation's overall economic
30 development aspirations for the area now and in the future. However, there may be
31 minor economic impacts to Ts'uubaa-asatx Nation's harvesting of fish.

1 **Mitigations:**

- 2 • Several conditions are proposed to mitigate impacts to Aboriginal title, including a
3 condition for Indigenous Cultural Awareness and Recognition, Cultural and
4 Archaeological Resource Management Plan, Indigenous Monitors, Engagement and
5 Reporting, Indigenous Training, Employment and Procurement Plan, Water Quality
6 Management Plan, and Indigenous Monitors. The EAO is also recommending Marine
7 Access and Transportation and Marine Communication Plans as a KMM under CEEA
8 2012 to reduce impacts to access from construction and operations.

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2 14.3 KWANTLEN FIRST NATION

The EAO acknowledges Kwantlen First Nation has written and submitted to the EAO their own impacts to rights assessment for inclusion into the final Part C of the referral materials. Following Kwantlen First Nation's review of TJLP's Bunkering Vessel Scenario Assessment (BVSA) Report, and during development of Kwantlen First Nation's revised impact to rights assessment, the EAO will continue to engage with Kwantlen First Nation to discuss and better reflect the potential for TMJ to impact Kwantlen First Nation's Aboriginal Interests in the Part C of the EAO's Assessment Report for TMJ. Kwantlen First Nation's Part C chapter will be included in the final Assessment Report that is submitted to Ministers for decision and will be posted on the EAO's ePIC website.

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1 14.4 MUSQUEAM INDIAN BAND

2 14.4.1 COMMUNITY PROFILE

3 Musqueam Indian Band is a Central Coast Salish First Nation whose asserted traditional
4 territory includes part of the Lower Mainland area in BC, including sections of the Fraser River
5 and the Strait of Georgia. Musqueam Indian Band has Aboriginal Interests within this territory,
6 including a proven Aboriginal right to fish as established in the *Sparrow* decisions, which are
7 protected under section 35 of the *Constitution Act*, 1982. Musqueam Indian Band's identity and
8 livelihood are intrinsically linked to their traditional territory and that their core teaching
9 reflects the necessity of stewardship responsibilities, and of knowing who you are and where
10 you come from. *x^wməθk^wəyám* translates to "Place of *məθk^wəy*", signifying the *məθk^wəy* plant,
11 that once grew in abundance in the Fraser River delta and tidal flats (Musqueam, 2018)¹⁹³.
12 Musqueam Indian Band oral histories describe the delta as it was over 9,000 years ago, and that
13 these oral histories are buttressed by radiocarbon dating at *səwǫ^weqsən* located around the
14 southern foundation of the Alex Fraser Bridge and studies of the sedimentation pattern of the
15 Fraser River delta.

16 Musqueam Indian Band assert Aboriginal title over their traditional territory. The 1976
17 Musqueam Declaration identifies a core territory of approximately 144,888 ha¹⁹⁴, which
18 encompasses the lands, lakes and streams defined and included by a line commencing at
19 Harvey Creek in Howe Sound and proceeding eastward to the height of land and continuing on
20 the height of land around the entire watershed draining into English Bay, Burrard Inlet and
21 Indian Arm; south along the height of land between Coquitlam River and Brunette River to the
22 Fraser River, across to the south or left bank of the Fraser River and proceeding downstream
23 taking in the left bank of the main stream and the South Arm to the sea, including all those
24 intervening lands, islands and waters back along the sea shore to Harvey Creek, and the sea, its
25 reefs, flats, tidal lands and islands adjacent to the above described land and out to the centre of
26 the Salish Sea (Strait of Georgia)¹⁹⁵. TMJ would be within Musqueam Indian Band's

¹⁹³ Musqueam Indian Band. 2018. Musqueam Indian Band Knowledge and Use Study for WesPac Midstream's Proposed LNG Marine Jetty Project.

¹⁹⁴ Musqueam Indian Band. 2007. Musqueam Community Profile: Knowing our Past, Exploring our Future.

¹⁹⁵ Musqueam Indian Band. 1976. *Musqueam Declaration*. Musqueam Indian Band.

http://www.musqueam.bc.ca/sites/default/files/musqueam_declaration.pdf.

1 Consultation, Accommodation, Resources Access (CARA) Boundary, which is the boundary that
2 Musqueam Indian Band provided to BC identifying areas for consultation. Musqueam Indian
3 Band has communicated to the EAO that TMJ is in Musqueam Indian Band's core territory.
4 Musqueam Indian Band described to the EAO that Aboriginal title is a fundamental aspect of
5 Musqueam identity and culture. Musqueam has not signed a treaty or otherwise surrendered
6 or ceded its Aboriginal title within Musqueam's territory, as described in the 1976 Musqueam
7 Declaration. Musqueam described its Aboriginal title as including the right to proactive
8 governance and control over Musqueam lands and resources - in short, the right to choose how
9 Musqueam title lands will be used, the right to manage Musqueam title lands, and the right to
10 the economic benefits of Musqueam title lands.

11 Musqueam Indian Band has reported that their oral tradition establishes ancestral connections
12 to these lands and waters, including the TMJ area since time immemorial¹⁹⁶. Musqueam Indian
13 Band's territory is described and known to them in a matrix of over 125 place names, but
14 Musqueam Indian Band noted that that this is likely a low (conservative) estimate of the
15 number of place names because many are not public. To Musqueam Indian Band these places
16 are not limited to settlements (seasonal and winter), landscape features, and transformer sites,
17 but also act as store houses of knowledge for oral traditions and histories of both individuals
18 and Musqueam society as a whole. Musqueam Indian Band reported histories describe the
19 delta as it was 9,000 years ago, a time when the Fraser River delta was only water, before its
20 current sedimentation, and are confirmed by radiocarbon dating at *səwq'wəqsən* and studies of
21 the sedimentation pattern of the Fraser River delta¹⁹⁶.

22 Musqueam Indian Band informed the EAO that Musqueam Indian Band's location at the mouth
23 of the Fraser River Delta is deeply entwined with Musqueam Indian Band's oral histories and
24 cultural identity. At the time of contact, Musqueam Indian Band's exercised rights and control
25 over salmon harvesting and other resource-harvesting areas in the lower Fraser River, and
26 specific protocols were in place to control and regulate access by outside Nations to these areas
27 based on kinship and inter-village ties. Musqueam Indian Band informed the EAO that a
28 protocol exists whereby other Indigenous groups seeking access to waterways and resources in
29 Musqueam Indian Band territory apply for permission through the Musqueam Fisheries
30 Department.

¹⁹⁶ Roy, Susan. (2007). "Who were these mysterious people?": the Marpole Midden, Coast Salish identity, and the dispossession of Aboriginal lands in British Columbia (T). University of British Columbia. Retrieved from <https://open.library.ubc.ca/collections/ubctheses/831/items/1.0076891>

1 As of November 2021, Musqueam Indian Band has 1,472 registered members, with 677
2 registered members living on reserve¹⁹⁷. Musqueam Indian Band presently has three reserves,
3 located approximately 10 to 14 km from the TMJ site, accounting for approximately 0.2 percent
4 (338 ha) of their core identified territory:

- 5 • Musqueam IR2 is the largest reserve, also known as the ‘Musqueam Indian Reserve,’
6 located south of Marine Drive at the mouth of the North Arm of the Fraser River;
- 7 • Sea Island IR3 is located opposite of Musqueam IR2 on the northwest corner of Sea
8 Island at the outlet of the north arm of the Fraser River; and
- 9 • Musqueam IR4 is located in Ladner¹⁹⁸.

10 The diversity of resources available to, and used by, Musqueam Indian Band people along the
11 Fraser River were extensive, but strongly centered around fish, which were depended on for a
12 major portion of their annual diet, as well as for surpluses that could be traded (Musqueam,
13 2018). Salmon and other fish species (for example, sturgeon and eulachon) have been and
14 continue to be an integral part of Musqueam life, language, culture, and economic systems for
15 Musqueam Indian Band^{193,194}.

16 There are multiple runs of each species targeted by Musqueam Indian Band fishers and
17 Musqueam Indian Band people processed fish and other food for storage to last throughout
18 cooler months, including salmon, sturgeon, eulachon, clams, berries, ducks, and crab apples
19 (stored in rainwater). Fishing areas and camps where fish was processed and dried are recorded
20 along the Fraser River delta, and along the banks of the Fraser River, as well as at the mouth of
21 the Coquitlam River¹⁹³. Musqueam Indian Band report that, historically, they fished the Fraser
22 River from the open ocean up towards Barnston Island and Pitt Lake¹⁹³.

23 Musqueam Indian Band fishing occurs over a wide geographical area, including all arms of the
24 lower Fraser River, and that the lower Fraser River is where the majority of Musqueam Indian
25 Band’s FSC fishing is conducted¹⁹³. Musqueam Indian Band fishers highlighted that different
26 areas of the lower Fraser River are used for fishing at different times, depending on the
27 complex interaction of each area with dynamic environmental factors and the target species of

¹⁹⁷ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Musqueam Indian Band. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=550&lang=eng, accessed December 13, 2021.

¹⁹⁸ Musqueam Indian Band. 2011. *Musqueam First Nation: A Comprehensive Sustainable Community Development Plan*. Musqueam Indian Band. And AANDC. 2015. First Nation Profiles. http://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNReserves.aspx?BAND_NUMBER=550&lang=eng.

1 fish to be harvested. Musqueam Indian Band explained that for this reason, all reaches of the
2 lower Fraser are highly important to Musqueam Indian Band fishing¹⁹³.

3 Musqueam Indian Band members continue to have a deep connection to many fish species;
4 however, decreases in the availability of sturgeon, eulachon, and shellfish has increased
5 Musqueam Indian Band reliance on the salmon fishery¹⁹³. Musqueam Indian Band also report
6 decreased access and availability for sockeye, Coho, and Chinook, which is shifting Musqueam
7 Indian Band to have greater reliance on crab and prawn for FSC purposes. Members desire to
8 harvest these, and other, species once stocks reach harvestable levels and issues of
9 contamination have been addressed¹⁹³.

10 Stewardship is central to being Musqueam, noting that members are continuously innovating
11 and taking measures to restore wild resources, including through selective fishing measures
12 and self-imposed restrictions on harvesting¹⁹³. From Musqueam's perspective, it can be difficult
13 to separate out each individual species, as separate VCs, from the other interrelated elements
14 of Musqueam territory. Musqueam people see themselves as belonging to the earth, as a child
15 belongs to their mother, which comes with a responsibility for care that extends to SRKW,
16 salmon, sturgeon, eulachon, and all other species. For Musqueam, this care or stewardship
17 responsibility carries its own cultural significance and contributes to Musqueam sense of
18 identity. Musqueam's Sense of Place and Identity and Cultural Continuity are intrinsically linked
19 to the health and wellbeing of all interrelated elements of Musqueam territory.

20 Musqueam Indian Band reported in the KUS prepared for the RBT2 panel hearings (noted in the
21 TMJ MSA) that fishing in the ocean and the Fraser River was important to them and fishing
22 values were reported in the LSA of their KUS for RBT2 which overlaps with RBT2 shipping
23 channels. Musqueam Indian Band reported that marine invertebrates (e.g., bivalves, abalone,
24 octopus, sea urchins, sea cucumber, etc.) are harvested within Musqueam Indian Band
25 traditional territory and crabbing occurs extensively in the shallow flats of the Salish Sea.
26 Musqueam Indian Band report that kelp continues to be an important food and medicinal
27 plants and that they must now trade for it either because it cannot be found, or it is avoided
28 due to contamination concerns. For Musqueam, *q̓əl̓t̓al̓m̓ac̓ən* (Orcas) and specifically SRKWs,
29 are a culturally and spiritually significant species through their importance to Musqueam's
30 cultural heritage and current use of land and resources for traditional purposes.

31 Musqueam Indian Band hunted terrestrial and marine mammals and birds, such as deer, elk,
32 waterfowl, and whales throughout their territory¹⁹³. Douglas Island, and some marshes in
33 Richmond were identified as key areas for hunting and habitat¹⁹³. Members recall how they
34 have hunted within areas of Metro Vancouver (e.g., Burns Bog) within their lifetimes¹⁹³.

35 Musqueam Indian Band have said that hunting remains an important activity for both
36 subsistence purposes and for Musqueam Indian Band culture, and that the site-specific data

1 indicates that they have used and continue to use the Study Area (Knowledge and Use Study
2 Area) defined in the Musqueam Indian Band Knowledge and Use Study for hunting¹⁹³.

3 Musqueam Indian Band reported that:

4 *“The act of hunting itself continues to be a crucial aspect of Musqueam identity, culture,*
5 *and society. Hunted species are still sought for ceremonial (e.g., bird feathers often appear*
6 *in ceremonies) and subsistence purposes. As with other traditional subsistence activities,*
7 *hunting is also a highly social event, from hunting knowledge transmission and*
8 *preparation to success, to the sharing and distribution of meat, to the consumption of*
9 *hunted resources, such as in community gatherings where they are a staple.”* (p. 107-108)

10 Musqueam Indian Band have reported that plants such as broad leaf maple were harvested to
11 create paddles or poles, yew was used to fashion bows, while alder served to smoke-dry fish or
12 clams, and Western red cedar—particularly abundant in the New Westminster area until at
13 least the mid-nineteenth century—was used to make baskets and other material goods (for
14 example, canoes, bailers) that were sometimes traded at a European village site in the Pattullo
15 Bridge area, upstream of the TMJ area¹⁹³. Root plants, raspberries, berries, camas, salal and
16 medicinal plants such as hemlock and wild licorice were also noted in the written records of
17 European explorers as highly valued and used.

18 **14.4.2 MUSQUEAM’S INVOLVEMENT IN THE CONSULTATION PROCESS**

19 The EAO set out its approach to consultation, including an initial assessment of strength of
20 claim and potential impacts on Musqueam Indian Band’s Aboriginal Interests in a letter to
21 Musqueam Indian Band dated June 18, 2015. Based on the Province’s initial strength of claim
22 assessment, Musqueam Indian Band was consulted at the deeper end of the spectrum as set
23 out in Schedule B of the Section 11 Order for TMJ. The EAO led consultation activities with the
24 Indigenous Groups identified in Schedule B and, as part of this work, invited Musqueam Indian
25 Band to participate in the Working Group. As part of the Working Group, the EAO invited
26 Musqueam Indian Band to review and provide comments on TJLP’s Application and MSA
27 Supplemental Analysis, the EAO’s draft Assessment Report (including Part C of the Assessment
28 Report), the draft CPD, draft provincial Certificate Conditions and the draft KMMs
29 recommended under CEAA 2012.

30 The EAO has consulted Musqueam Indian Band based on the feedback received from during the
31 EA for TMJ. To this end, the EAO revised its draft referral materials to include additional
32 information related to Musqueam Indian Band’s perspectives on the EA consultation process
33 and key concerns raised by Musqueam Indian Band regarding cumulative effects and TMJ-
34 related impacts to Musqueam Indian Band’s Aboriginal Interests. The EAO is of the view that it
35 has approached consultation with Musqueam Indian Band with the intent to identify potential

1 impacts and consider ways to address any potential impacts to any Aboriginal Interests in the
2 project area identified by Musqueam Indian Band.

3 During the EA process, the EAO and Musqueam Indian Band discussed TMJ concerns and
4 sought to understand, address, and resolve issues. The EAO invited Musqueam Indian Band to
5 review and provide comments on the draft Section 11 Order, the draft VC Selection document,
6 the draft AIR, TJLP's Aboriginal Consultation Plan and Reports, the screening of the Application
7 and on the Application and supplemental material, as well as the opportunity to review and
8 comment on several iterations of the EAO's draft decision materials. As part of the EA Working
9 Group, Musqueam Indian Band also participated in technical meetings, teleconferences, and
10 site visits (February 2016 and October 2018) during the Pre-Application and Application Review
11 stages.

12 The EAO met with Musqueam Indian Band prior to, and at the beginning of Application Review
13 (January 25, April 29, and May 4, 2019) to understand Musqueam Indian Band's desired
14 approach to consultation on the EA. The EAO and Musqueam Indian Band agreed to engage in
15 an iterative review of the Application and the EAO's referral materials. To support this iterative
16 and in-depth review process, the EAO provided additional capacity funding to support
17 Musqueam Indian Band's participation in collaborative undertakings, and a joint workplan was
18 agreed to that identified key meetings throughout the process.

19 During Application Review, the EAO and Musqueam Indian Band regularly discussed concerns
20 over the phone and in person and worked together to find appropriate dates for working group
21 meetings, revise meeting minutes, revise the workplan and discuss appropriate review
22 timelines. The EAO and Musqueam Indian Band endeavored to work cooperatively to find
23 mutually agreeable solutions and timelines.

24 TJLP began consulting with Musqueam Indian Band in February 2014, before entering the EA
25 process. TJLP reports that consultation and information-sharing events have included multiple
26 meetings, letters, email exchanges and phone calls. A summary of TJLP's engagement activities
27 with Musqueam Indian Band is provided in TJLP's Application and in TJLP's Aboriginal
28 Consultation Reports.

29 The Application states that TJLP provided Musqueam Indian Band with funding for a TMJ-
30 specific study regarding their Aboriginal Interests in TMJ area. Musqueam Indian Band prepared
31 two studies regarding their Aboriginal Interests in the TMJ area:

- 32 • Musqueam Indian Band Knowledge and Use Study, WesPac Midstream's Proposed LNG
33 Marine Jetty Project¹⁹³; and
- 34 • Impacts of marine vessel traffic on access to fishing opportunities of the

1 Musqueam Indian Band¹⁹⁹.

2 The EAO is also aware that capacity funding to support Musqueam Indian Band's participation
3 in the review of TJLP's BVSA Report was provided by TJLP. During the EA, Musqueam Indian
4 Band and TJLP worked together to develop and reach agreement on a Marine Communication
5 Protocol. This bilateral protocol aims to avoid or minimize interactions with Musqueam fishers
6 and other cultural activities and includes an oversight committee and funding to facilitate an
7 ongoing one-to-one open line of communication between TJLP and Musqueam Indian Band for
8 the life of the project. This protocol also includes mechanisms to continuously improve the
9 coordination of real-time communication and planning/scheduling to avoid fishing windows by
10 TMJ related vessels, provide notice for Musqueam member safety awareness, and
11 compensation for lost or damaged nets during construction.

12 Musqueam Indian Band have informed the EAO that the site-specific values and uses reported
13 in Musqueam's Knowledge and Use Study¹⁹³ are limited to those reported by Musqueam
14 members that were available to participate in the study; the study did not capture the totality
15 of the community values and uses and numbers should be understood and conservative
16 estimates or minimums. Musqueam Indian Band expressed concerns about the initial scope of
17 the assessment which excluded a Marine Shipping Assessment. Because the marine shipping
18 assessment was brought into the review at a later stage in the process, Musqueam Indian Band
19 has expressed that it was not possible to adequately engage in consultation related to the MSA
20 due to lack of time and capacity strengths.

21 The EAO has worked with Musqueam Indian Band and has incorporated Musqueam Indian
22 Band's detailed comments into the Current Use section (Section 11.4) and Part C of this Report.
23 In addition, the EAO has refined the assessment and updated conclusions on Current Use and
24 Part C to reflect the additional information provided by Musqueam Indian Band. In May of
25 2020, Musqueam Indian Band wrote to and informed the EAO that as a result of COVID-19, it
26 would not be possible for Musqueam Indian Band to collect the requested supplemental
27 information for the MSA within the timelines to inform the TMJ assessment. Musqueam Indian
28 Band commented that if TMJ is approved, it will still be necessary for TJLP to work with
29 Musqueam Indian Band to collect the information for TMJ to inform mitigation strategies and
30 management plans, prior to finalizing plans and design guidelines. Musqueam Indian Band

¹⁹⁹ Musqueam Indian Band. 2018B. Impacts of marine vessel traffic on access to fishing opportunities of the Musqueam Indian Band.

1 requested that the requirement to collect the information and conducting the required analysis
2 included as a condition on the EAC.

3 During the EA for TMJ, the EAO heard from Musqueam Indian Band that they have an
4 expectation for the EAO to undertake and meet a justification test prior to Ministers' decision if
5 there is a finding of an infringement of Musqueam Indian Band's *Sparrow* fishing right. The EAO
6 indicated to Musqueam Indian Band that it would be willing to consider the factors relevant to
7 the *Sparrow* justification analysis if there was information indicating a potential impact to
8 Musqueam Indian Band's right to fish from TMJ. The EAO then provided Musqueam Indian
9 Band with information relevant to the *Sparrow* justification analysis in a separate response. The
10 EAO is of the perspective that it is not required to undertake or meet a justification test when
11 concluding on potential impacts to Aboriginal rights during the EA. The EAO is of the view that it
12 has approached consultation with Musqueam Indian Band at the deeper end of the spectrum,
13 with the intent to consider for addressing any potential impacts to any Aboriginal Interests in
14 the project area identified by Musqueam Indian Band.

15 The EAO understands that Musqueam Indian Band does not view EAC conditions as being
16 adequate in addressing impacts on its rights, and Musqueam Indian Band consider that such
17 "blanket" conditions (where the conditions reference Schedule B Indigenous Groups) would
18 actively diminish Musqueam's ability to mitigate the impacts of TMJ (see below re:
19 Musqueam's separate submissions for more information). During the EA for TMJ, the EAO
20 consulted with Musqueam Indian Band to develop appropriate mitigations to address
21 Musqueam's concerns, which are reflected in the provincial conditions and recommended
22 KMMs under CEAA 2012. During the EA for TMJ, Musqueam Indian Band requested Musqueam-
23 specific conditions, and there were several conversations around how this could be done. The
24 EAO recommends a Cultural Heritage under CEAA 2012, which would require TJLP to develop
25 nation-specific measures to address the effects on tangible and intangible cultural losses
26 caused by TMJ, in consultation with those Indigenous Groups experiencing the effects in the
27 lower Fraser River (as described in this Report), and to consider developing or contributing to
28 Indigenous-led programs to preserve and enhance cultural heritage. Musqueam Indian Band
29 and the EAO have an ongoing discussion to explore future opportunities to better support
30 Musqueam's ability to effectively address impacts to Musqueam's Aboriginal Interests through
31 future EA processes on other Projects proposed within Musqueam Indian Band's territory.

32 Provincial conditions and recommended KMMs under CEAA 2012 for TMJ would also require
33 future engagement to be provided to all Schedule B Indigenous Groups, including Musqueam
34 Indian Band, and each Indigenous Group would determine the level of engagement needed.
35 The EAO acknowledges that Musqueam Indian Band and other Indigenous Groups have
36 different interests in the TMJ area, and TMJ has the potential to impact Indigenous Groups
37 differently. The EAO acknowledges that understanding the fundamental linkage between

1 presence of Aboriginal Interests in an area and potential impacts to these interests is needed to
2 appropriately customize engagement with each Indigenous Group. Furthermore, the EAO
3 considers that this approach to customizing engagement with each Indigenous Group is
4 consistent with the *Declaration on the Rights of Indigenous Peoples Act, 2019* which requires
5 the government to consider the diversity of the Indigenous peoples in BC (i.e., including distinct
6 languages, cultures, customs, practices, rights, legal traditions, institutions, governance
7 structures, relationships to territories and knowledge systems of Indigenous peoples).

8 ***Reliance on information from the RBT2 and TMX processes***

9 Musqueam Indian Band raised concerns with the EAO's approach of using information collected
10 for the assessments of TMX and RBT2 projects, and in particular, that it cannot be relied upon
11 for a fulsome representation of current use within Segment A-1 of the MSA. Musqueam Indian
12 Band noted that supplemental data collection on Musqueam Indian Band's current use is
13 needed to fully understand and assess the impacts of TMJ. Musqueam Indian Band is concerned
14 that the spatial and temporal limitations (i.e., using information from a 2017 RBT2 Knowledge
15 and Use Study) of the underlying data in the MSA would result in the EAO underestimating the
16 impact of TMJ on Musqueam Indian Band's current use. Musqueam Indian Band submitted
17 extensive comments on this and other matters to the EAO. The EAO incorporated this
18 additional information into the EAO's Current Use chapter and refined the assessment and
19 updated the conclusions on Current Use to reflect the additional information that Musqueam
20 Indian Band provided. As described in the Current Use of Lands and Resources for Traditional
21 Purposes section of Part B, the EAO found it is reasonable to expect that past effects would
22 combine with effects from TMJ-related marine shipping to result in significant cumulative
23 effects to current use for fishing and other cultural use of marine areas for Indigenous Groups
24 that preferentially use or rely on sites located at TMJ or within and adjacent to shipping lanes.
25 Further information related to concerns raised by Indigenous Group's with respect to reliance
26 on information from RBT2 and TMX processes is provided in [Section 13.2.1](#) of this Report.

27 ***Cultural and Spiritual Interests in Southern Resident Killer Whales***

28 During review of the CULRTRP section of the EAO's draft Assessment Report, Musqueam Indian
29 Band identified a concern that Musqueam's significant cultural and spiritual interests in Orca,
30 especially SRKW, were not accurately reflected in the draft materials. Musqueam Indian Band
31 identified that SRKW are a culturally and spiritually significant species through their importance
32 to Musqueam Indian Band's cultural heritage and current use of land and resources for
33 traditional purposes. Musqueam Indian Band also identified that, it can be difficult to separate
34 SRKW as a separate VC, from the other interrelated elements of Musqueam's territory.
35 Musqueam people see themselves as belonging to the earth, as a child belongs to their mother,
36 which comes with a responsibility for care that extends to SRKW, salmon, sturgeon, eulachon,

1 and other species. During the EA, Musqueam Indian Band and the EAO worked collaboratively
2 to ensure that Musqueam's cultural and spiritual significance to SRKW was appropriately
3 reflected in in the Assessment Report, including sections below.

4 ***Musqueam Indian Band Separate Submissions to Ministers***

5 On September 21, 2021, Musqueam Indian Band wrote to the BC Ministers, Federal Ministers,
6 the EAO, and the Agency regarding TJLP's unconventional offset proposal. In the letter
7 Musqueam Indian Band identified that while some of Musqueam Indian Band's concerns have
8 been addressed through the EA process there remains significant outstanding concerns related
9 to cumulative effects. In the letter Musqueam Indian Band identified TJLP's unconventional
10 offsetting proposal for a \$2M contribution to the FNFLF over five years as an appropriate
11 approach to mitigating for cumulative effects on Musqueam Indian Band's territory. Please see
12 [Section 13.1](#) of Part C for more information on how the EAO has considered TJLP's
13 unconventional offsetting proposal in the EA for TMJ.

14 Also, on September 21, 2021, Musqueam Indian Band wrote to the Minister of Environment
15 and Climate Change Strategy and the Minister of Transportation and Infrastructure regarding:
16 Submission to Ministers for the TMJ Project. The submission identified Musqueam Indian Band
17 had significant concerns about the EAO's approach to cumulative effects and Indigenous
18 consultation for TMJ. The EAO provided both of Musqueam's September 21, 2021 letters as
19 separate submissions to decision makers as part of the TMJ referral package.

20 ***Musqueam's outstanding concern with the EAO's approach to cumulative effects:***

21 Musqueam Indian Band's separate submission for TMJ emphasized an urgent need for the EAO
22 to address deficiencies in the EAO's cumulative effects methodology used for individual
23 projects, particularly as the ecological health of the region is in a crisis state and impacts in
24 Musqueam Indian Band's territory, especially in the Fraser River Delta, are severe.
25 Musqueam Indian Band considers that addressing such deficiencies must include establishing a
26 carrying capacity for the Fraser River Delta in order to understand the limits of development so
27 that ongoing and future project proposals can be more accurately assessed.

28 In the separate submission Musqueam Indian Band reference the recent *Yahey v. British*
29 *Columbia* decision and identified that in Musqueam Indian Band's view, some of the
30 circumstances faced by Musqueam Indian Band are parallel to those experiences of
31 Blueberry River First Nation. According to Musqueam Indian Band, those parallels with
32 Blueberry River First Nation include: Musqueam Indian Band also rejecting a pattern of
33 consultation in which legitimate concerns around cumulative effects are minimized on the basis
34 of current conditions and baselines which serve to uphold only a bare minimum standard of
35 access to territory and ecological health of the environment; Musqueam Indian Band's

1 experience of persistent cumulative effects of industrial development that have already pushed
2 Musqueam Indian Band territory past its carrying capacity to the extent that there is not
3 sufficient access to lands and water, nor access to adequate quality harvesting necessary for
4 the exercise of rights; any further approval of development in Musqueam Indian Band territory
5 that does not adequately address cumulative effects represents an infringement of Musqueam
6 Indian Band rights; and that the Province is responsible for ensuring that there are timely
7 enforceable mechanisms to assess and manage the impact of industrial development in
8 Musqueam Indian Band's territory as this relates to project specific and existing cumulative
9 effects.

10 ***Musqueam's outstanding concern with the EAO's approach to Indigenous consultation:***

11 Through the separate submission, Musqueam Indian Band identified several concerns related
12 to the EAO's approach to consultation and accommodation for TMJ, including the EAO's
13 conclusions that the residual effects from TMJ would combine with cumulative effects from
14 past, current and future activities to result in significant cumulative effects to the current use of
15 lands and resources for fishing and cultural heritage by
16 Musqueam Indian Band and other Indigenous Groups. From Musqueam Indian Band's
17 perspective, the EAO's conclusions obscure that Musqueam Indian Band is one of, if not the,
18 Indigenous Group most significantly impacted by the project. Musqueam Indian Band also
19 considers that the EAO's conclusions related to potential future uses of the marine terminal
20 area for fishing by other Indigenous Groups that do not currently use the area is problematic,
21 and that the EAO and the Agency are unwilling and inflexible to consider Musqueam-specific
22 conditions, despite the distinct impacts of TMJ on Musqueam Indian Band and the fact that
23 such an approach was taken on other past assessments.

24 The EAO understands that Musqueam Indian Band takes exception to the EAO's approach
25 towards consultation and accommodation with other Indigenous Groups for TMJ, where
26 Musqueam Indian Band considers these Indigenous Groups are asserting unproven claims of
27 title and rights in Musqueam Indian Band territory. Throughout the assessment for TMJ, the
28 EAO heard through comments, letters and dialogues that Musqueam Indian Band is frustrated
29 with the EAO's failure to distinguish between the twelve Schedule B Indigenous Groups, as
30 defined in the Section 11 and 13 orders, and that from Musqueam Indian Band's perspective,
31 the EAO is eroding Musqueam Indian Band's ability to continue to exercise their proven
32 *Sparrow* fishing right and maintenance of their cultural continuity.

33 Musqueam Indian Band also told the EAO that "blanket" conditions actively diminish
34 Musqueam Indian Band's ability to have the impacts of TMJ mitigated, because such conditions
35 would permit all Schedule B Indigenous Groups equal participation, regardless of the level of
36 impacts on their rights. Musqueam Indian Band identified that in their view, under the EAO's
37 current process, Musqueam Indian Band's attempts to have impacts on rights addressed

1 through EAC conditions have been generally frustrated by the EAO's requirement for the
2 condition to apply to all Schedule B Indigenous Groups.

3 **Musqueam's request for the EAO to resolve the issue in future environmental and**
4 **impact assessments in Musqueam territory:**

5 The EAO understands through Musqueam Indian Band's separate submission for TMJ that
6 Musqueam Indian Band's traditional governance relies on established relationships and
7 protocols with neighbouring First Nations, and that the EAO's policies can systematically
8 undermine this governance by creating opportunities for other Indigenous Groups to
9 participate in rights-based activities in Musqueam Indian Band's core territory in ways that are
10 not appropriate or consistent with Musqueam culture and governance. The EAO heard that
11 Musqueam Indian Band considers it harmful to have other Indigenous Groups asserting and
12 exercising rights within Musqueam Indian Band territory, especially for activities related to
13 cultural recognition and revitalization. The EAO heard that the EAO's approach to consultation
14 and accommodations in Musqueam Indian Band territory has the potential to further
15 perturbate legal and political complexities, frustration, and conflicts for Musqueam Indian Band
16 with other Indigenous Groups. The EAO also understands that Musqueam Indian Band is also
17 concerned that the EAO's policies can also result in as many as a dozen Indigenous Groups
18 developing strategies to mitigate impacts on culture and other rights-based activities, which
19 would have a pan-Indigenizing effect on cultural representation that actively erodes
20 Musqueam Indian Band's distinct culture.

21 Through Musqueam Indian Band's separate submission to ministers for TMJ, as well as
22 Musqueam Indian Band's feedback on the EAO's draft referral materials, including the EAO
23 conclusions on potential impacts to Musqueam Indian Band's Aboriginal Interests, and through
24 Musqueam Indian Band's September 21, 2021 letter regarding TJLP's unconventional offset
25 proposal for TMJ, the EAO understands that despite significant concerns about the EAO's
26 approach to cumulative effects and Indigenous consultations, Musqueam Indian Band has
27 continued to work with the EAO, the Agency, and TJLP to ensure impacts to
28 Musqueam Indian Band's Aboriginal interests are mitigated and accommodated, to the extent
29 possible. Musqueam Indian Band indicated that, subject to satisfactory finalization of
30 conditions and mitigation measures, Musqueam Indian Band is satisfied with the progression of
31 the environmental assessment of TMJ and believes it is ready to proceed onto referral to the
32 appropriate ministers for decision. Musqueam Indian Band emphasized that the concerns
33 related to the EAO's approach to cumulative effects and Indigenous consultation are being
34 expressed at the conclusion of TMJ's assessment, noting the importance of addressing these
35 issues in all future environmental and impact assessments in Musqueam territory.

1 14.4.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS

2 The following sections focus on potential impacts of TMJ to Musqueam Indian Band's Aboriginal
3 Interests. A discussion of the EAO's assessment approach is summarized in Section 1.0 EAO
4 Consultation Process Methodology of this Report.

5 The EAO considered information available, including from public sources, Musqueam Indian
6 Band's Knowledge and Use Study¹⁹³, Musqueam Indian Band's Shipping Study¹⁹⁹, as well as
7 relevant issues raised by Musqueam Indian Band members during the EA process (in meetings,
8 letters and Working Group comments), in the following assessments of the potential impacts of
9 TMJ on Musqueam Indian Band's Aboriginal Interests.

10 Musqueam Indian Band identified three rights-based VCs relating to Musqueam Indian Band
11 knowledge and use that they concluded would be impacted to a substantial degree by TMJ¹⁹³:

- 12 • Cultural continuity;
- 13 • Sense of place and identity; and
- 14 • Fishing.

15 Musqueam Indian Band expressed the importance of understanding that although Cultural
16 Continuity and Sense of Place and Identity are distinct from fishing, harvesting and the
17 biophysical environment, they are inherently connected to and dependent on each other. The
18 EAO's following assessment of TMJ's potential impacts to Musqueam Indian Band's rights to
19 fish (section A below) and hunt, trap and gather (section B below), included potential impacts
20 to Musqueam Indian Band's cultural continuity and sense of place and identity, which the EAO
21 understands are foundational concepts that inform the understanding of impacts to all
22 Musqueam Indian Band's Aboriginal Interests. The EAO also assessed potential impacts to
23 Musqueam Indian Band's Cultural Continuity (Section C below) and Sense of Place and Identity
24 (Section D below) as requested by Musqueam Indian Band.

25 A. POTENTIAL IMPACTS ON FISHING

26 Musqueam Indian Band has an established Aboriginal right to fish for FSC purposes, as
27 established in the Sparrow decision (R v. Sparrow, [1990] 1 S.C.R. 1075). Musqueam Indian
28 Band has reported that fishing (including salmon, sturgeon, and eulachon) has and continues to
29 be an integral part of Musqueam life, language, culture, and economic systems. Fishing and
30 activities associated with fishing (for example, preparation for fishing and fish processing) are
31 key cultural and livelihood activities for Musqueam Indian Band; waterways provide
32 transportation corridors, and spiritual and cultural benefits as well as food. Additionally, fishing
33 provides tangible and intangible benefits for Musqueam Indian Band members. Members also

1 reported fishing values in the LSA of their Knowledge and Use Study prepared for the RBT2
2 panel hearings, which overlaps with the shipping channels in the TMJ MSA area.

3 Fishing is an important source of food and nutrition as well as income for Musqueam Indian
4 Band members. Musqueam Indian Band has reported that some members hold commercial
5 licenses for various fish species or participate in commercial fishing as deckhands and net
6 menders, as well as by processing fish and fixing boats and traps. Musqueam Indian Band
7 identified fishing and the stewardship associated with fishing (knowledge, landscape, and
8 resources) as forming a core part of Musqueam Indian Band's identity and sense of place,
9 providing many benefits to Musqueam Indian Band's spiritual, psychological, and cultural
10 wellbeing. Stewardship is central to being Musqueam, noting that members are continuously
11 innovating and taking measures to restore wild resources, including through selective fishing
12 measures and self-imposed restrictions on harvesting¹⁹³.

13 Musqueam Indian Band reported that access to migratory species, such as chinook, Coho,
14 sockeye, pink and chum salmon, and steelhead and cutthroat trout fluctuated seasonally, with
15 salmon spawning in the Fraser River between spring and early winter, with peaks in August and
16 early September¹⁹³. Musqueam Indian Band dried and stored salmon to use during the winter
17 months. Musqueam Indian Band knowledge holders have stated that TMJ area is an important
18 holding area for salmon and eulachon.

19 Musqueam Indian Band reported that fishing and time spent on the water are critical for the
20 transmission of traditional knowledge, history, and language, including teaching place names,
21 the locations of key harvesting and habitat areas, how to read and navigate waterways, and
22 traditional fishing techniques¹⁹³. Musqueam Indian Band report members emphasize that they
23 share this knowledge with their own children and younger members of the Musqueam Indian
24 Band community today in order to ensure cultural continuity, and often do so by taking
25 younger members on the water, to go fishing and to teach Musqueam Indian Band oral
26 histories while in these places together¹⁹³.

27 Musqueam Indian Band described members' current fishing practices as follows:

28 *"Musqueam fishers primarily use gillnets for harvesting fish on the lower Fraser River*
29 *(Musqueam Indian Band v. The Vancouver Fraser Port Authority 2016, 23). Musqueam*
30 *gillnetters deploy 300-foot nets from fishing boats. The net is suspended from floats and*
31 *drifts along with the tide, catching fish as it moves. The net is then pulled into the boat*
32 *and the fish removed. Critically, reorienting and retrieving the net once deployed is a slow*
33 *and difficult operation. Nets are also easily affected by the tide and currents, as well as*
34 *propeller wash and drag from passing boats."* (p. 83)

35 Musqueam Indian Band fishers note that gillnetting *"is highly susceptible to shipping*
36 *interactions because retrieving nets once deployed is slow and difficult (increasing the chances*

1 *for collision)*” and both fishing and shipping are timed to the tides. Musqueam fishers note that
2 this has led to loss of fishing equipment in the past and emphasized that safety is becoming a
3 primary concern while fishing when large vessels are on the river.”¹⁹³ (p. 94)

4 Musqueam Indian Band reported that most members (56 %) participate in resource harvesting,
5 and 61 % prepare traditional foods at least occasionally (Musqueam, 2018). Many Musqueam
6 Indian Band members indicated that they would like to harvest or prepare traditional foods
7 more often (Musqueam, 2018). Resources were accessed through year-round and seasonal
8 settlements throughout the Fraser River delta, including those documented at the mouth of the
9 Brunette River, the mouth of Glen Creek, and along the Coquitlam and Pitt Rivers. Musqueam
10 Indian Band told the EAO that their future needs for FSC resources would likely increase
11 because their population is expected to continue to grow over time.

12 In the Musqueam Indian Band Knowledge and Use Study¹⁹³, the Project Jetty Footprint was
13 identified as the area within 250 m of the proposed jetty development site and its physical
14 works. Musqueam Indian Band has noted that this area is an important fishing location due to
15 its unique environmental characteristics, which create favourable habitat for salmon and
16 eulachon as a holding area. Musqueam Indian Band noted that the consistent and shallow
17 profile of the riverbed in the Project Jetty Footprint makes it a productive salmon fishing area
18 and is used by Musqueam Indian Band fishers and salmon research vessels.

19 Musqueam Indian Band has raised concerns regarding the existing cumulative effects of
20 development on Musqueam Indian Band’s Aboriginal Interests within their traditional territory.
21 Musqueam Indian Band reported that TMJ-specific effects would occur in a context of existing,
22 long-term, multi-source, and large-scale adverse impacts on Musqueam Indian Band’s territory,
23 rights, and interests as identified by members¹⁹³. Sources of cumulative effects as identified by
24 Musqueam Indian Band include, but are not limited to, agricultural effects and pollution, urban
25 and industrial development on Musqueam Indian Band’s title lands, river dredging and
26 deepening, overfishing, marine traffic and port expansions, recreational marine use, log booms
27 and booming activities, climate change, and other riverine structures such as jetties, piers,
28 docks, bridges, and ports. Musqueam Indian Band explained that its fishing rights in the region
29 have been constrained by due to a variety of reasons, including a decline in the abundance and
30 health of fish populations. Musqueam Indian Band expressed concerns through the Working
31 Group that the existing level of disturbance and underwater noise is making at-risk marine
32 mammals, such as SRKW, vulnerable to cumulative effects.

33 Musqueam Indian Band reported that their territory has changed significantly in recent decades
34 and the current baseline level of exclusion from fishing opportunities across the territory is
35 elevated from their perspective due to a variety of factors¹⁹⁹. In the Musqueam Knowledge and
36 Use Study, Musqueam Indian Band noted that due to these cumulative effects over time, most

1 salmon streams and other animal habitats have been lost, leading to the decline in elk, bear,
2 and deer from Musqueam Indian Band's traditional territory¹⁹³. Musqueam Indian Band
3 reported a decline in abundance of target fish species, as well as a decline in the number of
4 fishing vessels participating in the fisheries¹⁹⁹.

5 Musqueam Indian Band also reported that waterways in the region have been greatly
6 impacted, including the Fraser River delta. This began in the early 20th century with the
7 installation of river training structures and dredging for shipping channels, the construction of
8 jetties, and sealing off other previously free-flowing areas (Musqueam, 2018). Because of this,
9 Musqueam Indian Band reported that cumulative impacts have already significantly impaired
10 their ability to practice their rights in much of their traditional territory. Musqueam Indian Band
11 reports that development along the Fraser River, increased marine traffic, and changing legal
12 licensing protocols have restricted Musqueam Indian Band's ability to fish in terms of space,
13 time, quality, abundance, and method. Musqueam Indian Band has also commented that the
14 context of Musqueam fishing activities is highly constrained around the TMJ site, and
15 vulnerable to further cumulative effects in the lower Fraser River. Musqueam Indian Band
16 emphasized that holding areas in the Fraser River (such as the TMJ site) are preferred, and
17 noted increasing development added pressure for fishers to move into the shipping channels.

18 Musqueam Indian Band identified the following potential TMJ interactions with fishing in their
19 Knowledge and Use Study¹⁹³, which focused on the TMJ jetty footprint, the KUS LSA (south arm
20 of Fraser River from Sand Heads to Pattullo Bridge including the jetty footprint and river islands)
21 and the KUS RSA [KUS LSA, jetty footprint and north and middle arms of the Fraser River
22 (including river islands)]:

- 23 • *“Decreased and lower value of access and use on the Fraser River as a result of*
24 *increases in the size and volume of marine traffic through the length of the Project*
25 *shipping channel;*
- 26 • *Increased risk of collision or conflict between marine traffic and Musqueam vessels;*
- 27 • *Increased stress, behaviour changes, and mortality of fish as a result of changes in*
28 *foreshore and in-river infrastructure, noise disturbances, vibrations, dredging, and ship*
29 *vessel traffic;*
- 30 • *Increased degradation of valued fish habitat, including spawning grounds and fish*
31 *rearing areas due to dredging;*
- 32 • *Decreased fish abundance and health due to pollution and accidents;*
- 33 • *Decreased fishing efficiency and access to traditional foods as a result of changes in*
34 *fish abundance and behaviour, and disruptions caused by shipping traffic; and*

- 1 • *Decreased and lower value of access and use of preferred fishing areas due to*
2 *dredging, construction, and the creation of exclusion zones; and impediments to*
3 *Musqueam efforts to restore fish populations and habitat for the continuation of*
4 *rights-based activities.” (p.116).*

5 The Musqueam Marine Traffic Study (2018) made several recommendations to address the
6 impact of marine traffic on Musqueam fishing rights:

- 7 • Reduce the number of vessels interacting with Musqueam Indian Band’s fishery
8 openings;
9 • Monitor incidents of interaction between Musqueam Indian Band’s fishing vessels and
10 other vessel traffic;
11 • Encourage marine vessels to minimize and/ or avoid locations of interaction during
12 fishery openings (e.g., high conflict zones in the lower Fraser River, such as Tilbury Island
13 and Fraser Surrey Docks);
14 • Encourage marine vessels to minimize interactions during fisheries with gear types that
15 require more time to deploy (e.g., crab and prawn fisheries, salmon seine fisheries);
16 • Engage with project proponents to design projects and adopt mitigation strategies that
17 will minimize interactions with Musqueam Indian Band fishing opportunities; and
18 • Promote communication with marine vessel operators to encourage the
19 implementation and adherence to measures that will minimize interference with
20 Musqueam Indian Band fishing opportunities.

21
22 According to TJLP’s ACR-4, during its review of TJLP’s BVSA Report Musqueam Indian Band
23 raised concerns related to the increased vessel traffic associated with the BVS, which could
24 exacerbate existing conditions and further impact Musqueam Indian Band’s fishing and other
25 rights-based activities in the area. Musqueam Indian Band also noted that an increase in marine
26 vessel traffic under the BVS may lead to greater exclusions for Musqueam fishers, present
27 potential safety issues for Musqueam’s navigation on the Fraser River and greater risks of
28 accidents and malfunctions, and might surpass members’ comfort threshold near Tilbury Island
29 resulting in severe impacts for the quality of Musqueam’s experience while undertaking rights-
30 based activities and impact Musqueam’s sense of place and identity. The EAO is also aware that
31 Musqueam Indian Band is concerned that the increased vessel traffic associated with the BVS
32 may have greater impacts on fish species, including white sturgeon, eulachon, and species of
33 salmon that rely on the area around TMJ’s proposed marine terminal as a key migratory
34 corridor through the Fraser River, and that TMJ’s contribution to cumulative effects in the area
35 would further contribute to impacts to Musqueam’s rights.

36

- 1 • The EAO's response to concerns and issues raised by Indigenous Groups regarding BVS-
2 related changes to effects Fish and Fish Habitat can be found in that section of Part B
3 (Section 5.6), as well as in Section 13.3.1.1.3 of Part C. Also, the EAO evaluated the
4 potential for BVS-related changes to relevant pathways of effects on the biophysical,
5 geospatial, and other social, cultural, experiential sub-components of Aboriginal fishing
6 rights summarized in Section 13.3.1.2 and is satisfied that those findings would apply to
7 Musqueam Indian Band.
- 8 • The EAO agrees with TJLP's BVSA Report, that the EAO's conclusions on TMJ's potential
9 effects to the Fish and Fish Habitat and fishing component of the Current Use would
10 remain the same under the BVS, compared to the Application scenario. The EAO did
11 however, identify that under the BVS there would be potential for higher frequency of
12 interactions between TMJ vessels and Indigenous Groups conducting vessel based FSC
13 fishing activities in the lower Fraser River.
- 14 • The EAO proposes provincial conditions and federal KMMs under CEAA 2012 that are
15 related to the recommendations that came out of the 2018 Musqueam Marine Traffic
16 Study¹⁹⁹, including the Marine Communications Plan, Marine Access and Transportation
17 Plan, and Vessel Traffic Management Plan. Specifically, the Marine Access and
18 Transportation Plan would include mitigations to reduce disruptions caused by
19 construction and operations for commercial and non-commercial marine use or for
20 members of Indigenous Groups to carry out traditional use activities including fishing for
21 FSC purposes.
- 22 • Based on the assessment of TJLP's BVSA Report, the EAO is recommending additional
23 mitigation measures for the Marine Access and Transportation Plan that would require
24 TJLP to reduce potential interactions between TMJ-related vessel activity and vessel-
25 based Indigenous fishing activities in the lower Fraser River to Sand Heads during FSC
26 windows by: adjusting the LNG carrier call schedule annually; implement protocols to
27 adjust LNG carrier arrivals and departures; make arrangements to work with other users
28 in the area to synchronize bunker vessel arrivals and departures; and provide
29 opportunities for safety training for Indigenous Groups more marine navigation in the
30 terminal area.
- 31 • The EAO is aware that TJLP has proposed to contribute up to \$2 million to the FNFLF⁷⁴,
32 which is an Indigenous-led program that support recovery programs for Chinook
33 salmon, eulachon, and sturgeon in the Fraser River and Salish Sea. The EAO understands
34 that Musqueam Indian Band worked collaboratively with TJLP to determine appropriate
35 accommodations, and that Musqueam Indian Band views the proposal is an appropriate

1 approach to mitigating cumulative effects. For more information about the EAO's
2 consideration of TJLP's contribution proposal see [Section 13.1](#) on Current Context and
3 Cumulative Effects in Part C.

- 4 • While the EAO is of the view that the potential impacts on Musqueam Indian Band's
5 fishing rights have been avoided, minimized, and accommodated to the extent possible
6 for the purposes of the EA, the EAO also recognizes that there are outstanding impacts,
7 particularly cumulative effects, and these outstanding impacts are reflected in the EAO's
8 conclusions in Part B and Part C for TMJ.

9
10 Musqueam Indian Band expressed concerns regarding the temporal limitations of using the
11 2017 KUS for RBT2 as a source for determined current use for TMJ. For example, Musqueam
12 Indian Band reported an increased reliance on crab fishing since 2017 in the MSA area.
13 Musqueam Indian Band has also indicated that an increase in prawn and crab fisheries has
14 occurred for reasons including a decline in salmon abundance and related fishing opportunities.

15 The EAO notes in the RBT2 process, Musqueam Indian Band expressed concerns about the
16 cumulative effects of large vessel in the Salish Sea, and that traffic is an ongoing hindrance to
17 safe and effective fishing activities. Musqueam Indian Band stated the need for improved
18 communication between Musqueam Indian Band fishers and large commercial vessels. In the
19 MSA area, Musqueam Indian Band has informed the EAO Musqueam fishers have consistently
20 communicated that current vessel traffic levels impede Musqueam Indian Band vessels
21 engaging in rights-based fishing for FSC purposes and that the additional vessel movements
22 associated with TMJ would increase this impact.

23 In the following analyses, the EAO considers the above information and
24 Musqueam Indian Band's perspective in the analyses below, as well as mitigation measures that
25 were identified in the Application, mitigation measures that were identified during Application
26 Review, proposed conditions of the TOC and recommended KMMs under CEAA 2012.

27 **14.4.3.1.1 Potential Impacts to Fish and Fish Habitat**

28 As per Musqueam Indian Band's Knowledge and Use Study¹⁹³, Musqueam Indian Band
29 members have concerns related to TMJ's potential impacts, as described below:

- 30 • LNG Carrier and bunker vessel presence on the seascape and while at port;
- 31 • Noise and visual effects from construction and operation activities such as pile driving
32 and dredging;
- 33 • Concern about potential project contributions to cumulative deposition of contaminants
34 that could affect the quality of harvested foods, resources, and the ecosystem;

- 1 • Concerns around the consequences of an accident or malfunction at the jetty and/or for
2 LNG carriers and bunker vessels while in transit; and
- 3 • Concerns related to activities such as pile-driving and dredging, which could cause
4 vibration, noise, sedimentation, and riverine changes, could affect fish behaviour and
5 mortality.

6 During the EA, Musqueam Indian Band identified a concern that TMJ-related vessels operating
7 in the dredge pocket may pose a risk to sturgeon that use the TMJ area for holding and rearing.
8 Musqueam Indian Band identified that the TMJ area is also used by juvenile sturgeon at certain
9 times of the year when decaying eulachon can become prevalent in the area, providing a food
10 source to juvenile sturgeon that act as nature's scavengers. In the Fish and Fish Habitat section
11 of Part B ([Section 5.6](#)) the EAO identified potential low magnitude effect for mortality or injury
12 to sturgeon from TMJ-related vessel strike that could result in a small change on sturgeon
13 abundance. The EAO predicted that potential for high population-level effects from TMJ would
14 be unlikely in any scenario; however, the EAO acknowledges that the loss of a large, mature
15 female could have a greater effect because this species takes a relatively long time to reach the
16 age of first reproduction.

17 The EAO acknowledges Musqueam Indian Band's stewardship and cultural connections to
18 sturgeon and appreciates Musqueam Indian Band's concerns about potential impacts to
19 sturgeon are rooted in Musqueam Indian Band's indigenous ecological knowledge at the TMJ
20 site. The EAO understands that there would be a limited time period during which deep draft
21 vessels would have propellers near the bottom of the dredge pocket and the EAO concluded
22 that injury or mortality to sturgeon from TMJ-related vessel strikes would not be expected to
23 result in a significant residual effect. The EAO is recommending as a KMM under CEAA 2012 for
24 the Fish Mitigations to Reduce Harm and Mortality, including provisions for side-scan sonar
25 surveys for sturgeon once the dredge pocket has been established to inform sturgeon
26 occupancy mitigation and recording and reporting observations of sturgeon mortality or injury
27 at the Marine Terminal Area to Indigenous Groups and DFO. The development of the Fish
28 Mitigations to Reduce Harm and Mortality would be in consultation with Musqueam Indian
29 Band should TMJ be granted an EAC Certificate.

30 The Application also described a number of Musqueam Indian Band concerns related to fish,
31 such as loss of fish habitat and disturbances to fisheries resources, potential impacts on a
32 holding area for fish that knowledge holders have identified as overlapping the TMJ site, the
33 potential for sturgeon habitat to be created and the possibility that vessel movement may
34 disturb sturgeon that are attracted to this habitat. The Application also described Musqueam
35 Indian Band's concerns related to potential impacts of TMJ-related shipping on SRKW which

1 could lead to an increase in seal and sea lion populations, which could affect salmon stocks and
2 impact Musqueam Indian Band's subsistence salmon harvesting.

3 **14.4.3.1.2 Potential Impacts to Access and Use of the Area for Fishing**

4 Musqueam Indian Band reported¹⁹³ site-specific fishing values (e.g., subsistence,
5 environmental, habitation, cultural, and transportation values) potentially affected by TMJ,
6 including:

- 7 • Knowledge and Use study Project Jetty Footprint (an area defined in Musqueam, 2018
8 as being within 250 m of the proposed TMJ): 54 site-specific fishing values including
9 fishing sites used to harvest a variety of species, key habitat features for fish (such as
10 spawning areas and migratory routes) travel routes used by Musqueam Indian Band
11 members to access fishing sites and fisheries, and a past Musqueam Indian Band
12 habitation. Through consultation during the EA, Musqueam identified that areas
13 overlapping the Project Jetty Footprint (within 250 m of the proposed TMJ – defined in
14 KUS) become increasingly important for FSC harvesting activities depending on many
15 different and interacting factors. For example, Musqueam identified that the site could
16 potentially become Musqueam's only access for FSC fishing in the future if in-river
17 salmon gillnet fisheries were no longer allowed by DFO. In another example, the KUS
18 described Musqueam's reliance on the site when fishing at other locations becomes
19 impractical due to the high rate of competition for fish from seals and sea lions in the
20 river, which has also been increasing over time;
- 21 • Musqueam recognize this site as currently representing the only remaining site in their
22 traditional territory that could support traditional near-shore communal harvesting
23 activities (e.g., eulachon harvesting at high-tide), which Musqueam Indian Band has a
24 strong desire to resume in the future, once eulachon populations have recovered.
25 Musqueam Indian Band identified the site could potentially support other traditional or
26 contemporary Musqueam fishing practices (i.e., fish weir, sturgeon fishing or beach
27 seine). This is because the site features a continuous shallow sandy bottom, which is a
28 feature rarely available elsewhere in Musqueam's territory in a location suitable for
29 fishing. Musqueam stressed the importance of this site is linked to many factors, there
30 is seasonal importance, but other factors contribute to the use of the site from year to
31 year and this location can be, or could become, a critical access and use area.
32 Musqueam expressed this location is intrinsically linked to Musqueam core
33 stewardship, cultural continuity, and sense of place;
- 34 • Knowledge and Use LSA (an area defined in Musqueam, 2018 as the south arm of the
35 Fraser River from Sand Heads to the Pattullo Bridge, including the "Project Jetty

1 Footprint” as defined in the bullet above): 396 site-specific fishing values including key
2 fishing areas for various fish species, shellfish harvesting sites for crab, fish habitat (such
3 as spawning and migratory routes), camping sites used by Musqueam Indian Band
4 members while fishing, and processing sites where fish is smoked; and

- 5 • Knowledge and Use Regional Study Area (an area defined in Musqueam’s 2018 KUS¹⁹³,
6 as the north, middle and south arms of the Fraser River from the Salish Sea to the
7 Pattullo Bridge, including the “Project Jetty Footprint” and the “Local Study Area”, as
8 defined in the bullets above): 526 site-specific fishing values including fishing sites for a
9 variety of species, shellfish harvesting sites, processing sites for smoking, canning,
10 filleting and vacuum packing fish, key habitat features (such as eulachon spawning
11 areas and a herring migration route that is no longer active) and a camp used by
12 Musqueam Indian Band members while fishing.

13 Access related concerns were assessed in three ways in the Musqueam Marine Traffic Study¹⁹⁹.
14 The first component related to cumulative effects which contributed to baseline impact on
15 access to species such as crab, prawn and salmon fishing opportunities, broader development
16 patterns in the region and recent Musqueam Indian Band use of marine resources. The second
17 component focused on the impact of recent marine vessel traffic on fishing access, using data
18 for known fisheries openings and positional data by DFO. The third component focused on the
19 relationship between varying levels of recent marine vessel traffic and restrictions on access¹⁹⁹.

20 Musqueam’s 2018 Marine Traffic Study identified “high conflict areas” where there is overlap
21 between fishing locations and high use by marine traffic¹⁹⁹. Musqueam Indian Band knowledge
22 holders note that important fishing locations tend to overlap with high traffic areas due to their
23 unique environmental characteristics, which create favourable habitat for salmon and eulachon
24 as a holding area¹⁹⁹.

25 Musqueam Indian Band identified areas where the level of exclusion from access to fishing is
26 highest, including the Fraser Surrey Docks, Tilbury Island, and other areas in the lower Fraser
27 River. Musqueam Indian Band report that exclusion from fishing varies by location and target
28 species, and is predicted to be more frequent because of TMJ. Musqueam Indian Band reports
29 that they have high confidence that even with mitigation, there will be substantial exclusion
30 effects occurring in the vicinity of the TMJ site, which is also a Musqueam preferred fishing
31 area. Based on the description of the Marine Safety Protocol provided by TJLP during
32 Application Review, the EAO understands that Indigenous harvesters and mariners may enter
33 or pass through the marine terminal area, but the EAO has taken a conservative approach in
34 the impacts assessment and assumed that Indigenous harvesters would avoid entering and
35 remaining in the marine terminal area due to the warning signs and notifications regarding
36 elevated public risk, in particular when vessels would be berthing, loading, or de-berthing at
37 TMJ .

1 Musqueam Indian Band members who seek to fish in the shipping channel, and downstream
2 and upstream from the TMJ site may be restricted by construction and TMJ-related marine
3 traffic. These access restrictions can potentially alienate Musqueam Indian Band members from
4 important places and from activities that are fundamental to Musqueam Indian Band culture,
5 rights, and identity¹⁹³. As mentioned above, Musqueam Indian Band also identified concerns
6 that increased vessel traffic associated with the BVS may lead to greater exclusion of
7 Musqueam fishers from the Project area.

8 **14.4.3.1.3 Potential Impacts to the Social, Cultural, and Experiential Aspects of Fishing**

9 The Knowledge and Use Study describes the integral role that fishing plays to Musqueam Indian
10 Band culture, which is also discussed in Impacts on Cultural Continuity section below. For
11 instance, Musqueam Indian Band identity is linked to sharing fish with friends and family and
12 being able to obtain and provide resources¹⁹³. The report further describes fishing for others
13 and sharing the catch as an activity that enhances self-worth, creates cultural pride, and builds
14 social connections and respect among community members. These benefits ultimately
15 strengthen Musqueam Indian Band cultural resilience and further enable Musqueam Indian
16 Band traditions such as community engagement, knowledge transmission, ceremonies, and
17 gatherings. The report furthers that while intangible, norms and social bonds are enabled by
18 having adequate and accessible fish stocks.

19 Fish resources are also critical for Musqueam Indian Band ceremonies, principles, norms,
20 community gatherings, protocols, and values – and ultimately, impacts to fishing could also
21 have indirect effects on the transmission of knowledge in these linked domains. Musqueam
22 Indian Band has also stated that its opportunities to teach on and off the river have been
23 severely affected by low populations of preferred fish species. TMJ’s potential effects on fish
24 populations, including fish behavior, could only serve to exacerbate them¹⁹³. The report
25 furthers that any loss of resource access, quality, or quantity could affect the social fabric of the
26 Musqueam Indian Band culture and community. Musqueam Indian Band informed the EAO that
27 in the MSA area, if Musqueam Indian Band fishers are required to relocate to avoid large
28 vessels, the loss of the opportunity to fish and transfer knowledge cannot be effectively
29 replaced. Musqueam Indian Band explained that these disruptions would impact Musqueam
30 Indian Band’s cultural continuity, as they would impede the knowledge transfer and sense of
31 place associated with the exercising of Musqueam Indian Band’s Aboriginal fishing rights.
32 Musqueam Indian Band also discussed the possibility of TMJ causing emotional and
33 psychological stress by affecting factors such as: river access; opportunities for the preparation
34 and consumption of traditional foods; safety in the shipping channel; the opportunities for
35 social bonding; opportunities to engage in traditional activities; and the ability to meet cultural
36 norms.

1 Musqueam Indian Band noted that TMJ could cause an increased disruption of Musqueam
2 Indian Band members' sense of place, identity, and increased disconnection from Musqueam
3 cultural heritage due to direct and indirect effects on fishing, ceremonies, gatherings, and
4 consumption of traditional foods, and other cultural practices. Musqueam Indian Band
5 identified concerns about TMJ impacts on cultural continuity, sense of place and Musqueam
6 fishing and the impact on transmission of knowledge transmission through habitat disturbance,
7 access restrictions, and disturbances to quality of time spent on water¹⁹³; Musqueam Indian
8 Band also noted potential increased psychological and emotional stress from uncertainty over
9 TMJ effects (e.g., reduced safety from marine traffic, disruptions to fishing, accident and spill
10 potential); and increased disruption to the protection, persistence, and living of Musqueam
11 Indian Band *šxʷtəhim̓* (i.e., ways, manners, and customs) and *snəwəyət̓* (i.e., teachings received
12 since childhood, including identity and responsibilities) from TMJ construction and operations.
13 The EAO is also aware that Musqueam Indian Band is concerned that the increased vessel
14 traffic associated with the BVS near Tilbury Island might surpass members' comfort threshold
15 resulting in severe impacts for the quality of Musqueam's experience while undertaking rights-
16 based activities and impact Musqueam's sense of place and identity.

17 Musqueam Indian Band also identified concerns that TMJ would impact *q̓əl̓təlaməcən* (Orca),
18 especially SRKW, which have an important role in the ecosystems of Musqueam territory.
19 Musqueam Indian Band described that SRKW has a tangible impact on Musqueam fishing
20 practices and transmission of knowledge, since SRKW can affect the timing of fish running up
21 the Fraser River, which directly alters the timing of Musqueam fishing opportunities.
22 More, broadly *q̓əl̓təlaməcən*, are also an important predator in the ecosystem and play a role in
23 controlling the populations of other marine mammals, such as seals and sea lions, which
24 directly affects abundance of fish in the Territory for Musqueam fishers and can alter the
25 availability of preferred fishing locations. More information related to Musqueam's cultural and
26 spiritual interests in *q̓əl̓təlaməcən* are provided in the sections on Cultural Continuity and Sense
27 Place and Identity below.

28 **14.4.3.1.4 Conclusion**

29 The EAO predicts that TMJ alone would have a moderate impact to Musqueam Indian Band's
30 right to fish. In consideration of the available information, the EAO's consultation with
31 Musqueam Indian Band, Musqueam Indian Band's engagement with TJLP, TJLP's commitments,
32 the EAO's proposed EAC conditions if an EAC is issued and the recommended KMMs under
33 CEAA 2012, the EAO concludes that TMJ-related effects combined with cumulative effects is
34 expected to result in a moderate-to-serious impact on Musqueam Indian Band's right to fish.
35 The EAO predicts that TMJ would interact with current baseline levels of cumulative effects that
36 already have a combined negative impact to Musqueam Indian Band's resource availability,

1 access to fishing areas and the experience of fishing in the lower Fraser River and to a lesser
2 extent in the Salish Sea. These cumulative effects are compounded by the importance of the
3 site and the lower Fraser River for Musqueam Indian Band's Cultural Continuity and Sense of
4 Place and Identity, limited seasonal opportunities for Musqueam Indian Band's salmon
5 harvesting, importance of salmon to Musqueam Indian Band's culture, and incompatibility of
6 drift net fishing and TMJ-related vessel activities in a relatively confined and heavily utilized
7 marine environment, which increase the seriousness of impact of on Musqueam Indian Band's
8 right to fish.

9 The EAO considered Musqueam Indian Band's perspectives on cumulative effects and
10 Musqueam Indian Band's ability to meaningfully practice their fishing rights in the Lower Fraser
11 and MSA area. The EAO acknowledges that there are already vessels transiting the lower Fraser
12 River which can impact Indigenous fishers' access to and quality of experience of fishing. The
13 EAO understands that shipping-related access disruptions and concerns about safety currently
14 contribute to reduced opportunities for cultural transmission while undertaking traditional
15 harvesting activities. While the EAO recognizes there is some uncertainty when considering
16 how cumulative effects impact Aboriginal Interests, the EAO agrees with Musqueam Indian
17 Band, that any increase in vessel traffic at the lower Fraser River would potentially be more
18 serious when combined with past, present, and reasonably foreseeable activities.

19 The EAO understands that, though Musqueam Indian Band does not agree with the EAO's
20 conclusion that TMJ would not have significant adverse residual effects or significant
21 cumulative effects on Fish and Fish Habitat (Section 5.6.6), Musqueam Indian Band does agree
22 with the EAO's conclusion that the consideration of cumulative effects increases the severity of
23 impacts on Musqueam's fishing rights. The EAO heard that Musqueam Indian Band face an
24 unprecedented challenge with record low salmon returns in recent years, as affirmed by the
25 recent decision to implement long-term commercial closures and a License Retirement Program
26 for Pacific Salmon.

27 The EAO heard from Musqueam Indian Band that at this critical juncture,
28 Musqueam Indian Band, through its role as stewards of the Fraser River and their traditional
29 territory, are working to preserve and restore the territory to provide adequate access to these
30 resources for future Musqueam generations. Musqueam Indian Band noted that additionally,
31 given the severity to salmon stocks more generally, it is important to note that these conditions
32 are rapidly evolving and that other species (i.e., Eulachon or Sturgeon) may be targeted in the
33 future. Musqueam Indian Band consider in this context, the severity of both TMJ-specific and
34 cumulative impacts to Musqueam's cultural continuity are significantly increased.

35 In Musqueam Indian Band's view, a full regional cumulative effects assessment of the Lower
36 Fraser River is necessary to fully understand the impact of project approvals on

1 Musqueam Indian Band's fishing rights from cumulative impacts on fish and fish habitat and
2 Musqueam Indian Band's access. Musqueam Indian Band told the EAO that in this context,
3 Musqueam Indian Band has worked collaboratively with TJLP to mitigate impacts and
4 determine appropriate accommodation. Therefore, as outlined in Musqueam Indian Band's
5 September 21, 2021, letter to the Minister of Environment and Climate Change Strategy and
6 the Minister of Transportation and Infrastructure, that subject to satisfactory finalization of
7 conditions and mitigation measures, Musqueam Indian Band is satisfied with the progression of
8 the environmental assessment of TMJ and believes it is ready to proceed onto referral to the
9 appropriate ministers. The EAO has considered a variety of information sources in support of its
10 conclusions on
11 the impacts to the right to fish, including the results of Part B, information in
12 Musqueam Indian Band 2018 and Musqueam Marine Traffic Study, 2018 and information
13 shared by Musqueam Indian Band over the course of the EA including through consultation.
14 The key factors that were considered in support of the EAO's conclusion on the impacts to the
15 right to fish are summarized as follows:

16 **Biophysical:**

- 17 • The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would have
18 potential to result in low to moderate magnitude residual effects to fish and fish
19 habitat at the TMJ site, and low magnitude residual effects to sturgeon from vessel
20 strikes. The EAO did not predict residual effects to fish in the MSA area;
- 21 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed.
22 The MSA area is a heavily utilized marine environment;
- 23 • Musqueam Indian Band told the EAO that the ability of Musqueam Indian Band to
24 carry out their fishing rights with preferred fish species is already constrained under
25 baseline conditions due, in part, to a decline in the recent past of fisheries resources;
- 26 • Musqueam Indian Band implement a self-imposed moratorium on sturgeon and
27 practice innovative catch-and-release methods as a conservation approach; and
- 28 • Gillnetting, the preferred Musqueam fishing method is very sensitive to shipping
29 interactions.

30 **Geospatial (places, sites and access):**

- 31 • Musqueam Indian Band has identified 54 site-specific fishing values within the KUS
32 Project Jetty Footprint;
- 33 • Musqueam Indian Band have identified that the TMJ site as a preferred fishing site due
34 to its unique environmental characteristics, which makes it a productive salmon fishing

- 1 area; There is potential for Musqueam Indian Band harvesters to rely on this site at
2 certain times of the year or under certain scenarios;
- 3 • During construction, access to the TMJ site would be restricted for three years. During
4 operations, Indigenous mariners and fishers would avoid entering and remaining in the
5 marine terminal area due to the warning signs and notifications regarding elevated
6 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ;
 - 7 • Musqueam Indian Band has indicated that TMJ will have a high likelihood of exclusion
8 effects on Musqueam Indian Band fishers and that gillnet fishing in the river (i.e., drift
9 net fishing) would be particularly vulnerable to interruptions or disruptions due to TMJ-
10 related vessel operations (especially tug-escorted LNG carriers) due to limited
11 navigational space in the river channel;
 - 12 • Specific to the BVS there is potential for higher frequency of interactions to occur
13 between TMJ-related vessels and Indigenous Groups engaging in vessel based FSC
14 fishing in the lower Fraser River during FSC fishing windows.
15 Musqueam Indian Band identified that the increased vessel traffic associated with the
16 BVS near Tilbury Island might surpass members' threshold to visit the TMJ site.
 - 17 • The EAO's conclusions in the Current Use chapter in Part B of this Report found that
18 TMJ-related vessel transits would have negligible to low magnitude effect to access to
19 fishing compared to baseline numbers of vessel transits, that could be experienced as
20 higher in the Fraser River as a change from baseline compared to Salish Sea. This effect
21 would be due to regularly occurring (i.e., on average one vessel call per day under the
22 BVS) and short-duration vessel movements to pass through known fishing areas in the
23 Fraser River and Salish Sea, which could cause negligible to low magnitude effects to
24 access to fishing; and
 - 25 • Musqueam Indian Band have stated that they currently fish in the TMJ area, and intend
26 to do so in the future, and identified the general area around Tilbury Island as one of the
27 areas in the Lower Fraser where existing levels of exclusion from access to fishing are
28 the highest due to interactions with vessel traffic.

29 **Social, Cultural and Experiential:**

- 30 • As outlined in the noise and visual quality assessments in Part B, potential negligible to
31 low magnitude impacts due to a change in noise and visual quality during construction
32 and to changes in visual quality and potential concerns about safety during operations;
- 33 • Musqueam Indian Band have reported that the size and volume of current vessel traffic
34 in their territory is already a safety concern and a deterrent to fishing, and TMJ-related
35 vessels would contribute to this concern;

- 1 • Musqueam Indian Band has reported that fish (including salmon, sturgeon, and
2 eulachon) has and continues to be an integral part of Musqueam Indian Band life,
3 language, culture, and economic systems;
- 4 • Musqueam Indian Band informed the EAO that TMJ could impact their sense of place,
5 identity and increase disconnection from Musqueam cultural heritage;
- 6 • Musqueam Indian Band indicates that changes to land, waters, and resources from
7 urbanization, industrialization, and other manmade impacts create disconnects between
8 individuals, their communal collective and connection to place, including the Fraser
9 River, decreasing, for example their sense of place;
- 10 • Musqueam Indian Band, through its role as stewards of the Fraser River and their
11 traditional territory, are working to preserve and restore the territory to provide
12 adequate access to these resources for future Musqueam generations; and
- 13 • Musqueam Indian Band indicates that fishing opportunities are already highly limited as
14 are opportunities for the transfer of knowledge. Musqueam Indian Band has reported
15 that knowledge transmission is place-based and experiential. Loss of opportunities to
16 access the land and its resources thus affects cultural knowledge transmission, which is
17 core to cultural persistence.

18 **Mitigations:**

- 19 • Proposed mitigations for potential impacts to Musqueam Indian Band's right to fish,
20 include mitigations to reduce impacts to noise and visual quality in the CEMP and OEMP
21 as well as the recommended key mitigations under CEAA 2012, specifically the Fish
22 Mitigations to Reduce Harm and Mortality, Fish Habitat and Offset Plan, Marine
23 Communications Plan, Marine Access and Transportation Plan, and Vessel Traffic
24 Management Plan.

25 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING, AND GATHERING***

26 The EAO's evaluation of potential effects on the right to hunt, trap, and gather considers
27 impacts to biophysical components that may result in changes in harvestable resource quantity
28 and quality, changes in access to hunting, trapping, and gathering sites, and changes to the
29 experience of hunting, trapping, and gathering that are attributable to TMJ.

30 Musqueam Indian Band considers their rights to hunting and the collection of plants and
31 medicines as highly diminished due to cumulative effects. Hunting is described as a crucial
32 activity to Musqueam cultural identity, although the opportunity to do so has been constrained
33 due to development, administrative restrictions, and industrialization. The Knowledge and Use
34 study describe Musqueam Indian Band's alienation from hunting and plant gathering in their

1 core territory¹⁹³. Musqueam Indian Band is still able to hunt waterfowl in specific locations;
2 however, this practice is becoming less common due to toxicity concerns. Shrinking hunting
3 areas are also occurring due to the mobile nature of birds. These factors contribute to
4 Musqueam Indian Band concerns regarding future developments that would further affect
5 waterfowl populations and hunting areas¹⁹³. The lack of opportunity to hunt other species, such
6 as ungulates, and other mammals does not indicate this practice is no longer culturally
7 important, as the act of hunting itself continues to be a crucial aspect of Musqueam culture and
8 identity¹⁹³.

9 In the MSA, waterfowl such as dabbling ducks, geese, and swans were reported as an important
10 food source for the Musqueam Indian Band. Musqueam Indian Band previously reported
11 hunting activity, including for ducks and geese, near the northernmost part of the international
12 marine shipping lanes. Musqueam Indian Band reported harvesting harbor seal, sea lion, and
13 porpoise, with seals harvested throughout the Fraser River Estuary, including all areas of the
14 South Arm of the Fraser River and offshore of Steveston, Westham Island, and Brunswick Point.
15 The MSA noted that Musqueam Indian Band is able to harvest seals and sea lions under a
16 special DFO licence, however, they have noted that they prefer not to due to concerns
17 regarding pollutants. Musqueam Indian Band have noted that they desire to resume harvesting
18 seals and sea lions upon the resolution of contamination and conservation concerns.

19 Similarly, Musqueam Indian Band has experienced a lack of opportunities to collect plants in
20 the KUS Study Area¹⁹³. Many of the same causes that have limited Musqueam Indian Band's
21 hunting opportunities also apply to gathering, including agriculture, residential development,
22 foreshore development along the Fraser and invasive species issues. Only a few areas exist
23 where plant species can be harvested in Musqueam Indian Band's core territory. The quality
24 and quantity of these plants are often found to be insufficient or unsuitable for collection due
25 to lack of privacy and cleanliness (especially critical for medicinal plants). Plants collected in the
26 KUS Study Area traditionally provided a number of uses, including medicinal, ceremonial,
27 artistic and subsistence. Plant harvesting involves a number of activities, including preparation
28 and processing, alongside more intangible activities and values such as spirituality, social
29 bonding, knowledge creation and teaching. In the MSA, kelp continues to be an important food
30 and medicinal plant. Musqueam Indian Band reported they must now trade for it, either
31 because it cannot be found or is avoided due to contamination concerns.

32 In the following analyses, the EAO considers the above information and Musqueam Indian
33 Band's perspective in the analyses below, as well as mitigation measures that were identified in
34 the Application, mitigation measures that were identified during Application Review, proposed
35 conditions of the TOC and recommended KMMs under CEAA 2012.

1 **14.4.3.1.5 Potential Impacts to Wildlife, Wildlife Habitat and Plants**

2 Musqueam outlined a number of comments related to wildlife and wildlife habitat, including
3 concerns related to effects of daytime and nighttime lighting on wildlife of importance.

4 In response to a Musqueam Indian Band request, TJLP provided supplementary information on
5 the potential effects to Barn Owls, migratory birds, and the Little Brown Myotis bat. Based on
6 this assessment TJLP committed to include suitable mitigations to address potential effects
7 from habitat loss, noise, light, ship strikes, and barriers to movement for these species in their
8 wetland and wildlife management plans.

9 As discussed in [Section 13.3.2](#), during construction, site preparation and ground stabilization
10 could result in direct loss of traditional use plants. Although traditional use plants were not
11 observed within the Project Disturbance Area, baseline field surveys cannot determine their
12 complete absence. In the Application, TJLP stated that a pre-construction survey of the Project
13 Disturbance Footprint would be conducted to identify any potential traditional use plants prior
14 to initiation of construction. Methods to protect, salvage and transplant those plants will be
15 outlined in the vegetation management and wetland management component of the CEMP.
16 TJLP also expects the wetland and riparian enhancement and restoration to expand the
17 available habitat for these species. After considering the proposed mitigation measures, the
18 EAO concluded that TMJ would result in a potential loss of wetland and riparian ecosystems.
19 Considering the proposed mitigation measures and conditions, the EAO is satisfied that TMJ is
20 not likely to result in significant adverse residual effects to the Vegetation VC.

21 **14.4.3.1.6 Potential Impacts to Access and Use of the Area for Hunting, Trapping and** 22 **Gathering**

23 Musqueam Indian Band members have a strong desire to rehabilitate the environment to
24 enable hunting throughout Musqueam territory in the future¹⁹³. The EAO is aware that
25 Musqueam Indian Band has identified a concern through its review of TJLP's BVSA Report that
26 increased vessel traffic under the BVS has the potential to impact Musqueam's ability to
27 undertake other rights-based activities, including hunting, gathering, and trapping in the area.

28 The EAO notes that traditional use plant collecting areas were not identified on Tilbury Island
29 and no traditional use plants were observed within the TMJ site. As discussed above,
30 Musqueam Indian Band reported a lack of opportunities to collect plants in the Knowledge and
31 Use Study Area. The EAO acknowledges there is a potential for traditional use plants to be
32 present on Tilbury Island in the future. Given the current levels of harvestable resources for
33 hunting, trapping, and gathering within the TMJ site, of which the upland portion is situated on
34 fee simple (private) land, the EAO cannot discern that TMJ would have a measurable effect on
35 access to areas used for hunting, trapping, and gathering by Musqueam Indian band. As

1 described in [Section 13.3.2](#), the EAO did not identify any changes to relevant pathways of
2 effects to Aboriginal Interests related to the Wildlife, Wildlife habitat, and Marine Birds VC.

3 **14.4.3.1.7 Potential Impacts to the Social, Cultural, and Experiential Aspects of Hunting,** 4 **Trapping and Gathering**

5 Hunting is a highly social event for Musqueam Indian Band members, from the transmission of
6 hunting knowledge to the distribution and consumption of hunted products, including at
7 community gathering.

8 As outlined in Air Quality, Water Quality and Current Use of Lands and Resources for Traditional
9 Purposes sections of Part B, the EAO is of the opinion that TMJ-induced changes to air quality,
10 water quality respectively are negligible to low magnitude and as such are unlikely to materially
11 affect the experience of hunting, trapping, and gathering. Nevertheless, the EAO acknowledges
12 that some Indigenous people may have existing concerns about consuming harvested resources
13 from their territory and that additional development would likely increase those concerns with
14 potential effects to the experience of hunting, trapping, and gathering. The EAO proposes light
15 management, noise management and air quality management components of the CEMP and
16 OEMP to reduce the impacts of visual, noise and air quality impacts to the experiential aspects
17 of hunting, trapping and gathering at the TMJ site.

18 **14.4.3.1.8 Conclusion**

19 In consideration of the available information, the EAO's consultation with Musqueam Indian
20 Band, Musqueam Indian Band's engagement with TJLP, TJLP's commitments, the EAO's
21 proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012,
22 TMJ is expected to result in a negligible impact on Musqueam Indian Band's right to hunt, trap
23 and gather.

24

25 The key factors that were considered in support of the EAO's conclusion on the impacts to the
26 right to hunt, trap and gather are summarized as follows:

27 **Biophysical:**

- 28 • The EAO's conclusions at the TMJ site on adverse residual effects to Wildlife and Wildlife
29 Habitat and Vegetation (see respective chapters in Part B) indicate negligible to low
30 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
31 from noise and light, and mortality; as well as low magnitude residual effects on
32 wetland and riparian ecosystems;
- 33 • The EAO's conclusions in the MSA area on adverse residual effects to Marine Birds (see

1 Wildlife section in Part B) indicate negligible to low magnitude residual effects related to
2 mortality of marine birds; and

- 3 • Musqueam Indian Band reported historically hunting terrestrial and marine mammals
4 and birds, such as deer, elk, waterfowl and whales throughout their territory, and
5 harvesting kelp, broad leaf maple, yew, alder and Western red cedar, root plants,
6 raspberries, berries, camas, salal and medicinal plants such as hemlock and wild licorice.

7 **Geospatial (places, sites and access):**

- 8 • Musqueam Indian Band reported that it is currently limited in their hunting, trapping or
9 gathering ability in the area due to existing development;
- 10 • Musqueam Indian Band identified hunting historically throughout their territory,
11 including Douglas Island and marshes in Richmond, and within areas of Metro
12 Vancouver (e.g., Burns Bog). Plants collected in the Knowledge and Use Study Area
13 traditionally provided a number of uses, including medicinal, ceremonial, artistic and
14 subsistence. Traditional use plant collecting areas were not identified on Tilbury Island;
- 15 • Construction (just over three years in duration) and operation (30 years) is unlikely to
16 cause disruptions to Musqueam Indian Band's access to areas traditionally used for
17 hunting, trapping, and gathering activities at the TMJ site or in the MSA area;
- 18 • The upland portion of the TMJ site is situated on fee simple (private) land; and
- 19 • For harvesting of marine species from the water, the small number of TMJ-related
20 vessels relative to current vessel traffic are predicted to have a negligible effect in terms
21 of access.

22 **Social, Cultural and Experiential:**

- 23 • Potential impacts to experience in the vicinity of the TMJ site and along the shipping
24 route due to a change in noise and visual quality during construction and operations
25 which are anticipated to be negligible to low in magnitude in the Fraser River and Salish
26 Sea.

27 **Mitigations:**

- 28 • Proposed conditions to mitigate impacts to Musqueam Indian Band's right to hunt, trap
29 and gather are the Vegetation and Wetland Management and Wetland Offsetting Plan,
30 and the wildlife and wildlife habitat management, light management, and noise
31 management components of the CEMP and OEMP, all of which would require
32 consultation with Indigenous Groups. The EAO is also proposing these mitigations as
33 KMMs under CEAA 2012 which would include the requirements for migratory birds,

- 1 lighting, noise and wildlife and wildlife habitat management and monitoring, and a
2 Wetland Compensation Plan; and
- 3 • All vessels would adhere to the Marine Regulations and Legislation regulating vessel
4 noise and lighting.

5

6 The EAO heard that Musqueam Indian Band understands that the EAO has reached a conclusion
7 regarding TMJ-specific impacts to hunting, trapping, and gathering based on conditions today,
8 that Musqueam must reiterate that lack of TMJ-specific severe impact is due to existing impacts
9 that have already severely alienated Musqueam from their territory and degraded Musqueam's
10 ability to practice rights-based harvesting.

11 The EAO also heard that additionally, Musqueam are continually working on restitution of
12 habitat and restitution of harvesting opportunities. As such, Musqueam has a primary goal to
13 acquire land and restore habitat to a degree that future hunting, trapping, and gathering
14 opportunities are re-established. Musqueam told the EAO that with this context in mind,
15 Musqueam has worked collaboratively with TJLP to mitigate impacts and determine
16 appropriate accommodation. Therefore, as outlined in Musqueam Indian Band's letter, subject
17 to satisfactory finalization of conditions and mitigation measures, Musqueam is satisfied with
18 the progression of the environmental assessment of TMJ and believes it is ready to proceed
19 onto referral to the appropriate ministers.

20 *POTENTIAL IMPACTS ON CULTURAL CONTINUITY & SENSE OF PLACE AND IDENTITY*

21 Cultural Continuity and Sense of Place and Identity are important Musqueam values, and the
22 following sections in italics were written by Musqueam Indian Band in their own words. The
23 EAO appreciates that Musqueam has provide information and examples about Musqueam
24 cultural continuity and sense of place and identity in their own words to help the EAO and
25 Decision Makers to better understand these core interconnected values and how these values
26 may interact with potential impacts from TMJ. The EAO assessed potential impacts to
27 Musqueam's cultural continuity and sense of place and identity as requested by Musqueam in
28 the sections below. As previously described, the EAO has also included these two values in its
29 assessment of TMJ's potential impacts to Musqueam Indian Band's rights to fish (section A
30 above) and hunt, trap and gather (section B above).

31 *INTRODUCTION – RELATIONSHIP BETWEEN CULTURAL CONTINUITY & SENSE OF PLACE AND* 32 *IDENTITY*

33 *The purpose of this section is to assess the potential impacts of TMJ on Musqueam's cultural*
34 *continuity and sense of place and identity. To adequately understand these values, it is*

1 *necessary to understand their relationship to each other and to Musqueam’s other rights-based*
2 *value components and activities. To this end, this section uses ąəłłaləmăcən (orcas) and*
3 *Musqueam fishing practices as illustrative examples to outline these relationships. It is*
4 *important to consider multiple examples to clarify that these concepts are applicable to more*
5 *than the examples provided. The potential impacts on cultural continuity and sense of place and*
6 *identity are assessed separately to ensure distinct impacts are identified.*

7 *Musqueam’s cultural continuity and sense of place and identity are crucial aspects of*
8 *Musqueam culture and well-being which are foundational and inter-related; sense of place and*
9 *identity is not possible without cultural continuity and cultural continuity is not possible without*
10 *sense of place and identity. Both are directly tied to the land, waters, and resources of*
11 *Musqueam’s territory, and as a result, impacts to any valued component (i.e., harvesting,*
12 *marine access, socio-economic impacts) threaten cultural continuity and sense of place and*
13 *identity. Thus, understanding the nature of cultural continuity and sense of place and identify is*
14 *vital to understanding all impacts to Musqueam Aboriginal Interests. Importantly, cultural*
15 *continuity, sense of place and identity, and fishing were identified by Musqueam in their*
16 *Knowledge and Use Study as the three rights-based Valued Components relating to Musqueam*
17 *knowledge and use that may be impacted to a substantial degree by TMJ. While they were*
18 *separated into distinct categories for the purpose of the knowledge and use study, it’s important*
19 *to understand that they are heavily inter-related.*

20 *Musqueam is at a critical time for supporting and promoting cultural continuity as a generation*
21 *of knowledge holders ages while current and ongoing opportunities for these knowledge holders*
22 *to engage in the transfer of knowledge with younger generations is threatened by reduced*
23 *access to important locations, experiences, and cultural practices. Sense of place stems from*
24 *being in the environment and being able to experience a connection to the lands and waters*
25 *that is uninterrupted by external stressors and annoyances and unimpeded by access*
26 *constraints. Sense of place is also reinforced in a multi-generational way; ideally knowledge*
27 *holders and younger Musqueam members participate in cultural activities (i.e., fishing) in the*
28 *broader territory which reinforce sense of place, and by extension promote and support cultural*
29 *continuity. Every aspect of Musqueam’s lived environment is a mnemonic device for aspects of*
30 *Musqueam’s sniŵ (teachings) and sŵəyəm (ancient histories), further reinforcing the*
31 *relationship between sense of place and identity and cultural continuity.*

32 *For the purposes of the assessing impacts on Musqueam’s Aboriginal Interests it may be useful*
33 *to understand cultural continuity and sense of place and identity as distinct concepts that can be*
34 *impacted differently by project-related activities. However, for Musqueam, these concepts are*
35 *inseparable from Musqueam’s distinct way of life and they rely on and re-enforce each other*
36 *through the active practice of Musqueam culture, including harvesting, using həŋqəmiŋəm,*

1 *navigating the territory, sharing sniw̓ (teachings) and sɣʷəyə́n̓ (ancient histories), and fulfilling*
2 *the responsibility to be stewards of the territory. Just as these concepts are Inextricably*
3 *interrelated, impacts on them are as well. There is both negative and positive feedback loops*
4 *that are reinforced when these practices are disrupted or practiced. Musqueam values and way*
5 *of life, including fulfilling Musqueam's responsibilities as stewards of their traditional territory*
6 *rely on maintaining cultural continuity and sense of place and identity.*

7 *q̓əl̓təl̓m̓əc̓ən (ORCAS) EXAMPLE TO DEMONSTRATE PROJECT IMPACTS ON CULTURAL* 8 *CONTINUITY AND SENSE OF PLACE AND IDENTITY*

9 *For Musqueam, q̓əl̓təl̓m̓əc̓ən (orcas) and specifically the SRKWs, are a culturally and spiritually*
10 *significant species through their importance to Musqueam's Cultural Heritage and Current Use*
11 *of Land and Resources for Traditional Purposes. SRKW are intrinsically tied to the Musqueam's*
12 *cultural continuity and sense of place and identity. They have an important role in Musqueam's*
13 *oral histories and traditions, including songs and artwork, which are essential for cultural*
14 *wellbeing. For Musqueam people the songs, artworks and the q̓əl̓təl̓m̓əc̓ən (orcas) themselves*
15 *provide cues for sharing knowledge and are tools for teaching Musqueam's culture and*
16 *language. Impacts on SRKW and their potential loss disrupts cultural continuity, as it takes only*
17 *a couple of generations to move from histories to stories.*

18 *SRKW and q̓əl̓təl̓m̓əc̓ən (orcas) role in Musqueam's sense of place and identity is tied to the*
19 *way Musqueam people understand both q̓əl̓təl̓m̓əc̓ən (orcas) and their own relationship to the*
20 *territory. From Musqueam's perspective, it can be difficult to separate SRKW, as a separate*
21 *valued component, from the other interrelated elements of Musqueam territory. Musqueam*
22 *people see themselves as belonging to the earth, as a child belongs to their mother, which*
23 *comes with a responsibility for care that extends to SRKW, salmon, sturgeon, eulachon and*
24 *other species. For Musqueam, this care or stewardship responsibility carries its own cultural*
25 *significance and contributes to Musqueam sense of identity.*

26 *Furthermore, SRKW and q̓əl̓təl̓m̓əc̓ən (orcas) are important to Musqueam's cultural continuity*
27 *because of both their distinct role in the territory's ecosystems and their specific relevance to*
28 *Musqueam culture. SRKW have an important role in the ecosystems of Musqueam territory,*
29 *which has a tangible impact on Musqueam. SRKW can affect the timing of fish running up the*
30 *Fraser River, which directly alters the timing of Musqueam fishing opportunities. q̓əl̓təl̓m̓əc̓ən*
31 *(orcas), more broadly, are also an important predator in the ecosystem and play a role in*
32 *controlling the populations of other marine mammals, such as seals and sea lions, which directly*
33 *affects abundance of fish in the territory for Musqueam fishers and can alter the availability of*
34 *preferred fishing locations. Not only is the ecosystem disrupted by the decline in SRKW, but their*
35 *decline also disrupts Musqueam ability to transfer knowledge from one generation to the next*
36 *when important features of the territory are no longer frequently present. This represents a key*

1 *example of how an impact to one element of the environment or to one particular species has*
2 *cascading effects on other elements of the territory, these combined impacts representing a*
3 *direct threat to cultural continuity and sense of place and identity.*

4 *The relationship between SRKW, fish, Musqueam's fishing practices, cultural continuity and*
5 *sense of place and identity is one illustrative example of the deep intrinsic connects between*
6 *these concepts for Musqueam.*

7 **FISHING EXAMPLE TO DEMONSTRATE PROJECT IMPACTS ON CULTURAL CONTINUITY AND**
8 **SENSE OF PLACE AND IDENTITY**

9 *Musqueam's fishing practices also provide a clear example of the complex interdependence of*
10 *Musqueam's Aboriginal rights, traditional practices and cultural continuity and sense of place*
11 *and identity. Musqueam fishing, including harvesting of crab and other seafood, is both one of*
12 *the clearest expressions of Musqueam culture and traditions and one that is most clearly*
13 *impacted by the Project. The continuation of many Musqueam culture activities rely on both*
14 *having sufficient fish and seafood for the community and participating in the act of fishing.*
15 *Musqueam continues the practice of communally distributing fish to Musqueam families,*
16 *particularly elders and others who are unable to fish. Having sufficient fish is also important for*
17 *Musqueam ceremonies, such as funerals, and for maintaining protocols between families and*
18 *other nations. The act of fishing itself is essential for Musqueam's cultural continuity, as it*
19 *creates opportunities for Musqueam members to share Musqueam history, practices and values*
20 *and knowledge about Musqueam territory and its species. All aspects of Musqueam fishing,*
21 *including harvesting, preserving, distribution, consumption and fisheries management, provide*
22 *opportunities for cultural continuity and contribute to sense of place and identity. It is through*
23 *consistent and regular repetition of these practices that Musqueam culture has been*
24 *transmitted between generations for thousands of years. The continuation of these cultural*
25 *practices and knowledge in turn supports the continuation of Musqueam fishing practices.*
26 *Together Musqueam fishing, knowledge and other cultural practices sustain each other.*

27 *Cultural continuity is about ensuring the ability of future Musqueam generations to practice the*
28 *Musqueam way of life. Taking this concept seriously requires considering the impacts projects*
29 *have on Musqueam's future ability to exercise Aboriginal rights. As part of our stewardship*
30 *responsibility, Musqueam is actively working to restore key populations, such as sturgeon,*
31 *eulachon, clams and oysters, to a condition where they can be harvested again. If harvesting*
32 *sites, such as tidal flats for harvesting clams, are destroyed while populations are recovering, it*
33 *will not be possible to restore traditional harvesting practices at these locations. Activities*
34 *practiced in specific locations often have specific knowledge tied to them, including about the*
35 *territory (timing, seasonality and movement of species), history and hə́nqəmiḥə́m. Ending a*
36 *practice at an important location therefore risks losing the knowledge associated with it.*

1 *There is also a deep relationship between Musqueam’s fishing practices and sense of place and*
2 *identity. Musqueam sense of place and identity is tied to the ability to access fish and resources*
3 *from traditional territory, as this is part of what it means to be xʷməθkʷəy̓əm. The act of fishing*
4 *is also one of the primary ways Musqueam people navigate, experience, and maintain*
5 *knowledge about their territory. Actively maintaining this knowledge is particularly important as*
6 *projects continue to alter the territory, river geomorphology, fish behavior and resource*
7 *abundance. Musqueam’s traditional ecological knowledge is not static but is learned and*
8 *maintained though lifetimes of practice throughout the territory. The loss of fishing*
9 *opportunities, therefore, also impacts the ability to maintain sense of place and identity. In turn,*
10 *maintaining this sense of place and identity is important for ensuring Musqueam people,*
11 *including future generations, continue fishing and associated practices.*

12 *In other words, any disruptions to Musqueam fishing, including from the Project, will impact*
13 *Musqueam’s cultural continuity and sense of place and identity. At the same time, disruptions to*
14 *Musqueam’s cultural continuity and sense of place and identity are likely to impact the efficacy*
15 *and safety of Musqueam fishing activities. A more thorough analysis of impacts to Musqueam*
16 *fishing is provided above in [Section 14.5.3.A](#). It is important to re-emphasize that the concepts*
17 *outlined here about fishing are also true of many of Musqueam’s other traditional practices,*
18 *including plant harvesting and waterfowl hunting.*

19 *In summary, to adequately understand what cultural continuity and sense of place and identity*
20 *mean to Musqueam, it is essential to understand how fundamentally interrelated these*
21 *concepts are to each other and to other VCs, such as fishing and q̓əl̓haləməcən (orcas). However,*
22 *it is also important to understand the distinct impacts the Project may have on both valued*
23 *components. Therefore, the following sections separately assess the potential impacts of the*
24 *Project on Musqueam’s cultural continuity and sense of place and identity.*

25 **C. POTENTIAL IMPACTS ON CULTURAL CONTINUITY**

26 In the Musqueam 2018 Knowledge and Use Study, Musqueam Indian Band stated that their
27 ability as a people and a culture depends on the ability of members to transmit and share their
28 knowledge¹⁹³. This includes knowledge of places and practices, as well as the
29 *hən̓q̓əm̓iñəm̓* language, which is tied to the knowledge and practices across the landscape (for
30 example, through place names, mnemonic devices for stories, histories, and genealogies).

31 Musqueam Indian Band has identified the area surrounding the TMJ as a place where teaching
32 actively occurs. Musqueam Indian Band teaching and learning models are activity-based and
33 depend on multisensory interactions with the landscape. Musqueam Indian Band noted those
34 teaching moments are often spontaneous and unscripted and arise from opportunities to
35 practice traditional activities in the company of someone who is more experienced or

1 knowledgeable. This is a life-long and iterative process that requires repeated exposure to
2 understand seasonal and year-over-year differences in resource availability.
3 Musqueam Indian Band also noted that knowledge transmission requires the participation and
4 the experience of numerous individuals, and that the diffusion of knowledge within the
5 community builds social cohesion¹⁹³.

6 *snəwəyəł* (teaching) also include *šxwtəhim* (beliefs, ways, manners, and customs) and
7 Musqueam Indian Band identity, including rights, responsibilities, and what distinguishes
8 Musqueam Indian Band from others. Musqueam Indian Band stated that abundant and high-
9 quality resources are vital to the transmission of knowledge, but this is becoming increasingly
10 difficult due to cumulative effects to resources within Musqueam Indian Band's territory.
11 Similarly, resources must also be accessible to facilitate knowledge transmission, and
12 Musqueam Indian Band emphasized the importance of navigation on the Fraser River, including
13 access to areas, the quality of the access, and adequate time to teach. Musqueam Indian Band
14 reported that their cultural continuity continues to be affected by government legislation and
15 policies, including the reserve system, residential schools, and restrictions to resources.
16 Musqueam Indian Band noted that impacts to members' ability to engage in traditional
17 resource use leads to an erosion of knowledge, teaching capacities, and opportunities for
18 teaching and learning.

19 **14.4.3.1.9 Potential Impacts to Access and Use of Key Cultural Areas resulting from the** 20 **Project**

21 In its 2018 Knowledge and Use Study, Musqueam Indian Band outlined a number of site-specific
22 values related to Cultural Continuity in the Knowledge and Use Study Area, as described below
23 ¹⁹³:

- 24 • Knowledge and Use Study Project Jetty Footprint: nine site specific values including:
25 teaching areas; important fishing locations; a water route; high value fish habitat and
26 spawning locations; hunting and trapping areas; habitation sites; and a spiritual site;
- 27 • Knowledge and Use LSA: 61 site-specific values, including: culturally significant sites and
28 travel routes along which Musqueam Indian Band members pass on intergenerational
29 teachings on traditional harvesting, particularly fishing, hunting, crabbing, and food
30 plant gathering; sites where Musqueam Indian Band members have gathered to pass
31 along oral histories and teachings, including a site containing Musqueam belongings;
32 and
- 33 • Knowledge and Use Regional Study Area: 86 site-specific values including areas used for
34 the intergenerational transmission of knowledge related to fishing, hunting, plant
35 gathering, and processing activities such as smoking and drying fish, and water routes

1 travelled by members to access Musqueam Indian Band territory.

2 Musqueam Indian Band identified the following potential TMJ interactions with their cultural
3 continuity:

4 • *“Increased interruptions to knowledge transmission and lost opportunities to transmit
5 knowledge due to loss of access and use of the [Knowledge and Use] Study Area and
6 from construction and operation activities, including the additions of in-water
7 infrastructure and increases in marine vessel traffic;*

8 • *Increased interruptions to knowledge transmission and lost opportunities to transmit
9 knowledge due to the compounding effects of industrial development projects,
10 urbanisation, and environmental stressors on the resources, lands, and waters in the
11 vicinity of the Project;*

12 • *Increased interruptions to knowledge transmission and lost opportunities to transmit
13 knowledge due to rapid environmental change caused by Project activities, rendering
14 Musqueam knowledge outdated;*

15 • *Increased interruptions in knowledge transmission and lost opportunities to transmit
16 knowledge due to avoidance of, and alienation from, the [Knowledge and Use] Study
17 Area as a result of increases in marine traffic, hydrological and ecological changes, and
18 noise disturbances; and*

19 • *Increased disruption to knowledge transmission due to Project restrictions that reduce
20 Musqueam members’ abilities to freely access preferred resources and waters in the
21 [Knowledge and Use] Study Area.”¹⁹³(p. 3, 59, 115); and*

22 • Musqueam Indian band identified that Impacts on SRKW and their potential loss
23 disrupts cultural continuity, as it takes only a couple of generations to move from
24 histories to stories and the decline in SRKW disrupts Musqueam ability to transfer
25 knowledge from one generation to the next when important features of the territory
26 are no longer frequently present.

27 Musqueam Indian Band described the importance of being on the land to teaching and learning
28 of community members. A large amount of cultural knowledge relates to the lower Fraser
29 River, which includes the Knowledge and Use Study Area. The Fraser River is used as a
30 classroom, where knowledge is taught and built through experience¹⁹³. Knowledge transmission
31 depends on time, in that reiteration and exposure are necessary elements for it to occur.
32 Knowledge transmission also depends on healthy resources, through both sharing information
33 about traditional foods, including how to obtain and process them, and also through sharing
34 the actual foods. Due to this, fewer resources can mean fewer opportunities to learn about
35 obtaining these resources. Musqueam Indian Band noted that learning through direct

1 experience can be lost when resources are depleted, for example, when certain salmon runs
2 have been too low to fish, it has deprived Musqueam Indian Band members (especially younger
3 generations) for the opportunity for learning and cultural continuity.

4 Knowledge transmission depends on a number of key factors, such as access to the land,
5 resources and time, and impacts to any of these factors can have adverse effects on cultural
6 persistence¹⁹³. Many interconnections exist between access restrictions and environmental
7 change and effects on knowledge transmission. Musqueam Indian Band also identified impacts
8 to knowledge transmission and cultural continuity occurring through impacts to the Musqueam
9 VC for fishing, which are described in the “Cultural Continuity” section below.

10 Musqueam Indian Band notes that TMJ could result in increased gaps in knowledge from lost
11 opportunities (decreased availability of resources) to transmit knowledge due to TMJ activities.
12 With respect to the importance of access and use of key areas and resources, please refer to
13 the above sections discussing potential impacts of TMJ on fishing, hunting, and trapping, and
14 gathering and the section below which discusses potential impacts of TMJ on Musqueam Indian
15 Band’s proven and asserted Aboriginal rights and title.

16 Musqueam Indian Band identified concerns regarding potential decreased access, change in
17 quality of access, and use of key areas for cultural continuity as a result of TMJ construction.
18 Musqueam Indian Band noted that this could then contribute cumulatively to the multiple
19 interacting factors that disrupt and reduce knowledge transmission that is essential to the
20 maintenance of Musqueam Indian Band’s social connections, member identities, and cultural
21 wellbeing.

22 TJLP has stated that TJLP’s influence on TMJ-related vessel operations would be limited beyond
23 TMJ’s marine terminal area but is committed to adjusting their shipping schedule when safe
24 and feasible to do so in order to reduce the likelihood of TMJ-related vessels interrupting FSC
25 openings in the lower Fraser River. To avoid or reduce disruptions to marine access to the area,
26 the EAO is recommending KMMs under CEAA 2012 for a Marine Access and Transportation Plan
27 from the TMJ site to Sand Heads and a Vessel Traffic Management Plan for the shipping route
28 until 12 nm. The Marine Access and Transportation Plan would include a description of
29 mitigations to reduce disruptions caused by construction and operations for members of
30 Indigenous Groups to carry out traditional use activities that have been identified and
31 communicated by Indigenous Groups to TJLP in relation to this or other relevant plans. The
32 Vessel Traffic Management Plan would include speed limits, where safe, within the Fraser River
33 and MSA area, and commit TMJ-related vessels to following established shipping routes and
34 maintaining a constant course. The EAO is also proposing Condition 17: Indigenous Cultural
35 Awareness, Recognition and Mitigation, which would assist in mitigating impacts to cultural
36 continuity and Musqueam Indian Band knowledge holders, by offering opportunities to

1 Indigenous Groups to lead or support activities such as holding ceremonies, executing cultural
2 protocols, transmission of knowledge or language, and recognizing cultural heritage.

3 **14.4.3.1.10 Potential Impacts to Musqueam Experience of the TMJ Area**

4 Musqueam Indian Band's 2018 Knowledge and Use Study outlines how TMJ (alongside other
5 developments) could create gaps in knowledge in a short span of time¹⁹³. Rapid change can
6 create disconnects between Musqueam Indian Band members and rights-based practices and
7 between generations of people. Similarly, changes to the environment can result in fewer direct
8 experiences on the water, which can reduce how reliable current knowledge is.

9
10 Musqueam Indian Band also raised that the quality of the experience also depends on the
11 availability of resources that make the experience possible. As discussed in the sections below,
12 there is potential for changes to quality of experience while exercising traditional harvesting
13 activities, which could affect cultural continuity at important locations for Musqueam Indian
14 Band. Noise, vibration, and changes to visual quality (daytime viewing and nighttime lighting)
15 during construction have the potential to impact quality of experience, though these effects
16 would be temporary and short-term in nature. As part of the Cultural Awareness, Recognition
17 and Mitigation condition, Musqueam Indian Band would be involved to implement cultural
18 practice, education, or recognition opportunity and associated activities. The EAO proposed
19 several conditions such as the light management and noise and vibration management
20 components of the CEMP and OEMP which would require consultation with Indigenous groups,
21 which seeks to partially address these temporary, potential effects. The EAO is also
22 recommending a Marine Access and Transportation Plan as a KMM under CEAA 2012 to reduce
23 impacts to access from construction and operations.

24 **14.4.3.1.11 Potential Impacts to Cultural Aspects of the TMJ Area**

25 Musqueam Indian Band noted that one specific activity that could directly impact Musqueam
26 Indian Band knowledge is dredging. Dredging has the potential to change how and what fish
27 congregate in an area, how the river flows or where fish spawn. Interruptions to knowledge
28 transmission are especially likely if TMJ-related environmental changes occur at the same time
29 as access and use restrictions. Community members viewed TMJ as yet another threat to a
30 central pillar of Musqueam Indian Band's cultural wellbeing¹⁹³.

31
32 Musqueam Indian Band identified concerns related to increased interruptions in knowledge
33 transmission and lost opportunities to transmit knowledge due to avoidance of, and alienation
34 from, the Knowledge and Use Study Area resulting from hydrological and ecological changes,
35 marine traffic, and noise disturbances. The EAO proposes Condition 17: Indigenous Cultural
36 Awareness, Recognition and Mitigation that would include a description of 1) a process for

1 continuing engagement with Indigenous Groups to further identify and plan for opportunities
2 for cultural awareness and recognition; 2) how opportunities for cultural awareness and
3 recognition that have been requested by Indigenous Groups have been considered and
4 supported by TJLP; and 3) the process of how Indigenous Groups will be involved in the
5 implementation of cultural awareness and recognition activities. The EAO also proposes a
6 condition for Indigenous Monitors that would require TJLP to offer opportunities for
7 Involvement of Indigenous Groups in construction monitoring activities for activities that may
8 affect Indigenous use and related environmental values. Similarly, several conditions and KMMs
9 recommended under CEAA 2012 require the development of plans, these plans would also
10 require the inclusion and consideration of any Indigenous knowledge that has been shared with
11 TJLP. This would ensure that the management of TMJ-related effects allow for mitigation
12 measures to be informed by traditional knowledge.

13 **D. POTENTIAL IMPACTS TO SENSE OF PLACE AND IDENTITY**

14 Musqueam Indian Band reported that for members, place names, heritage sites, ceremonies,
15 gatherings, norms, protocols, social bonds, and use and travel of the Fraser River are
16 fundamental to sense of place and identity¹⁹³. Musqueam Indian Band consider Sense of Place
17 and Identity to be highly connected to the other VCs of Fishing and Cultural Continuity, as well
18 as other resource and land-based cultural activities, such as hunting and plant harvesting.
19 Musqueam Indian Band noted that Sense of Place and Identity is distinct in that it describes
20 specific kinds of relationships between people, and people and place, which depend on unique
21 environmental and social factors which warrant discussion. Musqueam Indian Band stated that
22 its culture is inseparable from the surrounding environment.

23 A key aspect of Musqueam Indian Band's sense of place is encompassed in *snəw' eyəł*, which
24 includes a person's understanding of their genealogy, rights, and responsibilities, and
25 geographical, temporal and social space. Sense of place is also built from memories and
26 experiences in a particular environment or space, as well as the presence of familiar and valued
27 features. Sense of self is closely linked to place, in which people and environment are united as
28 whole. The environment, place, identity and spirituality are interlaced and reinforcing. This
29 holistic worldview is a pillar of Musqueam Indian Band identity, and ties in to Musqueam
30 stewardship, as Musqueam Indian Band are the guardians for their ancestors and future
31 generations¹⁹³. Stewardship and being guardians of the salmon (and other resources) and the
32 Fraser River are common Musqueam Indian Band values and have been for generations. Such
33 norms and principles are a core part of many Musqueam members' ideas of self, community,
34 and heritage. As a consequence, environmental degradation is in direct contravention of these
35 ideals, and is harmful to Musqueam identities and emotional, spiritual, and psychological
36 wellbeing .

1 Musqueam Indian Band reported that oral histories and historical experiences tell them who
2 they are, where they come from, and their ties to their territory. In addition to these histories
3 and experiences, a record of belongings (artefacts), and village and burial sites (archaeological
4 sites) anchor Musqueam Indian Band sense of place and identity. Place names are tied to
5 stories and spiritual sites, which form a network of 125 Musqueam Indian Band named sites
6 linked by genealogy, history, story, cultural practice, teachings, and familial and community
7 relationships¹⁹³. Musqueam Indian Band told the EAO that SRKW have an important role in
8 Musqueam's oral histories and traditions, including songs and artwork, which are essential for
9 cultural wellbeing.

10 Musqueam Indian Band have noted that rapid industrialization and urbanization have
11 drastically changed Musqueam Indian Band's territory, from its aesthetics, to the quality of
12 access and use, to the abundance of resources, resulting in the loss of valued place
13 characteristics and disrupting Musqueam Indian Band members' connection to place.
14 Landscape changes have left large parts of Musqueam Indian Band's territory inappropriate for
15 ceremonial and cultural activities¹⁹³. Musqueam Indian Band noted that psychological and
16 emotional distress often accompanies disruptions to the water, the land, and its resources
17 given the close affinity felt by Musqueam Indian Band towards the environment.

18 **14.4.3.1.12 Potential Impacts to Cultural Heritage Resources and Sites**

19 Heritage sites are discussed in the Knowledge and Use Report (Musqueam, 2018), as place
20 names, camp sites and old village sites represent Musqueam Indian Band ancestral ties to the
21 territory¹⁹³. For instance, the named site of *ł̓aqtin̓as* (or "long shore") is located across the
22 Fraser River from the TMJ site. In addition, an old village site is located approximately five km
23 upstream from the Project Jetty Footprint, known as *səw̓áq̓'eqsən*. Musqueam Indian Band
24 stated that burials and belongings found within hints at the expansive historic use. As discussed
25 in [Section 13.2.3](#), the EAO notes that temporary interruptions to Indigenous access to known
26 heritage resources are possible throughout construction and during operations since the EAO
27 assumed that Indigenous mariners would avoid entering and remaining in the marine terminal
28 area due to the warning signs and notifications regarding elevated public risk, in particular
29 when vessels would be berthing, loading, or de-berthing at TMJ and during transit of TMJ-
30 related vessels (LNG Carriers and Bunker vessels) through the Salish Sea and in the Fraser River.
31 Based on the assessed magnitude of wakes attributable to TMJ-related vessels, impacts to
32 cultural sites from wakes are not anticipated (see Vessel Wakes and Current Use of Lands and
33 Resources for Traditional Purposes sections in Part B).

34 To ensure access to cultural and archaeological sites at the TMJ site are not disrupted during
35 construction and operations, the EAO proposes a condition for a Cultural and Archaeological
36 Resources Management Plan which would involve TJLP addressing Indigenous concerns around

1 access, both in terms of ensuring Indigenous access to sites during construction and prohibiting
2 unauthorized access by the public. The Heritage Resources chapter of Part B provides further
3 details on the Cultural and Archaeological Resources Management Plan. The EAO notes that
4 where intact or disturbed resources are found at the TMJ site, TJLP would be required to
5 manage them in accordance with the HCA, employ a Chance Find Protocol and carry out all
6 activities that would affect those resources in compliance with any permits issued for the HCA.
7 The EAO also understands that Musqueam Indian Band also requires Musqueam Indian Band-
8 specific permits for archaeological work, which would allow Musqueam Indian Band to input
9 additional mitigations. The EAO is also recommending KMMs under CEAA 2012 for a Marine
10 Access and Transportation Plan, which would identify the procedures of communication to
11 Indigenous Groups and identification of mitigations to reduce disruptions to access caused by
12 Construction and Operations for members of Indigenous Groups to carry out traditional use
13 activities.

14 **14.4.3.1.13 Potential Impacts to Access to and Use of Cultural Sites and Areas**

15 In the 2018 Knowledge and Use Study, Musqueam Indian Band outlined a number of site-
16 specific values related to Sense of Place and Identity in the Knowledge and Use Study Area, as
17 described below¹⁹³:

- 18 • Knowledge and Use Study Project Jetty Footprint: Three site-specific values including a
19 water route used to access Musqueam Indian Band's territory, camping sites, and a
20 spiritually valued area for Musqueam Indian Band members;
- 21 • Knowledge and Use LSA: 151 site-specific values including temporary and permanent
22 habitation sites used currently and historically (such as traditional harvesting camps, old
23 village sites, and other areas habituated by Musqueam Indian Band members prior to
24 reserves), historic burial sites, place names, ceremonial and spiritually important sites,
25 and travel routes used by Musqueam Indian Band members to access their traditional
26 territory; and
- 27 • Knowledge and Use Regional Study Area: 269 site-specific values including sites of
28 ceremonial importance where Musqueam Indian Band members have hosted and
29 attended various ceremonies (such as mask dance ceremonies, burnings, coming and
30 age and naming ceremonies, weddings, and memorials), place names, locations of
31 former and existing burial sites, other areas of historic importance (such as former
32 battlegrounds, village sites, and a shell midden) and water routes used to access
33 Musqueam Indian Band's traditional territory and for war canoe racing.

34 Musqueam Indian Band identified the following potential TMJ interactions with their sense of
35 place and identity:

- 1 • *Increased disruption of Musqueam members' sense of place as a result of changes to*
2 *valued places and place characteristics (e.g., from marine traffic, noise disturbances,*
3 *and ecological changes);*
- 4 • *Disruption of Musqueam identities and increased disconnection from Musqueam*
5 *cultural heritage due to direct and indirect Project effects on fishing, ceremonies,*
6 *gatherings, and consumption of traditional foods, and other cultural practices;*
- 7 • *Increased psychological and emotional stress from uncertainty over Project effects*
8 *(e.g., reduced safety from marine traffic, disruptions to fishing, accident, and spill*
9 *potential); and*
- 10 • *Increased disruption to the protection, persistence, and living of Musqueam šxʷtəhiṃ*
11 *(i.e., ways, manners, and customs) and snəwəyət (i.e., teachings received since*
12 *childhood, including identity and responsibilities) as a result of Project construction*
13 *and operations”¹⁹³ (p. 79, 116).*

14

15 As described in the 2018 Musqueam Indian Band's Knowledge and Use Study, one potential
16 outcome of TMJ is avoidance of the TMJ site, as Musqueam Indian Band members may be
17 deterred by construction noise and activity. This would be a more likely outcome for younger
18 generations who are still learning to navigate the Fraser River and the presence of bigger ships
19 could lead to further obstacles. This may also be the case for more experienced members who
20 would also be barred from using parts of the Fraser River due to ship traffic and maneuvering
21 and exclusion zones. As discussed in [Section 13.3.1](#), the EAO acknowledges Indigenous concerns
22 that noise and visual disruptions and concerns about safety could then lead to reduced
23 opportunities for cultural transmission including Indigenous language acquisition by younger
24 generations while undertaking traditional harvesting activities on land or on the water. To
25 reduce this impact, the EAO is proposing Condition 17: Indigenous Cultural Awareness,
26 Recognition and Mitigation, which would provide opportunities for Musqueam Indian Band to
27 execute cultural protocols and transmission of knowledge or language.

28

29 Musqueam Indian Band's Knowledge and Use Study discusses pathways of interaction between
30 TMJ and Sense of Place and Identity, including potential effects from marine traffic. Musqueam
31 Indian Band noted that the potential for more traffic would mean more stress and less
32 enjoyment on the water, including concerns for safety when on the water¹⁹³. The report
33 outlined that the current level of traffic in the area created a high level of disturbance, and
34 additional vessels might surpass Musqueam Indian Band's threshold of comfort to visit the TMJ
35 site. With respect to the potential effects of TMJ-related vessel traffic, as discussed in section
36 2.2.1, the EAO acknowledges that Musqueam Indian Band's marine travel and traditional

1 marine harvesting activities (fishing, crabbing, and other marine based gathering activities)
2 could be affected periodically and for short terms by transiting TMJ-related vessels. The EAO is
3 recommending KMMs under CEAA 2012 for a Marine Communication Plan and Marine Access
4 and Transportation Plan which would identify the procedures of communication to Indigenous
5 Groups and identification of mitigations to reduce disruptions caused by Construction and
6 Operations for members of Indigenous Groups to reduce impacts caused by TMJ-related
7 vessels.

8 **14.4.3.1.14 Potential Impacts to Musqueam Indian Band's quality of experience of the TMJ**
9 **area**

10 As described in the 2018 Knowledge and Use Study, there are many facets and dimensions of
11 sense of place and identity, including spatial, physical, emotional, symbolic, psychological,
12 social, and activity-based dimensions¹⁹³. These dimensions are developed over time through
13 familiarity, shared experiences and cultural knowledge. Musqueam Indian Band described the
14 intangible benefits of spaces that impart this sense of place and identity, including emotional
15 and psychological benefits and social and cultural connections and wellbeing.

16 Emotional and psychological stress can sometimes occur alongside disruptions to resources,
17 land and the water, which can have cross-generational effects¹⁹³. The EAO understands TMJ
18 could increase the disruption to Musqueam Indian Band members' sense of place in the TMJ
19 area due to factors such as increased noise, increased marine traffic, and ecological and
20 geographical changes. This could then lead to increased psychological and emotional stress
21 from changes to physical and auditory landscape, and the deterioration of social relationships
22 from the loss of access to that area. There would be the potential for changes to quality of
23 experience which could affect sense of place and identity at important locations for Musqueam
24 Indian Band. The EAO concluded that there would be a residual effect to noise during
25 construction and decommissioning. Visual conditions during construction and operations could
26 also affect the site. The EAO proposes a condition requiring the development of a noise
27 management plan and lighting management plan as part of the CEMP and OEMP, in
28 consultation with Indigenous groups, which seeks to partially address potential effects to the
29 auditory and visual experience of the TMJ site. The CEMP and OEMP would also include
30 component plans for vegetation and wetland management.

31
32 The EAO is also proposing a key mitigation under CEAA 2012 for a Marine Access and
33 Transportation Plan, which would reduce impacts to users on the Fraser River to Sand Heads.
34 The Plan would identify marine uses and navigation in the Project area, including fish harvest
35 timing windows, methods to coordinate and communicated with other marine users, and
36 mitigations to reduce disruptions for members of Indigenous Groups to carry out traditional

1 activities, including fishing for FSC purposes that have been identified by Indigenous Groups.
2 Although there are residual effects related to marine use, noise and vibration, and visual
3 quality, all of these effects would be temporary and short-term in nature.

4 **14.4.3.1.15 Conclusion on impacts to Cultural Continuity and Sense of Place and Identity**

5 In consideration of the available information, the EAO's consultation with Musqueam Indian
6 Band, Musqueam Indian Band's engagement with TJLP, TJLP's commitments, the EAO's
7 proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012,
8 the EAO is of the view that the concerns raised regarding potential TMJ related impacts on
9 Musqueam Indian Band's cultural continuity and sense of place and identity have been
10 adequately considered and addressed for the purpose of the EA.

11
12 The EAO understands that in Musqueam Indian Band's view, the existing cumulative impacts on
13 Musqueam territory mean that additional impacts to Musqueam cultural continuity and sense
14 of place and identity cannot be fully mitigated. The EAO heard from Musqueam Indian Band
15 that impacts to their quality of experience and disruption of Musqueam's access and
16 intergenerational knowledge transfer are inherent to TMJ's construction and operation.

17
18 Furthermore, in Musqueam Indian Band's view, the Crown's approach to this assessment has
19 limited Musqueam's ability to effectively address impacts to Musqueam's cultural continuity
20 and sense of place and identity. The EAO understands that Musqueam Indian Band consider
21 both the unwillingness to include Musqueam-specific conditions and the lack of distinction
22 between Indigenous Groups that assert Aboriginal rights and Musqueam, who have a proven
23 Aboriginal Right and actively practice rights-based activities that will be impacted by TMJ,
24 frustrate Musqueam's ability to ensure Musqueam-specific impacts are addressed during the
25 assessment. The EAO heard from Musqueam Indian Band that this is unacceptable to
26 Musqueam Indian Band for projects anywhere in Musqueam territory and
27 Musqueam Indian Band expects the Crown to address these issues differently in future
28 assessments.

29
30 The EAO heard that Musqueam Indian Band understand why the EAO has refrained from
31 determining the significance on impacts to Musqueam's cultural continuity and sense of place
32 and identity, given the limitations of the EAO's assessment methodology. However, the EAO
33 also understands that Musqueam Indian Band do not think lack of an appropriate methodology
34 equates with adequate consideration of impacts and hope to see this issue better addressed in
35 the future. Musqueam Indian Band emphasizes that impacts to cultural continuity and sense of

1 place are already severely impacted as Musqueam has been reterritorialized, alienated, and
2 displaced from territory that is vital to Musqueam cultural continuity.

3 *E. POTENTIAL IMPACTS ON TITLE*

4 The assessment of impacts to Aboriginal title was informed by the relevant information
5 presented above in the EAO's assessment of effects to VCs in Part B of this Report that
6 informed the discussion of impacts to vegetation, wildlife, fishing, hunting, trapping, and
7 gathering, and other traditional and cultural interests.

8 In considering potential impacts of TMJ-related activities on Aboriginal title claims within the
9 vicinity of the TMJ-site, EAO has considered the following three components of Aboriginal title:

- 10 • Use and occupation: Consideration of potential alienation of an area, the degree of
11 potential disturbance or functional effect of the potential disturbance associated with
12 the Project, how the proposed decision might restrict community members' access to
13 the area, and how the proposed decision might affect community members'
14 enjoyment, experience, and use of the area, now and in the future;
- 15 • Decision-making: Consideration of whether the proposed decision would result in a
16 new tenure or transfer of ownership to the area, the extent to which an Aboriginal
17 community might be involved in the decision-making process, and whether the activity
18 might be consistent/ inconsistent with any cultural/other objectives of the Aboriginal
19 group for management in this area, now and in the future; and
- 20 • Economic benefits: consideration of whether the Project-related decision might affect a
21 community's ability to derive direct and/or indirect economic benefits from the area,
22 and how the proposed decision might affect a community's economic development
23 aspirations for the area, now and in the future.

24 Musqueam Indian Band emphasizes the project is entirely within the unceded homeland and
25 territory of the *x^wməθk^wəyám* (Musqueam) people, within which Musqueam continues to hold
26 title and rights. During the EA, Musqueam Indian Band raised concerns about the EAO's
27 characterization of Aboriginal rights and title related to the village site in the draft assessment
28 report for TMJ. To address these concerns, Musqueam Indian Band requested that the EAO
29 include more information to appropriately contextualize claims and a deeper understanding of
30 the familial ties and protocols that govern access to *łáqtinəs* as provided in Musqueam's 2018
31 KUS study.

32 Musqueam Indian Band's 2018 KUS study states that old village and camp sites, such as
33 *łáqtinəs*, are a clear representation of Musqueam ancestral ties to the territory and are
34 important spaces that connect Musqueam to their heritage¹⁹³. Musqueam Indian Band's 2018

1 KUS study also identified that Musqueam and their neighbours and relations practiced a system
2 of resource distribution based on bilateral kinship and descent, which provided people with
3 opportunities to access a wide range of fishing, gathering, and hunting sites through both
4 maternal and paternal lineages if they followed proper protocols¹⁹³. Musqueam people
5 arranged inter-village marriages based on this system to ensure access to resources, as well as
6 participating in feasts and ceremonies that involved the sharing of food and goods between
7 families and villages²⁰⁰.

8 Musqueam Indian Band also identified that Musqueam's Aboriginal title includes a legal
9 interest in land, which encompasses inherent rights, powers, and responsibilities to govern over
10 Musqueam territory - Central to this is decision making, which is reflected in the assessment
11 report under "control of area." Musqueam Indian Band also consider, that in addition to the
12 economic impact from Musqueam's loss of ability to harvest fish, TMJ would also prevent
13 Musqueam from deriving economic benefits from future use of the impacted crown land,
14 for at least the life of the project.

15 Potential TMJ impacts on Musqueam Indian Band title are assessed below.

16 **14.4.3.1.16 Conclusion**

17 In consideration of the available information, the EAO's consultation with Musqueam Indian
18 Band, Musqueam Indian Band's engagement with TJLP, TJLP's commitments, the EAO's
19 proposed EAC conditions if an EAC is issued, and the recommended KMMs under CEAA 2012
20 TMJ is expected to result in a minor impact to Musqueam Indian Bands's Aboriginal title.

21 The EAO understands that that Musqueam is aware of, but does not agree with, the EAO's
22 determination that TMJ will have minor impacts on Musqueam's Aboriginal title, based on its
23 assessment of TMJ's impacts on Musqueam's use and occupation of the area, control of the
24 area, and economic benefits. The EAO heard that Musqueam is already severely impacted by
25 reduced access to both the broader territory and the project area in particular and related
26 degradation of resources. As a result, Musqueam does not consider further impacts to
27 Musqueam's use and occupation to have minor impacts on Musqueam's Aboriginal title.

28 Musqueam Indian Band also views the EAO's approach to consultation as directly undermining
29 Musqueam's ability to practice its governance, which also constitutes an impact on
30 Musqueam's control of the area and Aboriginal title.

²⁰⁰ Suttles, Wayne. 1987. "The Persistence of Inter-village Ties among the Coast Salish." In *Coast Salish Essays*, pp. 209-230. Vancouver: Talonbooks.

1
2 Nonetheless, it is within this context that Musqueam Indian Band has worked collaboratively
3 with the proponent to mitigate impacts and determine appropriate accommodation. Therefore,
4 as outlined in Musqueam Indian Band's letter, Musqueam Indian Band is satisfied with the
5 progression of the Environmental Assessment of the Project and believes it is ready to proceed
6 onto referral to the appropriate minister.

7 The key factors that were considered in support of the EAO's conclusion on the impacts to
8 Aboriginal title are summarized as follows:

9 **Use and Occupation:**

- 10 • Based on the description of the Marine Safety Protocol provided by TJLP during
11 Application Review, the EAO understands that Indigenous harvesters and mariners may
12 enter or pass through the marine terminal area, but the EAO has taken a conservative
13 approach in the impacts assessment and assumed that Indigenous harvesters would
14 avoid entering and remaining in the marine terminal area due to the warning signs and
15 notifications regarding elevated public risk, in particular when vessels would be
16 berthing, loading, or de-berthing at TMJ;
- 17 • The increase in vessel traffic along the Fraser River would be a small percentage
18 increase from traffic already present; and
- 19 • Low magnitude noise effects at the village site of *łəq̓tinəs* which is anticipated to be
20 short-term in duration.

21 **Control of Area:**

- 22 • The area of development for the TMJ jetty is crown land (submerged);
- 23 • Musqueam Indian Band emphasizes that consultation on this project, has primarily
24 involved solicitation of Musqueam feedback regarding what happens in an area more
25 than a substantive role in decision-making;
- 26 • Musqueam Indian Band have identified that stewardship and being guardians of the
27 salmon (and other resources) and the Fraser River is central to being Musqueam, noting
28 that members are continuously innovating and taking measures to restore wild
29 resources, including through selective fishing measures and self-imposed restrictions on
30 harvesting;
- 31 • Historically Musqueam and their neighbours and relations practiced a system of
32 resource distribution based on bilateral kinship and descent, which provided people
33 with opportunities to access a wide range of fishing, gathering, and hunting sites

- 1 through both maternal and paternal lineages if they followed proper protocols; and
- 2 • Musqueam Indian Band have identified Musqueam’s Aboriginal title includes a legal
- 3 interest in land, which encompasses inherent rights, powers, and responsibilities to
- 4 govern over Musqueam territory and central to this is decision making and governance.

5 **Economic Benefits:**

- 6 • The upland portion of TMJ is located on fee simple private lands that were used for
- 7 industrial purposes
- 8 • The construction and operation in the water lot and the vessel traffic from TMJ in the
- 9 Fraser River may have minor economic impacts on Musqueam Indian Band’s harvesting
- 10 of fish; and
- 11 • Musqueam consider that in addition to the economic impact from loss of ability to
- 12 harvest fish, TMJ would also prevent Musqueam from deriving economic benefits from
- 13 future use of the impacted crown land, for at least the life of the project.

14 **Mitigations:**

- 15 • Several conditions are proposed to mitigate impacts to Aboriginal title, including an
- 16 Indigenous Cultural Awareness, Recognition and Mitigation Condition, a Cultural and
- 17 Archaeological Resource Management Plan, Indigenous Monitors, Engagement and
- 18 Reporting, and an Indigenous Training, Employment and Procurement Plan. The EAO is
- 19 also recommending a Marine Access and Transportation Plan as a KMM under CEAA
- 20 2012 to reduce impacts to access from construction and operations.

21 **14.5 SEMIAHMOO FIRST NATION**

22 **14.5.1 COMMUNITY PROFILE**

23 Semiahmoo First Nation is a Central Coast Salish group whose asserted traditional territory

24 includes part of the Lower Mainland area in BC, including sections of the Fraser River and the

25 Strait of Georgia. Semiahmoo First Nation members historically spoke the hə́ŋqəmiḥəm

26 (pronounced “Hul-ka-MEE-num”) language. Semiahmoo First Nation has one reserve, fronting

27 Semiahmoo Bay (part of Boundary Bay) at the Canada-United States border, about one km

1 southeast of White Rock. The reserve, covering approximately 129 ha, is home to 50 of the
2 Nation's 106 registered members²⁰¹.

3 Semiahmoo First Nation's asserted traditional territory is centered on Boundary Bay, takes in
4 the lower Fraser River and adjacent lands downstream of the confluence with the Sumas River,
5 all the Gulf Islands south of Gabriola Island, the San Juan Islands, most of Bellingham Bay, and
6 the Nooksack River. The Boundary Bay area was considered by ethnographers as the core
7 territory of Semiahmoo First Nation. Village sites are identified in the information around the
8 mouth of the Nicomekl River, on Drayton Harbour and from around the mid-1800s, the mouth
9 of the Campbell River. The ethnohistoric information indicates that Cannery Point and the
10 Nicomekl and Campbell Rivers were used by the Semiahmoo people for fishing, hunting, and
11 gathering resources. In the mid-1800s, the information suggests the Semiahmoo may have
12 expanded into an area that opened up for access along the Salmon River.

13 Semiahmoo First Nation have traditionally fished for salmon, sturgeon, and eulachon, as well as
14 other freshwater and marine species. Semiahmoo First Nation identified Important salmon
15 fishing areas as open-ocean sites off the Point Roberts Peninsula, and riverine environments
16 such as the Nicomekl and Little Campbell rivers that feed into Boundary Bay. Semiahmoo First
17 Nation has indicated that historically their traditional economy included fishing in the lower
18 Fraser River, and this fishing was enabled by relationships with other First Nations.

19 Semiahmoo village sites around the mouth of the Nicomekl River, Drayton Harbour and the
20 mouth of the Campbell River were identified as specific sites of traditional importance
21 associated with the Semiahmoo First Nation's fishing right. These areas were used by the
22 Semiahmoo people for fishing, hunting, and gathering resources (such as salmon, herring, and
23 shellfish). Semiahmoo reported that they primarily fished for salmon using a technique known
24 as reef-netting. This requires a specific set of conditions which were limited to only a small
25 number of areas within the Strait of Georgia and off the Point Roberts Peninsula and Cannery
26 Point.

201

Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Semiahmoo First Nation.
https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=569&lang=eng,
accessed December 13, 2021.

1 **14.5.2 SEMIAHMOO FIRST NATION'S INVOLVEMENT IN THE CONSULTATION** 2 **PROCESS**

3 The EAO is of the view that it has approached consultation with Semiahmoo First Nation at the
4 deeper end of the spectrum, with the intent to identify potential impacts and consider ways to
5 address potential impacts to any Aboriginal Interests in the project area identified by
6 Semiahmoo First Nation. As described in the EAO-led Consultation Activities with Indigenous
7 Groups section of this Report, the EAO invited Semiahmoo First Nation to participate in the
8 Working Group.

9 The EAO set out its approach to consultation, including assessments of strength of claim and
10 potential impacts on Semiahmoo First Nation's Aboriginal Interests in a letter to
11 Semiahmoo First Nation dated May 11, 2016. Based on the Province's initial assessments,
12 Semiahmoo First Nation was consulted at the deeper end of the spectrum as set out in
13 Schedule B of the Section 13 Order dated May 11, 2016, which amended the July 24, 2015,
14 Section 11 Order for TMJ.

15 The EAO invited Semiahmoo First Nation to review and provide comments on the draft Section
16 11 Order, the draft VC Selection document, the draft AIR, TJLP's Aboriginal Consultation Plan
17 and Reports, the screening of the Application and on the Application and supplemental
18 material, as well as the opportunity to review and comment on several iterations of the EAO's
19 draft decision materials. As part of the EA Working Group, Semiahmoo First Nation was invited
20 to participate in technical meetings, teleconferences, and site visits during the Pre-Application
21 and Application Review stages. The EAO offered to meet directly with Semiahmoo First Nation
22 to discuss TMJ and the EA process.

23 TJLP began consulting with Semiahmoo First Nation in October 2014 by sending notification
24 letters, before entering the EA process. TJLP reports that they met with Semiahmoo First Nation
25 in June 2016 and Semiahmoo First Nation shared interests related to TMJ. TJLP and Semiahmoo
26 First Nation signed a capacity funding agreement in September 2018 to support participation in
27 the EA process. A summary of TJLP's engagement activities with Semiahmoo First Nation is
28 provided in TJLP's Application and in TJLP's Aboriginal Consultation Reports.

29 **14.5.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

30 The following sections focus on potential impacts of TMJ to Semiahmoo First Nation's
31 Aboriginal Interests. A discussion of the EAO's assessment approach is provided in the Impact
32 Assessment Methods section of Part C. The EAO considered information from public sources as
33 well as relevant issues raised by the Semiahmoo First Nation during the EA process in the

1 following assessments of the potential impacts of TMJ on the Semiahmoo First Nation's
2 Aboriginal Interests. The following sections focus on the potential impacts of TMJ to
3 Semiahmoo First Nation's Aboriginal right to fish, hunt, trap, and gather, and mitigations and
4 accommodations to address potential impacts.

5 *A. POTENTIAL IMPACTS ON FISHING*

6 The Application reported that Semiahmoo First Nation raised concerns about TMJ in relation to
7 fisheries, the Fraser River foreshore, and the effect of marine traffic, and cumulative effects on
8 the lower Fraser River. Semiahmoo First Nation indicated to TJLP that TMJ would be built on
9 unceded land and Semiahmoo First Nation's interests in the land and water need to be
10 considered. DFO data indicates that Semiahmoo members currently fish for FSC purposes
11 upstream of the Port Mann Bridge between the bridge and Kanaka Creek-Derby Reach. In 2014,
12 two community FSC licenses were issued to fish for sockeye by drift net.

13 The EAO evaluated the potential effects on fishing rights attributable to TMJ which are
14 summarized in [Section 13.3.1](#). The EAO is satisfied that the key impacts to biophysical
15 components resulting in changes to fish quantity and quality, changes in access to fishing
16 resources, and changes to social, cultural, and spiritual values associated with traditional fishing
17 activities summarized in that section apply to Semiahmoo First Nation. Semiahmoo First Nation
18 did not raise specific issues and concerns with potential TMJ impacts relating to fishing to the
19 EAO during the Application Review phase of the EA.

20 **14.5.3.1.1 Conclusion**

21 In consideration of the available information, consultation with Semiahmoo First Nation,
22 Semiahmoo First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
23 conditions if an EAC is issued and the recommended KMMs under
24 CEAA 2012, TMJ is expected to result in a minor impact on Semiahmoo First Nation's right to
25 fish.

26 The key factors that were considered in support of the EAO's conclusion on the impacts to the
27 right to fish are summarized as follows:

28 **Biophysical:**

- 29 • The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would have
30 potential to result in low to moderate magnitude residual effects to fish and fish habitat
31 at the TMJ site, and low magnitude residual effects to sturgeon from vessel strikes. The
32 EAO did not predict residual effects to fish in the MSA area; and
- 33 • The lower Fraser River is highly industrial and the TMJ area is previously disturbed and
34 the MSA area is a heavily utilized marine environment.

1 **Geospatial (places, sites and access):**

- 2 • The importance of fishing on the Fraser River and that Semiahmoo First Nation's
- 3 members currently fish upstream of the TMJ area;
- 4 • During construction, access to the TMJ site would be restricted for three years. During
- 5 operations, Indigenous mariners and fishers would avoid entering and remaining in the
- 6 marine terminal area due to the warning signs and notifications regarding elevated
- 7 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ.
- 8 At the scale of the LAA and RAA this would amount to a low magnitude impact to access
- 9 from impacts at the TMJ site; and
- 10 • The EAO's conclusions in the Current Use chapter in Part B found that TMJ-related
- 11 vessel transits would have negligible to low magnitude effect to access to fishing
- 12 compared to baseline numbers of vessel transits, that could be experienced as higher in
- 13 the Fraser River as a change from baseline compared to Salish Sea. This effect would be
- 14 due to regularly occurring (i.e., on average one vessel call per day under the BVS) and
- 15 short-duration vessel movements to pass through known fishing areas in the Fraser
- 16 River and Salish Sea.

17 **Social, Cultural and Experiential:**

- 18 • As outlined in the Current Use assessment in Part B, potential negligible to low
- 19 magnitude impacts to the change in noise and visual quality during construction and to
- 20 changes in visual quality and potential concerns about safety during operations in the
- 21 Fraser River and Salish Sea.

22 **Mitigations:**

- 23 • Proposed mitigations for potential impacts to Semiahmoo First Nation's right to fish
- 24 include mitigations to reduce impacts to noise and visual quality in the CEMP and OEMP
- 25 as well as the recommended key mitigations under CEAA 2012, specifically the Fish
- 26 Mitigations to Reduce Harm and Mortality, Fish Habitat Offset Plan, Marine
- 27 Communication Plan, Marine Access and Transportation Plan and Vessel Traffic
- 28 Management Plan.

29 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

30 Historically, Semiahmoo First Nation harvested wildlife, including migratory birds, on the lands

31 to the east of Boundary Bay, on both sides of the Canada-USA border. Mountain goat wool was

32 reported as gathered on the north side of the Fraser River, along Kanaka Creek. Semiahmoo

33 First Nation has reported that members have harvested beaver, waterfowl, and migratory birds

34 in proximity to the George Massey Tunnel area of the South Arm of the Fraser River. Beyond

1 the MSA, Semiahmoo First Nation identified Lake Terrell, approximately 6 km southeast of Birch
2 Bay in Washington State, as an area hunted for elk, deer, and beaver. Semiahmoo First Nation
3 hunted ducks at Tongue Spit on Drayton Harbour north of Birch Bay and at the mouths of
4 Dakota and California creeks.

5 Semiahmoo First Nation harvested camas, an important trade item, in the San Juan Islands and
6 behind their villages around Boundary Bay. Aquatic plants like bulrushes, tule rushes, and
7 grasses were also gathered to manufacture mats that were used for a range of household
8 purposes. Bulrushes and tule were gathered in locations that included Burns Bog. Semiahmoo
9 also harvested a range of berries for food. Other plants harvested included devil's club, rose
10 hip, stinging nettle, and the wood, bark, and roots of various tree species for a range of
11 purposes. Semiahmoo have reported that plant harvesting may still be occurring on the South
12 Arm of the Fraser River, in the vicinity of Tilbury and Deas islands.

13 The EAO evaluated the potential effects on hunting, trapping, and gathering rights attributable
14 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
15 [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical components resulting in
16 changes to wildlife and vegetation quantity and quality, changes in access to hunting, trapping,
17 and gathering areas, and changes to social, cultural, and spiritual values associated with
18 traditional hunting, trapping and gathering activities summarized in that section apply to
19 Semiahmoo First Nation. Semiahmoo First Nation did not raise specific issues and concerns with
20 potential TMJ impacts relating to hunting, trapping, and gathering.

21 **14.5.3.1.2 Conclusion**

22 In consideration of the available information, consultation with Semiahmoo First Nation,
23 Semiahmoo First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
24 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
25 to result in a negligible impact on Semiahmoo First Nation's right to hunt, trap and gather.

26 The key factors that were considered in support of the EAO's conclusion on the impacts to the
27 right to hunt, trap, and gather are summarized as follows:

28

29 **Biophysical:**

- 30
- 31 • The EAO's conclusions at the TMJ site on adverse residual effects to Wildlife and Wildlife
32 Habitat and Vegetation (see respective chapters in Part B) indicate negligible to low
33 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
34 from noise and light, and mortality; as well as low magnitude residual effects on
wetland and riparian ecosystems; and

- 1 • The EAO's conclusions in the MSA area on adverse residual effects to Marine Birds in
2 Part B indicate negligible to low magnitude residual effects related to mortality.

3 **Geospatial (places, sites and access):**

- 4 • The EAO understands that Semiahmoo First Nations do not currently harvest in the TMJ
5 area but may gather at sites close to the TMJ site located on the South Arm of the
6 Fraser River, in the vicinity of Tilbury and Deas islands;
- 7 • Construction (just over three years in duration) and operations (30 years) is unlikely to
8 cause disruptions to Semiahmoo First Nation's access to areas traditionally used for
9 hunting, trapping, and gathering activities at the TMJ site or in the MSA area; and
- 10 • The upland portion of the TMJ site is situated on fee simple (private) land.

11 **Social, Cultural and Experiential:**

- 12 • Potential impacts to experience in the vicinity of the TMJ site and along the shipping
13 route due to a change in noise and visual quality during construction and operations
14 which are anticipated to be negligible to low in magnitude in the Fraser River and Salish
15 Sea.

16 **Mitigations:**

- 17 • Proposed conditions to mitigate impacts to Semiahmoo First Nation's right to hunt, trap
18 and gather are the vegetation and wetland management, wildlife and wildlife habitat
19 management, light management, and noise management components of the CEMP and
20 OEMP all of which would require consultation with Indigenous Groups. The EAO is also
21 proposing these mitigations as KMMs under CEAA 2012 which would include the
22 requirements for vegetation and wetland creation and restoration, lighting, noise and
23 wildlife and wildlife habitat management and monitoring; and
- 24 • All vessels will adhere to the Marine Regulations and Legislation regulating vessel noise
25 and lighting.

26 **C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS**

27 Semiahmoo First Nation has reported that use of their traditional lands and resources has a
28 spiritual and sacred element not readily separated from practical considerations. Legendary
29 stories reflect this view, which convey that people related to the first ancestors, who
30 descended from the sky, were transformed by Khaals (the Transformer and mythical leader)
31 into physical and biological elements of the landscape and remain relatives of the Semiahmoo.
32 The Semiahmoo therefore consider themselves as part of the landscape (their territory), and
33 this landscape serves as their sacred place, their history book, and training ground. Semiahmoo

1 place names on this landscape include a location along the mainstem of the Fraser River,
2 upstream of the Port Mann Bridge, identified as *KITEY* (Katzie).

3 Semiahmoo First Nation has explained that their traditional economy was based on animals and
4 fish in the area, and that there are pathway effects that lead from the Fraser River into
5 Boundary and Semiahmoo Bays. They have also said that they regularly travelled through and
6 gathered food from their traditional territory, including the Fraser River estuary, Boundary Bay,
7 and areas now in Washington State, and that their members continue to use their territory to
8 practice their traditional economy on both sides of the border.

9 Semiahmoo First Nation reported use of a travel route through Active Pass to the Gulf Islands
10 and Victoria, emphasizing the importance this route has in maintaining their access to the
11 island where they have burial grounds. Semiahmoo First Nation reported using traditional
12 forms of transportation such as dug-out canoes along preferred maritime routes.

13 Semiahmoo First Nation has stated that their Aboriginal Interests include the right to practice
14 their culture in its entirety and the right to food security through their traditional economy.
15 Semiahmoo First Nation reports that urbanization and pollution of their traditional food supply
16 has limited their ability to practice this economy. Semiahmoo First Nation has advised that they
17 are seeking to restore or maintain the environment within their territory to promote the
18 exercise of ancestral uses in the future.

19 The EAO evaluated the potential effects on other traditional and cultural interests attributable
20 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
21 [Section 13.3.3](#). The EAO is satisfied that the key impacts associated with other traditional and
22 cultures interests summarized in that section apply to Semiahmoo First Nation. Semiahmoo
23 First Nation did not raise specific issues and concerns with potential Project impacts relating to
24 other traditional and cultural interests.

25 **14.5.3.1.3 Conclusion**

26 In consideration of the available information, consultation with Semiahmoo First Nation,
27 Semiahmoo First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
28 conditions if an EAC is issued, and recommended KMMs under CEAA 2012 TMJ is expected to
29 result in a negligible impact on Semiahmoo First Nation's other traditional and cultural
30 interests.

31 The key factors that were considered in support of the EAO's conclusion on the impacts to
32 other traditional and cultural interests are summarized as follows:

33 **Cultural and Heritage Resources:**

- 34 • The EAO's conclusions in the Heritage Resources chapter in Part B found no residual

1 effects to Heritage Resources ([Section 7.1](#)) from erosion due to wake effects along the
2 shorelines of the Fraser River in the RAA; and

- 3 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed. The
4 MSA area is a heavily utilized marine environment. These factors increase the
5 seriousness of impact of TMJ.

6 **Geospatial (places, sites and access):**

- 7 • Semiahmoo First Nation use a travel route, sometimes with traditional vessels, through
8 Active Pass to the Gulf Islands and Victoria, to access important areas including burial
9 grounds;
- 10 • During construction, access to the TMJ site would be restricted for three years. During
11 operations, Indigenous mariners and fishers would avoid entering and remaining in the
12 marine terminal area due to the warning signs and notifications regarding elevated
13 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ;
14 and
- 15 • The small number of TMJ-related vessels relative to current vessel traffic are predicted
16 to have a negligible to low effect on cultural activities in the MSA area in terms of access
17 from relatively infrequent and short-duration interruptions due to regularly occurring
18 (i.e., on average one vessel call per day under the BVS) vessel transits.

19 **Social, Cultural, Experiential:**

- 20 • The EAO's conclusions in the Noise chapter in Part B found sensory disturbances from
21 noise are anticipated to be negligible to low magnitude, temporary, and short-term;
- 22 • The EAO's conclusions in the Visual Quality chapter in Part B found a negligible to low
23 impact to the existing visual landscape character in the Fraser River and negligible
24 effects in the MSA area; and
- 25 • Potential negligible impacts from TMJ-related vessel traffic during operations affecting
26 visual quality, noise, and vessel wake (with an increasing magnitude of effect the closer
27 one is to the vessels).

28 **Mitigations:**

- 29 • Proposed provincial conditions to mitigate impacts to Semiahmoo First Nation's cultural
30 interests, include the development of the Lighting Management, Noise and Vibration
31 Management and Air Quality Management as part of the CEMP and OEMP; and
- 32 • To mitigation impacts to cultural heritage the EAO is recommending KMMs under CEEA
33 2012 for the Marine Access and Transportation, Marine Communications and Vessel

1 Traffic Management Plans.

2 **14.6 SQUAMISH NATION**

3 **14.6.1 COMMUNITY PROFILE**

4 Squamish Nation describe themselves as the descendants of Coast Salish ancestors that lived in
5 what are now known as the Greater Vancouver area, Gibson's Landing and Squamish River
6 watershed. Squamish (*Skwxwú7mesh Úxwumixw*) are Central Coast Salish and speak
7 *Skwxwú7mesh sníchim*.

8 Squamish Nation has 24 reserves, mostly located around Howe Sound and along the southern
9 portions of the Squamish River, and with 2,211 of 4,386 registered members residing on
10 Squamish Nation's reserve lands²⁰². The TMJ area does not overlap any current or former
11 Squamish Nation reserve lands.

12 Squamish territory has been described as taking in the area from Point Grey in the south to
13 Roberts Creek in the west; then north along the height of land to the Elaho River headwaters
14 including all the islands and drainages in Howe Sound; then southeast to the confluence of the
15 Soo and Green rivers north from Whistler; then south along the height of land to the Port
16 Moody area including the entire Mamquam River and Indian Arm drainages; then west along
17 the height of land to Point Grey. The area in which Squamish Nation asserts their Aboriginal
18 right to fish extends further south, to take in the Fraser River downstream of the Port Mann
19 Bridge²⁰³.

20 **14.6.2 SQUAMISH NATION'S INVOLVEMENT IN THE CONSULTATION PROCESS**

21 The EAO is of the view that it has approached consultation with Squamish Nation at the deeper
22 end of the spectrum, with the intent to identify potential impacts and consider ways to address
23 potential impacts to any Aboriginal Interests in the project area identified by Squamish Nation.
24 The EAO added Squamish to Schedule B in the Section 13 Order (May 11, 2016), and as

²⁰² Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Squamish Nation. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=555&lang=eng, accessed December 13, 2021.

²⁰³ Pattullo Bridge Replacement Project EAC Application, 2018 <https://projects.eao.gov.bc.ca/api/document/5b7343562400e50024428f13/fetch>, accessed May 29, 2019

1 described in the EAO-led Consultation Activities with Indigenous Groups section of this Report,
2 the EAO invited Squamish Nation to participate in the Working Group.

3 The EAO set out its approach to consultation, including assessments of strength of claim and
4 potential impacts on Squamish Nation's Aboriginal Interests in a letter to Squamish Nation
5 dated May 11, 2016. Based on the Province's initial assessments, Squamish Nation was
6 consulted at the deeper end of the spectrum as set out in Schedule B of the Section 13 Order
7 dated May 11, 2016 which amended the July 24, 2015 Section 11 Order for TMJ.

8 The EAO invited Squamish Nation to review and provide comments on the draft Section 11
9 Order, the draft VC Selection document, the draft AIR, TJLP's Aboriginal Consultation Plan and
10 Reports, the screening of the Application and on the Application and supplemental material, as
11 well as the opportunity to review and comment on several iterations of the EAO's draft decision
12 materials. As part of the EA Working Group, Squamish Nation was invited to participate in
13 Working Group meetings, teleconferences, and site visits (October 2018) during the Pre-
14 Application and Application Review stages. Squamish Nation participated in a pre-Application
15 Working Group meeting. The EAO offered to meet directly with Squamish Nation to discuss the
16 project, EA process, and any potential concerns with the project.

17 TJLP began consulting with Squamish Nation in December 2014 by sending notification letters,
18 before entering the EA process. TJLP reports that in June of 2018, TJLP and Squamish Nation
19 agreed to preliminary funding to support Squamish Nation's participation in the review of the
20 draft AIR. A summary of TJLP's engagement activities with Squamish Nation is provided in the
21 Application and in TJLP's Aboriginal Consultation Reports.

22 **14.6.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

23 The following sections focus on potential impacts of TMJ to Squamish Nation's Aboriginal
24 Interests. A discussion of the EAO's assessment approach is provided in the Impact Assessment
25 Methods section of Part C. The EAO considered information from public sources as well as
26 relevant issues raised by the Squamish Nation during the EA process in the following
27 assessments of the potential impacts of TMJ on the Squamish Nation's Aboriginal Interests. The
28 following sections focus on the potential impacts of TMJ to Squamish Nation's Aboriginal right
29 to fish, hunt, trap, and gather, and mitigations and accommodations to address potential
30 impacts.

31 **A. POTENTIAL IMPACTS ON FISHING**

32 Squamish Nation stated that, since time immemorial, salmon has been a principal food for
33 Squamish Nation and that the Fraser River has been a major source of that salmon. Historically,

1 Squamish Nation practiced a seasonal pattern of arriving on the Fraser River in April to fish and
2 returning to Burrard Inlet in late September (Squamish Nation, 2018).

3 Squamish Nation reported that there is no other source of sockeye in Squamish Nation territory
4 other than the Fraser River, and that fishing sockeye on the Fraser River, while not currently
5 practiced, remains integral to Squamish Nation culture (MOTI 2016: 10.1-134). Squamish
6 Nation has previously noted they are seeking to re-establish their sockeye fishing practices in
7 the Fraser River and ancestral connections to the area. Squamish Nation have previously noted
8 that other Indigenous Groups who currently fish in the Fraser River in the area of the Project
9 may be asked by Squamish Nation to fish on their behalf; however, at present, Squamish Nation
10 say their sockeye is obtained by a contracted seine boat that harvests the fish in the Johnstone
11 Strait area, outside Squamish territory and traditional fishing areas (MOTI 2016: 10.1-135). The
12 Squamish Nation's FSC allocation for sockeye has been reported as 20,000. Squamish have
13 requested that DFO increase this allocation to 70,000, which translates into approximately 17
14 sockeye per member.

15 The EAO evaluated the potential effects on fishing rights attributable to TMJ which are
16 summarized in [Section 13.3.1](#). The EAO is satisfied that the key impacts to biophysical
17 components resulting in changes to fish quantity and quality, changes in access to fishing
18 resources, and changes to social, cultural, and spiritual values associated with traditional fishing
19 activities summarized in that section apply to Squamish First Nation. Additional issues raised by
20 Squamish First Nation are outlined below and include a discussion of EAC conditions and
21 recommended key mitigations under CEAA 2012.

22 The Application notes that Squamish Nation raised the following concerns regarding potential
23 impacts on the right to fish:

- 24 • Concern about underwater noise during construction and operations, including in the
25 shipping lanes.
 - 26 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
27 concerns related to the effects of underwater noise from TMJ on fish. As
28 discussed in [Section 13.3.1](#), the proposed mitigation measures to address this
29 concern are included in the KMMs under CEAA 2012 proposed by EAO for Fish
30 Mitigations to Reduce Harm and Mortality, including the use of bubble curtains
31 at all times during impact pile driving where feasible and during vibratory pile
32 driving if noise levels exceed thresholds.
- 33 • Concerns regarding the potential adverse effect TMJ would have on Squamish Nation
34 fishing rights. This would include secondary impacts to Indigenous fishers who fish on
35 behalf of Squamish Nation.

- 1 ○ In section the Current Use chapter in Part B of this Report, the EAO concludes
2 that TMJ has the potential to interrupt Indigenous fishing during construction
3 (just over three years), operations (30 years) and decommissioning (one year)
4 due to transportation and marine shipping in the Fraser River, dredging
5 activities, onshore construction and that Indigenous mariners and fishers would
6 avoid entering and remaining in the marine terminal area; and
- 7 ○ The EAO is recommending key mitigations under CEAA 2012 for a Marine
8 Communication Plan and Marine Access and Transportation Plan. These plans
9 would identify the procedures of communication to Indigenous Groups and
10 identification of mitigations to reduce disruptions caused by construction and
11 operations for members of Indigenous Groups to carry out traditional use
12 activities including fishing for FSC purposes.

13 **14.6.3.1.1 Conclusion**

14 In consideration of the available information, the EAO's consultation with Squamish Nation,
15 Squamish Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
16 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
17 to result in a minor impact on Squamish Nation's right to fish.

18 The key factors that were considered in support of the EAO's conclusion on the impacts to the
19 right to fish are summarized as follows:

20 **Biophysical:**

- 21 • The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would have
22 potential to result in low to moderate magnitude residual effects to fish and fish habitat
23 at the TMJ site, and low magnitude residual effects to sturgeon from vessel strikes. The
24 EAO did not predict residual effects to fish in the MSA area; and
- 25 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed and
26 the MSA area is a heavily utilized marine environment.

27 **Geospatial (places, sites and access):**

- 28 • During construction, access to the TMJ site would be restricted for three years. During
29 operations, Indigenous mariners and fishers would avoid entering and remaining in the
30 marine terminal area due to the warning signs and notifications regarding elevated
31 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ.
32 At the scale of the LAA and RAA this would amount to a low magnitude impact to access
33 from impacts at the TMJ site;
- 34 • The EAO's conclusions in the Current Use chapter in Part B found that TMJ-related

1 vessel transits would have negligible to low magnitude effect to access to fishing
2 compared to baseline numbers of vessel transits, that could be experienced as higher in
3 the Fraser River as a change from baseline compared to Salish Sea. This effect would be
4 due to regularly occurring (i.e., on average one vessel call per day under the BVS) and
5 short-duration vessel movements to pass through known fishing areas in the Fraser
6 River and Salish Sea;

- 7 • Specific to the BVS there is potential for higher frequency of interactions to occur
8 between TMJ-related vessels and Indigenous Groups engaging in vessel-based FSC
9 fishing in the lower Fraser River during FSC fishing windows and that this effect would
10 apply to Squamish Nation should members engage in vessel based FSC fishing activities
11 in the lower Fraser River in the future.
- 12 • Squamish Nation's members seek to resume fishing in the Fraser River; and
- 13 • Due to small number of TMJ-related vessels relative to current vessel traffic along the
14 shipping route, these are predicted to have low to negligible residual effects on access
15 to fishing.

16 **Social, Cultural and Experiential:**

- 17 • As outlined in the Current Use assessment in Part B, potential negligible to low
18 magnitude impacts to the change in noise and visual quality during construction and to
19 changes in visual quality and potential concerns about safety during operations in the
20 Fraser River and Salish Sea.

21 **Mitigations:**

- 22 • Proposed mitigations for potential impacts to Squamish Nation's right to fish include
23 mitigations to reduce impacts to noise and visual quality in the CEMP and OEMP as well
24 as the recommended key mitigations under CEAA 2012, specifically the Fish Mitigations
25 to Reduce Harm and Mortality, Fish Habitat Offset Plan, Marine Communication Plan,
26 Marine Access and Transportation Plan and Vessel Traffic Management Plan.

27 ***B. POTENTIAL IMPACTS ON HUNTING TRAPPING AND GATHERING***

28 Squamish Nation reported hunting elk, deer, moose, mountain goats, black bears, small
29 terrestrial mammals, beaver, muskrat, otters, mink, marmots, ducks, geese and gulls. Squamish
30 Nation reported hunting deer primarily on Anvil, Bowen, Keats and Gambier Islands as well as
31 White Beach on the mainland. Mountain goats were harvested along the Squamish River,
32 McNab Creek and Deer Creek and marine birds in the Strait of Georgia as well as areas along
33 the Fraser River.

1 Squamish Nation reported harvesting a variety of plants at different times of the year such as
2 berries and other fruits, tender shoots, edible roots, tubers and bulbs as well as different types
3 of wood (such as Douglas-fir and yellow cedar) and aquatic plants.

4 The EAO evaluated the potential effects on hunting, trapping and gathering rights attributable
5 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
6 [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical components resulting in
7 changes to wildlife and vegetation quantity and quality, changes in access to hunting, trapping
8 and gathering areas, and changes to social, cultural, and spiritual values associated with
9 traditional hunting, trapping and gathering activities summarized in that section apply to the
10 Squamish Nation. Squamish Nation did not raise specific issues and concerns with potential TMJ
11 impacts relating to hunting, trapping and gathering.

12 **14.6.3.1.2 Conclusion**

13 In consideration of the available information, consultation with Squamish Nation, Squamish
14 Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC conditions if an
15 EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected to result in a
16 negligible impact on Squamish Nation's right to hunt, trap and gather.

17 The key factors that were considered in support of the EAO's conclusion on the impacts to the
18 right to hunt, trap and gather are summarized as follows:

19 **Biophysical:**

- 20 • The EAO's conclusions at the TMJ site on adverse residual effects to Wildlife and Wildlife
21 Habitat and Vegetation (see respective chapters in Part B) indicate negligible to low
22 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
23 from noise and light, and mortality; as well as low magnitude residual effects on
24 wetland and riparian ecosystems; and
- 25 • The EAO's conclusions in the MSA area on adverse residual effects to Marine Birds in
26 Part B indicate negligible to low magnitude residual effects related to mortality.

27 **Geospatial (places, sites and access):**

- 28 • The EAO understands that Squamish Nation members do not currently harvest in the
29 TMJ area;
- 30 • Construction (just over three years in duration) and operations (30 years) is unlikely to
31 cause disruptions to Squamish Nation member's access to areas traditionally used for
32 hunting, trapping and gathering activities at the TMJ site or in the MSA area; and
- 33 • The upland portion of the TMJ site is situated on fee simple (private) land.

1 **Social, Cultural and Experiential:**

- 2 • Potential impacts to experience in the vicinity of the TMJ site and along the shipping
3 route due to a change in noise and visual quality during construction and operations
4 which are anticipated to be negligible to low in magnitude in the Fraser River and Salish
5 Sea.

6 **Mitigations:**

- 7 • Proposed conditions to mitigate impacts to Squamish Nation's right to hunt, trap and
8 gather are the vegetation and wetland management, wildlife and wildlife habitat
9 management, light management and noise management components of the CEMP and
10 OEMP all of which would require consultation with Indigenous Groups. The EAO is also
11 proposing these mitigations as KMMs under CEAA 2012 which would include the
12 requirements for vegetation and wetland creation and restoration, lighting, noise and
13 wildlife and wildlife habitat management and monitoring; and
- 14 • All vessels will adhere to the Marine Regulations and Legislation regulating vessel noise
15 and lighting.

16 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

17 Squamish Nation identified areas at Bains Island (Brackendale), Cheekye, burial sites and old
18 village sites, canoe landing sites on Howe Sound Islands, Potlatch Creek, and traditional fishing
19 areas.

20 Squamish Nation has previously discussed the loss of resources within their asserted territory
21 such as eulachon has meant the loss of part of Squamish culture. Squamish Nation members
22 have discussed the fact that they can no longer teach their grandchildren or great grandchildren
23 how to dig clams, harvest crabs or dry seaweed.

24 Squamish Nation reported waterways as being important travel routes historically and currently
25 when harvesting marine resources, crossing the Salish Sea and transferring cultural knowledge.
26 Concern was reported regarding young Squamish Nation members lacking opportunities to get
27 out into the river systems within their asserted territory.

28 The EAO evaluated the potential effects on other traditional and cultural interests attributable
29 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
30 Section 2.3.3. The EAO is satisfied that the key impacts associated with other traditional and
31 cultures interests summarized in that section apply to Squamish Nation. Squamish Nation did
32 not raise specific issues and concerns with potential Project impacts relating to other traditional
33 and cultural interests.

1 **14.6.3.1.3 Conclusion**

2 In consideration of the available information, consultation with Squamish Nation, Squamish
3 Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC conditions if an
4 EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected to result in a
5 negligible impact on Squamish Nation's other traditional and cultural interests.

6 The key factors that were considered in support of the EAO's conclusion on the impacts to
7 other traditional and cultural interests are summarized as follows:

8 **Cultural and Heritage Resources:**

- 9 • The EAO's conclusions in the Heritage Resources chapter in Part B found no residual
10 effects to Heritage Resources ([Section 7.1](#)) from erosion due to wake effects along the
11 shorelines of the Fraser River in the RAA; and
- 12 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed. The
13 MSA area is a heavily utilized marine environment. These factors increase the
14 seriousness of impact of TMJ.

15 **Geospatial (places, sites and access):**

- 16 • During construction, access to the TMJ site would be restricted for three years. During
17 operations, Indigenous mariners and fishers would avoid entering and remaining in the
18 marine terminal area due to the warning signs and notifications regarding elevated
19 public risk, in particular when vessels would be berthing, loading, or de-berthing at TMJ;
20 and
- 21 • The small number of TMJ-related vessels relative to current vessel traffic are predicted
22 to have a negligible to low effect on cultural activities in the MSA area in terms of access
23 from relatively infrequent and short-duration interruptions due to transit of vessels to
24 and from TMJ's marine terminal area.

25 **Social, Cultural, Experiential:**

- 26 • The EAO's conclusions in the Noise chapter in Part B found sensory disturbances from
27 noise are anticipated to be negligible to low magnitude, temporary and short-term;
- 28 • The EAO's conclusions in the Visual Quality chapter in Part B found a negligible to low
29 impact to the existing visual landscape character in the Fraser River and negligible
30 effects in the MSA area; and
- 31 • Potential negligible impacts from TMJ-related vessel traffic during operations affecting
32 visual quality, noise and vessel wake (with an increasing magnitude of effect the closer
33 one is to the vessels).

1 **Mitigations:**

- 2 • Proposed provincial conditions to mitigate impacts to Squamish Nation’s cultural
3 interests, include the development of the Lighting Management, Noise and Vibration
4 Management and Air Quality Management as part of the CEMP and OEMP; and
- 5 • To mitigation impacts to cultural heritage the EAO is recommending KMMs under CEAA
6 2012 for the Marine Access and Transportation, Marine Communications and Vessel
7 Traffic Management Plans.
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2 14.7 TSAWWASSEN FIRST NATION

The EAO acknowledges Tsawwassen First Nation and the EAO have taken a co-drafting approach in Tsawwassen First Nation's impacts to rights assessment for inclusion into the final Part C of the referral materials. Following Tsawwassen First Nation's review of TJLP's Bunkering Vessel Scenario Assessment (BVSA) Report, and during development of Tsawwassen First Nation's revised impact to rights assessment, the EAO will continue to engage with Tsawwassen First Nation to discuss and better reflect the potential for TMJ to impact Tsawwassen First Nation's Aboriginal Interests in the Part C of the EAO's Assessment Report for TMJ. Tsawwassen First Nation's Part C chapter will be included in the final Assessment Report that is submitted to Ministers for decision and will be posted on the EAO's ePIC website.

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2 **14.8 TSLEIL-WAUTUTH NATION**

The EAO acknowledges Tsleil-Waututh Nation has written and submitted to the EAO their own impacts to rights assessment for inclusion into the final Part C of the referral materials. Following Tseil-Waututh Nation's review of TJLP's Bunkering Vessel Scenario Assessment (BVSA) Report, and during development of Tsleil-Waututh Nation's revised impact to rights assessment, the EAO will continue to engage with Tsleil-Waututh Nation to discuss and better reflect the potential for TMJ to impact Tsleil-Waututh Nation's Aboriginal Interests in the Part C of the EAO's Assessment Report for TMJ. Tsleil-Waututh Nation's Part C chapter will be included in the final Assessment Report that is submitted to Ministers for decision and will be posted on the EAO's ePIC website.

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2 14.9 SNUNEYMUXW FIRST NATION

Pursuant to the *BC EAA* (2002), the EAO issued a Section 13 Order on January 19, 2022, to include Snuneymuxw First Nation in the list of Schedule B Indigenous Groups for the duration of the EA for TMJ, limited to the scope for the Bunker Vessel Scenario Assessment (BVSA). During development of Snuneymuxw First Nation's impacts to rights assessment, the EAO will continue to engage with Snuneymuxw First Nation to discuss and better reflect the potential impacts to Snuneymuxw First Nation's Aboriginal Interests in the Part C of the EAO's Assessment Report for TMJ. Snuneymuxw First Nation's Part C chapter will be included in the final Assessment Report that is submitted to Ministers for decision and will be posted on the EAO's ePIC website.

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2 **15 SCHEDULE C: IMPACTS TO ABORIGINAL** 3 **INTERESTS BY INDIGENOUS GROUP**

4 **15.1 KATZIE FIRST NATION**

5 **15.1.1 COMMUNITY PROFILE**

6 Katzie First Nation is a Central Coast Salish group culturally and linguistically associated with the
7 Stó:lō; however, Katzie First Nation operates independently of the broader Stó:lō Nation in its
8 legal and political representations. Katzie First Nation’s ancestral language is the downriver
9 dialect of *hən̓q̓əmin̓əm* (pronounced “Hul-ka-MEE-num”), and Katzie First Nation reports that
10 they are among the most inland speakers of this “downriver” dialect of Mainland Halkomelem.

11 Katzie First Nation IR 1, on the north bank of the Fraser River, west of Port Hammond, and
12 south of the town of Pitt Meadows, serves as administrative hub and one of three residential
13 communities; the other two residential communities are located on Katzie IR 2 and Katzie IR 3.
14 Katzie First Nation reserve lands are located on the south bank of the Fraser River, on the south
15 shore of Barnston Island, at the lower end of Pitt Lake, and the Katzie First Nation cemetery
16 south of Lougheed Highway. As of February 2022, of 634 registered Katzie First Nation
17 members, 313 members live on reserve²⁰⁴. Katzie First Nation reports that their ancestors once
18 lived across 10 villages throughout Katzie First Nation territory, but eventually congregated at
19 the village of *q’ə’ye’ey*, the site of Katzie IR1 today. This village features heavily in Katzie oral
20 history. The only other Katzie First Nation village sites that are currently occupied are on
21 Barnston Island IR3 and Katzie IR2 which are approximately 28 km upriver from the TMJ site.

²⁰⁴ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Katzie First Nation.

https://fnp-ppn.aadnc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=563&lang=eng, Accessed March 22, 2022.

1 Katzie First Nation is currently involved in advanced Treaty negotiations with the federal and
2 provincial governments and is focused on an incremental approach to self-governance. Within
3 this process Katzie First Nation has filed a Statement of Intent (SOI) identifying an area
4 described as its traditional territory “extending south from the headwaters of the Pitt River to
5 encompass Pitt Lake, Pitt Polder, a portion of the Fraser River, and south east to encompass the
6 Nicomekl and Serpentine Rivers”. TMJ area does not overlap any current or former Katzie First
7 Nation reserve lands, although it does overlap the southwestern portion of Katzie First Nation’s
8 asserted traditional territory.

9 Katzie First Nation reported that it has Aboriginal Interests in the Fraser River upstream of TMJ
10 and other waterways within the Fraser River estuary, including the Nicomekl and Serpentine
11 Rivers. Katzie First Nation has identified past and ongoing effects that have altered and reduced
12 their use over time. Katzie First Nation identified that the Fraser River and its tributaries have
13 high archeological and cultural significance (tangible and intangible) and represent important
14 places for Katzie First Nation. Katzie First Nation’s Aboriginal Interests extend beyond fishing
15 and other TLU practices and include cultural and environmental stewardship. Katzie people
16 believe good stewardship of the land and waters is based upon a deep and holistic approach to
17 nature that embodies the inseparability of human and ecosystem health. Wetland
18 environments along the shoreline of the Fraser River, and all levels of the complex aquatic food
19 chain, are important to Katzie First Nation’s and have sustained Katzie First Nation’s way of life
20 since time immemorial. Katzie First Nation’s oral histories include that the traditional territory
21 was created for Katzie people to manage the resources within it for the benefit of both the
22 Katzie people and others, and Katzie First Nation consider respectful stewardship of the land and
23 its resources as a sacred duty and great responsibility.

24 **15.1.2 KATZIE FIRST NATION’S INVOLVEMENT IN THE CONSULTATION** 25 **PROCESS**

26 The EAO sent a notification email to Katzie First Nation May 6, 2015 noting that TMJ was to be
27 subject to a provincial EA pursuant to the Act. The EAO set out its approach to consultation,
28 including an initial assessment of strength of claim and potential impacts on Katzie First
29 Nation’s Aboriginal Interests in a letter to Katzie First Nation dated June 18, 2015. Based on the
30 Province’s initial strength of claim assessment, Katzie First Nation was consulted at the
31 notification level as set out in Schedule C of the Section 11 Order for TMJ.

32 A summary of TJLP’s engagement activities with Katzie First Nation is provided in the
33 Application and in TJLP’s Aboriginal Consultation Reports.

1 As specified in Section 12.2 of the Section 11 Order, the EAO provided Katzie First Nation
2 notification of, and relevant information at, key milestones during the EA process for TMJ so
3 that Katzie First Nation could be informed of the progress of the EA and have the opportunity to
4 raise any issues to the EAO for discussion. During the EA process, the EAO and Katzie First
5 Nation met to discuss EAO's rationale for placing Katzie First Nation on Schedule C, the
6 opportunities for Katzie First Nation's involvement in the EA, and Katzie First Nation's concerns
7 regarding TMJ's impact on Aboriginal Interests. The EAO is of the view that it has approached
8 consultation with Katzie First Nation with the intent to identify potential impacts and consider
9 ways to address any potential TMJ-related impacts identified by Katzie First Nation to their
10 Aboriginal Interests. This included meeting with Katzie First Nation and providing Katzie First
11 Nation with the opportunity to provide feedback on the Application and the EAO's draft part C
12 of the Assessment Report in advance of the final public comment period.

13 The EAO issued the final AIR on November 29, 2016 and notified Katzie First Nation. The EAO
14 initiated the 180-day Application Review period on March 20, 2019 and notified Katzie First
15 Nation by email. The EAO also notified Katzie First Nation regarding the start of the public
16 comment period for TMJ on March 26, 2019 and invited Katzie First Nation to review and
17 comment on the Application. On June 5, 2020, the EAO invited Katzie First Nation to review the
18 EAO's draft Part C Assessment Report, including the EAO's draft assessment of potential
19 impacts to Katzie First Nation's Aboriginal Interests.

20 Katzie First Nation provided feedback on the EAO's draft Part C of the Assessment Report,
21 including identifying potential concerns that TMJ could negatively impact Katzie Nation's fishing
22 rights, result in deleterious impacts to the environment and Katzie First Nation's Aboriginal
23 Interests due to spills, and contribute to shipping-related cumulative impacts to access, safety
24 and risk of spill. Katzie First Nation also expressed that cultural and environmental stewardship
25 is a part of Katzie First Nation's Aboriginal Interests and requested that affected Indigenous
26 communities be involved in the development of cultural and archaeological resource
27 management plans for documented and undocumented resources. Katzie First Nation also
28 identified that accidental spill risks associated with TMJ could also impact their stewardship
29 values, concern about that construction of TMJ and dredging may have impacts on cultural and
30 heritage resources (i.e., archeological sites).

31 Katzie also express that baseline used for the EAO's impacts assessment was not appropriate
32 and was linked to insufficient cumulative effects perspective. Katzie First Nation requested the
33 opportunity to be consulted on the various management plans that would be developed
34 pursuant to provincial conditions, including associated capacity funding, if TMJ were granted an

1 EAC. The EAO considered cumulative effects in the assessment of potential impacts to
2 Aboriginal Interests as described in [Section 13.1](#) of Part C. The EAO would not require that that
3 TJLP consult with Schedule C Indigenous Groups in development of management plans
4 pursuant to provincial conditions and notes that where monitoring or reporting would be
5 required for conditions, these documents would be posted to the EAO's public website. The
6 EAO considered Katzie First Nation's feedback provided on the draft Part C Assessment Report
7 and updated the report to better reflect Katzie First Nation's concerns and perspectives related
8 to potential impacts to Katzie First Nation's Aboriginal Interests due to TMJ and the
9 consultation process.

10 **15.1.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

11 The following sections focus on potential impacts of the Project to Katzie First Nation's
12 Aboriginal Interests. A discussion of the EAO's assessment approach is provided in the EAO's
13 Consultation Process Methodology section of Part C. The EAO considered information available,
14 including from public sources as well as relevant issues raised by the Katzie First Nation during
15 the EA process (in meetings, letters and Working Group comments), in the following
16 assessment of the potential impacts of TMJ on the Katzie First Nation's Aboriginal Interests.

17 The following sections focus on potential impacts of TMJ to Katzie First Nation's Aboriginal right
18 to fish, hunt, trap and gather, mitigations and accommodations to address potential impacts.

19 **A. POTENTIAL IMPACTS ON FISHING**

20 Currently, Katzie First Nation's communal food, social or ceremonial (FSC) fishing occurs
21 upstream of the Port Mann Bridge, and often in the river up to and including Kanaka
22 Creek/Derby Reach (approximately 20 km upriver from the TMJ site). This area includes their
23 traditional fishing locations around Barnston Island. In this stretch of the river upstream of the
24 Port Mann Bridge, Katzie First Nation are licenced to fish for Chinook, sockeye, and chum
25 salmon, steelhead, and eulachon, as well as for chum salmon specifically in the Pitt River. Katzie
26 First Nation also had access to Fraser River FSC fisheries as part of the Lower Fraser First
27 Nations.

28 DFO data indicates that for 2014, 36 communal FSC licenses, 4 communal FSC licenses with
29 limited participation, and 23 communal FSC licenses with allowance for sale were issued to
30 Katzie First Nation. These different licenses were issued for eulachon (drift net only), sockeye
31 (set net, drift net or beach seine), and Chinook (set or drift net). Timing and openings differed
32 based on the license. Katzie First Nation has previously advised that of all their registered
33 members, roughly one third of those members is reportedly licensed to fish during openings on

1 the Fraser River, and an estimated 120 Katzie First Nation vessels use the Fraser River to
2 harvest fish annually.

3 Katzie First Nation has also reported that from about the 1940s to the 1980s, many of their
4 members were involved in the commercial fishery, with some running their own boats. In 2014,
5 Katzie First Nation along with other Lower Fraser First Nations, participated in an economic
6 opportunity fishery for sockeye, and reported that they obtained approximately 10,000 sockeye
7 during this fishery that were eligible for sale.

8 The EAO evaluated the potential effects on fishing rights attributable to TMJ which are
9 summarized in [Section 13.3.1](#) of Part C. The EAO is satisfied that the key impacts to biophysical
10 components resulting in changes to fish quantity and quality, changes in access to fishing
11 resources, and changes to social, cultural, and spiritual values associated with traditional fishing
12 activities summarized in that section apply to Katzie First Nation. The following section focuses
13 on the specific issues and potential impacts to the Katzie First Nation's Aboriginal right to fish.

14 Katzie First Nation identified a key concern was potential for detrimental effects to Katzie First
15 Nation's fishing rights due to impacts to fish and fish habitat during construction of TMJ,
16 increased TMJ-related vessel traffic or in the event of a hazardous material spill in the Fraser
17 River. Katzie First Nation expressed concerns that limited information was available on the
18 impacts of LNG spill on a water body, there could be potential effects from a spill on the
19 environment which could negatively impact Katzie First Nation's Aboriginal Interests. Katzie
20 First Nation also expressed concern that cumulative effects related to marine shipping would
21 further increase the risks of an accident and malfunctions resulting in spills. To avoid and/or
22 reduce these impacts, Katzie First Nation requested that spill mitigation and management
23 measures (including long term bio-physical baseline monitoring), including spill response, were
24 meaningfully factored into the assessment and EAC conditions (if a Certificate is issued).

25 The EAO respectfully acknowledges Katzie First Nation's concern and worldview provided in
26 understanding the importance of the Fraser River ecosystem, salmon and other resources
27 within Katzie First Nation's asserted traditional territory to sustaining Katzie First Nation's
28 harvesting rights, and cultural and stewardship values. The EAO understands that Katzie First
29 Nation has concerns regarding the current state of the ecosystem, including potential effects on
30 fish, such as salmon, from underwater noise, construction and associated habitat loss,
31 increased vessel traffic, and/or an LNG spill event in the Fraser River, which would lead to
32 detrimental effects on Katzie First Nation's fishing rights, and cultural and stewardship values.

- 33 • As described in the Accidents and Malfunctions section of Part B of this report, the EAO
34 is satisfied that potential accidents and malfunction associated with TMJ have been
35 adequately identified and assessed for this EA. The EAO concludes that impacts from
36 potential accidents and malfunctions on environmental VCs, such as fish and fish habitat

1 vegetation and wildlife and wildlife habitat, would be low to moderate. The EAO is
2 recommending KMMs under CEAA 2012 for an Emergency Response Plan and a Marine
3 Shipping Emergency Response Outreach Program. The EAO is also proposing conditions
4 requiring the development of a CEMP and OEMP, which would include emergency
5 response planning and spill prevention for the marine terminal area. The EAO notes that
6 where monitoring or reporting would be required for conditions, these documents
7 would be posted to the EAO's public website; and

- 8 • The EAO is recommending KMMs under CEAA 2012, including the Fish Mitigations to
9 Reduce Harm and Mortality, Fish Habitat Offset Plan, and Vessel Traffic Management
10 Plan and concludes that effects to fish and fish habitat from TMJ would not be
11 significant within the LAA/RAA.

12 Conclusion

13 In consideration of the available information, the EAO's consultation with Katzie First Nation,
14 Katzie First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
15 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
16 to result in a negligible-to-minor impact on Katzie First Nation's right to fish.

17 The key factors that were considered in support of the EAO's conclusion on the impacts to the
18 right to fish are summarized as follows:

19 **Biophysical:**

- 20 • The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would have
21 potential to result in low to moderate magnitude residual effects to fish and fish habitat
22 at the TMJ site, and low magnitude residual effects to sturgeon from vessel strikes; and
23 • The lower Fraser River is highly industrial and the TMJ area is previously disturbed.

24 **Geospatial (places, site and access):**

- 25 • The importance of fishing on the Fraser River and that Katzie First Nation's members
26 currently fish upstream of the TMJ site; and
27 • During construction (just over three years in duration) and operations (30 years in
28 duration) Indigenous mariners and fishers would avoid entering and remaining in the
29 marine terminal area and TMJ-related vessel activity may result in short-term,
30 temporary disruptions to Katzie First Nation members traveling on the Fraser River
31 within the vicinity of the TMJ site for fishing purposes.

32 **Social, Cultural and Experiential:**

- 33 • As outlined in the Current Use of Lands and Resources for Traditional Purposes section

1 in Part B, potential negligible to low magnitude impacts to the change in noise and visual
2 quality during construction and to changes in visual quality and potential concerns
3 about safety during operations in the Fraser River; and

- 4 • Environmental stewardship is a sacred duty for Katzie First Nation that considers good
5 stewardship of the land and waters is based upon deep and holistic approach to nature
6 that embodies the inseparability of human and ecosystem health.

7 **Mitigations:**

- 8 • Proposed mitigations to reduce impacts to Katzie First Nation's right to fish include
9 mitigations to reduce impacts to noise and visual quality in the CEMP and OEMP as well
10 as the recommended key mitigations under CEAA 2012, specifically the Fish Mitigation
11 to Reduce Harm and Mortality, the Fish Habitat Offset Plan, and follow-up programs, the
12 Marine Communication Plan, the Marine Access and Transportation Plan and the Vessel
13 Traffic Management Plan.

14

15 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

16 Katzie First Nation has reported that their members have harvested a wide variety of mammals
17 and birds within their territory, including deer, elk, mountain goat, black bear, beaver, marten,
18 mink, and raccoon. Katzie First Nation also harvested waterfowl, which they have indicated
19 were abundant on the shores and marshy flats on and around Pitt River and Pitt Lake. Katzie
20 First Nation has also reported that their members historically harvested a wide variety of plant
21 species for sustenance and cultural purposes, including wapato, cranberries, bog blueberries,
22 strawberries, salmonberries, blackberries, blackcaps, thimbleberries, red and blue
23 huckleberries, Saskatoons, salal-berries, crabapple, oso plum and back haw. Traditional
24 gathering areas were identified at the mouth of the Alouette River, Sturgeon Slough, Silver
25 Creek and the west banks of Pitt River.

26 Katzie First Nation reported that hunting is almost as important to their subsistence and
27 ceremonial lives as fishing, but also reported that they are now limited to a few remaining areas
28 where it is safe to use firearms given the development within their territory. Katzie First Nation
29 reported that they still harvest waterfowl on Barnston Island, but the harvesting area on the
30 island is limited. The EAO evaluated the potential effects on hunting, trapping and gathering
31 rights attributable to TMJ which apply broadly to Indigenous Groups. These potential effects
32 are summarized in [Section 13.2.2](#). The EAO is satisfied that the key impacts to biophysical
33 components resulting in changes to wildlife and vegetation quantity and quality, changes in
34 access to hunting, trapping and gathering areas, and changes to social, cultural, and spiritual
35 values associated with traditional hunting, trapping and gathering activities summarized in

1 [Section 13.2.2](#) apply to Katzie First Nation. Katzie First Nation did not raise specific issues and
2 concerns with potential Project impacts relating to hunting, trapping and gathering.

3 **Conclusion**

4 In consideration of the available information, the EAO's consultation with Katzie First Nation,
5 Katzie First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
6 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
7 to result in a negligible impact on Katzie First Nation's right to hunt, trap and gather.

8 The key factors that were considered in support of the EAO's conclusion on the impacts to the
9 right to hunt, trap and gather are summarized as follows:

10 **Biophysical:**

- 11 • The EAO's conclusions at the TMJ site on adverse residual effects to wildlife and
12 vegetation (see respective chapters in Part B) which indicate negligible to low
13 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
14 from noise and light, and mortality; as well as low magnitude residual effects on
15 wetland and riparian ecosystems; and
- 16 • Terrestrial wildlife species of cultural importance to Katzie First Nation members have
17 either not been found within the TMJ area or are not anticipated to be affected by the
18 TMJ-related activities.

19 **Geospatial (places, sites and access):**

- 20 • Construction (just over three years in duration) and operation (30 years) is unlikely to
21 cause disruptions to Katzie First Nation members access to areas traditionally used for
22 hunting, trapping, and gathering activities at the TMJ site; and
- 23 • The upland portion of the TMJ site is situated on fee simple (private) land.

24 **Social, Cultural and Experiential:**

- 25 • Potential impacts to experience in the vicinity of the TMJ site due to a change in noise
26 and visual quality (see respective chapters in Part B) during construction and operation
27 which are anticipated to be negligible to low in magnitude in the Fraser River.

28 **Mitigations:**

- 29 • Proposed conditions to mitigate impacts to Katzie First Nation's right to hunt, trap and
30 gather are the vegetation and wetland management, wildlife and wildlife habitat
31 management, light management and noise management components of the CEMP and
32 OEMP. The EAO is also proposing these mitigations as KMMs under CEAA 2012 which

1 would include the requirements for vegetation and wetland creation and restoration,
2 lighting, noise and wildlife and wildlife habitat management and monitoring.

3 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

4 Katzie First Nation has explained that their identity and territory are inseparable, and that the
5 landscape is sacred, filled with meaning that informs Katzie First Nation members' identity, and
6 ties Katzie First Nation to a wider community of kin that share a common ancestry and
7 relationships to cultural landscapes and sense of place. Wetland environments along the
8 shoreline of the Fraser River, and all levels of the complex aquatic food chain, are important to
9 Katzie First Nation's and have sustained Katzie First Nation's way of life since time immemorial.
10 Katzie First Nation's Aboriginal Interests extend beyond fishing and other TLU practices and
11 include cultural and environmental stewardship within their territory.

12 Katzie First Nation has reported that the Fraser River and other waterways within the Fraser
13 River estuary were focal points for harvesting fish, wildlife and plant resources. They were also
14 travel and trade corridors, connecting Katzie First Nation with neighbouring communities.
15 Katzie First Nation reports that these ties continue to be an important component of Katzie
16 First Nation identity, but that development and industrialization along the Fraser River has
17 changed the waterways that facilitated Katzie First Nation's ties to their neighbours. Katzie First
18 Nation notes that as access to their territory declines, each opportunity to practice traditional
19 activities, such as knowledge transmission, becomes even more important. Katzie First Nation
20 states that their ability to practice their cultural heritage includes their continuous use and
21 connection to harvesting areas, spiritual and ceremonial sites, named locations, cultural
22 landmarks and archaeological sites.

23 Katzie First Nation identified that their Aboriginal Interests extend beyond fishing and other TLU
24 practices and include cultural and environmental stewardship within Katzie First Nation's
25 territory and that cultural stewardship is intrinsically linked to Katzie First Nation's rights. Katzie
26 First Nation identified that the Fraser River and its tributaries have high archeological and
27 cultural significance (tangible and intangible) and represent important places for Katzie First
28 Nation. Katzie First Nation requested that TJLP and potentially affected Indigenous
29 communities collaboratively develop a Cultural and Archaeological Resources Management
30 Plan that considers both documented and undocumented resources.

- 31
- The EAO proposes Condition 17: Indigenous Cultural Awareness, Recognition and
32 Mitigation to mitigate TMJ-related effect on cultural resources in the marine
33 terminal area, developed in consultation with Schedule B Indigenous Groups. The
34 EAO notes that where monitoring or reporting would be required for conditions,
35 these documents would be posted to the EAO's public website.

1 Katzie First Nation also identified linkages between risks associated with LNG spills, dredging
2 activities, cumulative effects of marine shipping, wake effects, and potential impacts to Katzie
3 First Nation's environmental stewardship and other cultural heritage values associated with
4 surrounding shorelines and wetlands and the complex food webs that have sustained
5 Katzie First Nation cultural since time immemorial. Katzie First Nation requested stringent
6 vessel and maintenance requirements, ongoing baseline monitoring of Fraser River ecosystem
7 health to measure and assess potential impacts throughout the life of TMJ and effective spill
8 mitigation and management measures as EAC conditions (if a Certificate is issued).

- 9
- 10 • The EAO concludes in the Accidents and Malfunctions section of Part B that there
11 is potential for extremely rare likelihood but very high severity of consequences of
12 accidents and malfunctions causing irreversible damage to heritage resources, for
13 which the residual risk is moderate. For potential impacts of accidents and
14 malfunctions on other environmental VCs, the residual risk level is low to
15 moderate. The EAO did not predict any residual effects to heritage resources from
16 erosion due to wake effects along the shorelines of the Fraser River in the RAA in
17 the Heritage Resources section of Part B;
 - 18 • The EAO is recommending KMMs under CEAA 2012 for an Emergency Response
19 Plan and a Marine Shipping Emergency Response Outreach Program. The EAO is
20 also proposing conditions requiring the development of a CEMP and OEMP, which
21 would include emergency response planning and spill prevention for the marine
22 terminal area. The EAO notes that where monitoring or reporting would be
23 required for conditions, these documents would be posted to the EAO's public
24 website; and
 - 25 • The EAO understands that marine shipping associated with TMJ would be required
26 to meet the international standards and Canadian regulations set out by Canada's
27 compliance-based marine safety and security system, which is designed to protect
28 life, property, and the marine environment.

28 Conclusion

29 In consideration of the available information, consultation with Katzie First Nation, Katzie First
30 Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC conditions if an
31 EAC is issued, TMJ is expected to result in a negligible impact on Katzie First Nation's other
32 traditional and cultural interests.

33 The key factors that were considered in support of EAO's conclusion on the impacts to other
34 traditional and cultural interests are summarized as follows:

35 **Cultural Heritage Resources:**

- 1 • The EAO's conclusions in Heritage Resources chapter of Part B did not predict residual
2 effects to Heritage Resources ([Section 7.1](#)) from erosion due to wake effects along the
3 shorelines of the Fraser River in the RAA; and
- 4 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed (this
5 factor increase the seriousness of impact of TMJ).

6 **Geospatial (places, sites and access):**

- 7 • Construction and operations are unlikely to cause disruptions to Katzie First Nation's
8 access to cultural sites and uses identified by Katzie First Nation in the Fraser River area;
- 9 • The small number of TMJ-related vessels relative to current vessel traffic are predicted
10 to have a negligible to low effect on cultural activities in the MSA area in terms of access
11 from relatively infrequent and shortduration disruptions to access due to the regularly
12 occurring transit of vessels to and from TMJ's marine terminal area; and
- 13 • Katzie First Nation identify that the Fraser River have high archeological and cultural
14 significance and represent an important place.

15 **Social, Cultural, Experiential:**

- 16 • The EAO's conclusions on Noise in Part B which found sensory disturbances from noise
17 are anticipated to be negligible to low magnitude, temporary and short-term;
- 18 • The EAO's conclusions on Visual Quality in Part B which found a negligible to low impact
19 to the existing visual landscape character in the Fraser River; and
- 20 • Katzie First Nation identified other TLU practices, including cultural and environmental
21 stewardship that is linked to Katzie First Nation's Aboriginal Interests and stewardship is
22 considered a sacred duty and important responsibility.

23 **Mitigations:**

- 24 • Proposed provincial conditions to mitigate impacts to cultural heritage are the
25 development of the Cultural and Archaeological Resources Management Plan for the
26 TMJ site, the Lighting Management, Noise and Vibration Management and Air Quality
27 Management as part of the CEMP and OEMP as well as the Water Quality Management
28 Plan and the Indigenous Cultural Awareness and Recognition Condition;
- 29 • *Heritage Conservation Act* (RSBC 1996, c. 182); and
- 30 • Proposed mitigations for potential impacts to traditional and cultural interests are the
31 recommended key mitigations under CEAA 2012 for a Marine Communications, and
32 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach

1 Program.

2 **15.2 STÓ:LŌ COMMUNITIES**

3 **15.2.1 COMMUNITY PROFILE**

4 The Stó:lō are Coast Salish speakers of the Halkomelem language that traditionally lived along
5 the lower Fraser River below Yale. The Stó:lō Nation is the political amalgamation of 11 Stó:lō
6 communities or Nations²⁰⁵. Based on differences in dialect and culture, the Stó:lō groups may
7 be described as Upper and Lower Stó:lō, or Upriver and Downriver Halkomelem.

8 The Stó:lō Nation's asserted territory extends from the mouth of the Fraser River up to the
9 Lower Fraser Canyon. Geographically, this territory extends from the US border in the south, to
10 Garibaldi Provincial Park in the north, and from the City of Vancouver in the west, to just past
11 the community of Hope in the east. Stó:lō Nation and Stó:lō Tribal Council assert collective
12 Aboriginal title and rights to the lands encompassed by their member nations/bands. The
13 People of the River Referrals Office was formed in 2012 as a virtual office of technical staff from
14 Stó:lō Nation (Stó:lō Research and Resource Management Centre), Stó:lō Tribal Council²⁰⁶, and
15 the Ts'elxeyeqw Tribe. The People of the River Referrals Office provides administrative,
16 research, and technical support for consultation with 13 groups²⁰⁷ who are signatories to the
17 Stó:lō Strategic Engagement Agreement (SEA).

18 **15.2.2 STÓ:LŌ NATION'S INVOLVEMENT IN THE CONSULTATION PROCESS**

19 On May 6, 2015, the EAO sent a notification email to Shxw'ow'hamel First Nation, Skawahlook
20 First Nation, Soowahlie First Nation, and Seabird Island First Nation (the Stó:lō Communities)
21 noting that TMJ was to be subject to a provincial EA pursuant to the Act. At that time,
22 Shxw'ow'hamel First Nation, Skawahlook First Nation and Soowahlie First Nation were affiliated

²⁰⁵ The Stó:lō communities or Nations include: Aitchelitz Indian Band, Leq'a:mel First Nation, Matsqui First Nation, Popkum First Nation, Skawahlook First Nation, Skowkale First Nation, Shxwhá:y Village, Squiala First Nation, Sumas First Nation, Tzeachten First Nation and Yakweakwoose First Nation

²⁰⁶ Stó:lō Tribal Council communities include: Seabird Island Band, Scowlitz First Nation, Soowahlie First Nation, Kwaw'Kwaw'Apilt First Nation, Shxw'ow'hamel First Nation, Chawathil Indian Band and Cheam First Nation.

²⁰⁷ The People of the River Referrals Office provides administrative, research and technical support for consultation with the following groups: Aitchelitz Indian Band, Skawahlook First Nation, Skowkale First Nation, Shxwhá:y Village, Squiala First Nation, Sumas First Nation, Tzeachten First Nation and Yakweakwoose First Nation, Scowlitz First Nation, Soowahlie First Nation, Kwaw'Kwaw'Apilt First Nation, Chawathil Indian Band and Cheam First Nation.

1 with the People of the River Referrals Office (PRRO), and all of the EAO communication was
2 directed to the PRRO for those First Nations. Seabird Island Band operates independently, and
3 communication was sent to Seabird Island First Nation directly.

4 The EAO set out its approach to consultation, including an initial assessment of strength of
5 claim and potential impacts on Stó:lō Communities' Aboriginal Interests in a letter to Stó:lō
6 Communities dated June 18, 2015. Based on the Province's initial strength of claim assessment,
7 Stó:lō Communities were consulted at the notification level as set out in Schedule C of the
8 Section 11 Order for TMJ. Stó:lō Communities expressed to the EAO through correspondence
9 their disagreement with the EAO's initial strength of claim assessment and putting them on
10 Schedule C. Stó:lō Communities asserted that the EAO's initial strength of claim analysis did not
11 take into account or acknowledge their use of the Fraser River for travel, the cultural identity of
12 the Stó:lō, nor did it reflect their current view of Traditional Territory as outlined by the United
13 Nations Declaration on the Rights of Indigenous Peoples. The EAO acknowledged the concerns
14 and offered opportunities for additional engagement, for example: in person meetings;
15 bilateral meetings with TJLP; and earlier review of draft materials.

16 As specified in Section 12.2 of the Section 11 Order, the EAO provided Stó:lō Communities
17 notification of, and relevant information at, key milestones during the EA process for TMJ so
18 that Stó:lō Communities could be informed of the progress of the EA and have the opportunity
19 to raise any issues to the EAO for discussion. The EAO issued the final AIR on November 29,
20 2016 and notified Stó:lō Communities. The EAO accepted TMJ's Application for an EAC on
21 March 20, 2019 and notified Stó:lō Communities by email. The EAO also notified Stó:lō
22 Communities regarding the start of the public comment period for TMJ on March 26, 2019, and
23 invited Stó:lō Communities to review and comment on the Application. On June 5, 2020, the
24 EAO invited Stó:lō Communities to review the EAO's draft Part C Assessment Report, including
25 the EAO's draft assessment of potential impacts to Stó:lō Nation's Aboriginal Interests.

26 A summary of TJLP's engagement activities with Stó:lō Communities is provided in the
27 Application and in TJLP's Aboriginal Consultation Reports.

28 **15.2.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

29 The EAO understands that for the Upper Stó:lō Indigenous Groups, salmon fishing contributed
30 the greatest amount of food, and as with other Central Coast Salish groups, dried salmon was a
31 particularly important stored winter food. The five miles of the Fraser River Canyon upstream of
32 Yale were particularly important for catching and drying salmon. Salmon were caught in the
33 canyon with dip nets and in smaller rivers with gaff hooks, weirs and by other means, including
34 in smaller streams in the lower Fraser Valley. Other fish caught by Upper Stó:lō Indigenous
35 Groups included sturgeon, trout, and eulachon. Upper Stó:lō Indigenous Groups reportedly

1 fished for eulachon in the vicinity of Fort Langley and at the mouth of the Pitt River. The Upper
2 Stó:lō Aboriginal groups are also understood to have traded for fresh or dried clams with
3 Indigenous groups located further downstream along the Fraser River.

4 Stó:lō reported that the area below the Port Mann Bridge, which includes the TMJ site, is not
5 fished by Stó:lō member Nations, but reported fishing in the areas between the Port Mann
6 Bridge to Sawmill Creek. Stó:lō member Nations have reported that due to DFO regulations,
7 fishing windows have been restricted which they assert has impacted fishing activities and the
8 transfer of cultural knowledge.

9 Stó:lō reported hunting deer, elk, mountain goat, bear and small types of game as well as birds
10 such as pheasants, grouse, duck and loon. Hunting and trapping are important for ceremonial
11 and subsistence purposes to Stó:lō community members and continues to play a vital role in
12 Stó:lō culture. Members hunt black tail deer, black bear, bobcat, cougar and grouse at current
13 hunting sites such as Sumas Mountain and Mount Cheam. Stó:lō community members
14 previously reported that habitat fragmentation by development has had a major impact on
15 their hunting practices.

16 Stó:lō community members reported gathering a variety of plants such as roots (bracken fern,
17 camas, tiger lily) and berries (blueberries, cranberries, huckleberries, salmon berries, salal
18 berries, Saskatoon berries and strawberries) as well as cedar roots, bark and wood for
19 sustenance, medicinal and ceremonial uses. Stó:lō estimated that 75 percent of their
20 community members continue to harvest traditional materials for FSC purposes today and have
21 expressed concern regarding lost opportunities to gather traditionally harvested plants as well
22 as the potential contamination of plants.

23 Stó:lō community members reported historically using the Fraser River and its tributaries as a
24 transportation corridor. Stó:lō community members currently practice traditional travel
25 (canoeing) in ceremonial and spiritual practices for fishing, hunting, trapping and plant
26 gathering as well as for wind drying activities. Stó:lō community members have previously
27 reported the loss of traditional bathing sites due to the cumulative effects of transportation
28 development, tourism and recreation.

29 The People of the River Referrals Office raised the following concerns regarding potential
30 impacts to Aboriginal Interests due to TMJ:

- 31 • Concerns regarding the impacts of noise and vibration from pile driving and
32 maintenance dredging on salmonids.
- 33 ○ See [Section 13.3.1](#) of Part C for a detailed discussion of the analysis and
34 resolution of concerns related to the effects of underwater noise from TMJ on
35 fish. As discussed in that section, the EAO is recommending KMMs under CEAA

1 2012, including the Fish Mitigations to Reduce Harm and Mortality, including the
2 use of bubble curtains at all times during impact pile driving where feasible and
3 during vibratory pile driving if noise levels exceed thresholds.

- 4 • Concerns regarding TMJ's potential adverse effects on fish and fish habitat (specifically
5 green and white sturgeon as well as salmon) due to pollution travelling to intertidal
6 estuaries of the Fraser River and an increase in marine traffic.
 - 7 ○ See [Section 13.3.1](#) of Part C for a detailed discussion of the analysis and
8 resolution of concerns related to TMJ effects on fish and fish habitat. As
9 discussed in that section, the EAO is recommending KMMs under CEAA 2012,
10 including the Fish Mitigations to Reduce Harm and Mortality and Fish Habitat
11 Offset Plan. The offsetting plan would be developed in consultation with
12 Schedule B Indigenous Groups and identify offsets that are greater and of higher
13 fisheries value (higher productivity) than the habitat that would be directly lost
14 by TMJ. It would also include a monitoring program to assess and evaluate the
15 effectiveness of offsetting measures and would require the incorporation of
16 Indigenous traditional knowledge and the effectiveness of the proposed fish
17 habitat offset.
 - 18 ○ As described in the Current Use of Lands and Resources for Traditional Purposes
19 in Part B, the EAO predicts that TMJ-related vessel transits would have
20 negligible-low magnitude effects to access to fishing compared to baseline
21 numbers of vessel transits, that could be experienced as higher in the Fraser
22 River compared to Salish Sea. The EAO is proposing a KMM under CEAA 2012 for
23 TJLP to develop a Marine Communication Plan for TMJ (from the jetty out to 12
24 nm), including procedures to inform Indigenous Groups of traffic schedules, for
25 Indigenous Groups to submit any feedback on potential adverse effects on
26 navigation as a result of TMJ, and for TJLP to document and respond to any
27 feedback received in a timely manner.

28 Conclusion

29 In consideration of the information available, the EAO 's consultation with Stó:lō Communities,
30 Stó:lō Communities' engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
31 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
32 to result in a negligible-to-minor impact on Stó:lō Communities' Aboriginal right to fish and a
33 negligible impact on Stó:lō Communities' right to hunt, trap, gather plants and other traditional
34 and cultural interests.

35 The key factors that were considered in support of EAO's conclusion on the impacts to
36 Aboriginal Interests are summarized as follows:

1 **Biophysical:**

- 2 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed;
- 3 • **Fishing:** The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would
- 4 have potential to result in low to moderate magnitude residual effects to fish and fish
- 5 habitat at the TMJ site, and low magnitude residual effects to sturgeon from vessel
- 6 strikes;
- 7 • **Hunting, trapping and gathering:** The EAO's conclusions on adverse residual effects to
- 8 wildlife and vegetation (see respective chapters in Part B) which indicate negligible to
- 9 low magnitude residual effects on loss or alteration of wildlife habitat, sensory
- 10 disturbance from noise and light, and mortality; as well as low magnitude residual
- 11 effects on wetland and riparian ecosystems; and
- 12 • **Other Traditional and Cultural Interests:** The EAO's conclusions in the Heritage
- 13 Resources chapter of Part B found no residual effects to paleontological resources and
- 14 historical and physical heritage and no residual effects on Heritage Resources from
- 15 erosion due to wake effects along the shorelines of the Fraser River in the RAA.

16 **Geospatial (places, sites and access):**

- 17 • During construction (just over three years in duration) and operations (30 years in
- 18 duration) Indigenous mariners and fishers would avoid entering and remaining in the
- 19 marine terminal area and TMJ-related vessel activity may result in short-term,
- 20 temporary disruptions to traveling on the Fraser River to access fishing areas used by
- 21 Sto:lo upstream of the TMJ site;
- 22 • Construction (just over three years in duration) and operation (30 years) is unlikely to
- 23 cause disruptions to Stó:lō Community members access to areas traditionally used for
- 24 hunting, trapping, and gathering activities or cultural sites; and
- 25 • The upland portion of the TMJ site is situated on fee simple (private) land and previously
- 26 disturbed foreshore.

27 **Social, Cultural and Experiential:**

- 28 • As outlined in the Current Use of Lands and Resources for Traditional Purposes section
- 29 in Part B, potential impacts to experience in the vicinity of the TMJ area due to a change
- 30 in current use, noise and visual quality (see respective chapters in Part B) during
- 31 construction and operations which are anticipated to be negligible to low in magnitude
- 32 in the Fraser River.

33 **Mitigations:**

- 1 • **Fishing:** Proposed mitigations to reduce impacts to the right to fish, include mitigations
2 to reduce impacts to noise and visual quality in the CEMP and OEMP as well as the
3 recommended key mitigations under CEAA 2012, specifically the Fish Mitigation to
4 Reduce Harm and Mortality, the Fish Habitat Offset Plan, and follow-up programs, the
5 Marine Communications Plan, the Marine Access and Transportation Plan and the
6 Vessel Traffic Management Plan;
- 7 • **Hunting, trapping and gathering:** Proposed conditions to mitigate impacts to Stó:lō
8 Communities' right to hunt, trap and gather are the vegetation and wetland
9 management, wildlife and wildlife habitat management, light management and noise
10 management components of the CEMP and OEMP. The EAO is also proposing these
11 mitigations as KMMs under CEAA 2012 which would include the requirements for
12 vegetation and wetland creation and restoration, lighting, noise and wildlife and wildlife
13 habitat management and monitoring; and
- 14 • **Other Traditional and Cultural Interests:** Proposed conditions to mitigate impacts to
15 Sto:lo Communities' other traditional and cultural interests are the Cultural and
16 Archaeological Resources Management Plan for the TMJ site, the Lighting Management,
17 Noise and Vibration Management and Air Quality Management as part of the CEMP and
18 OEMP as well as the Water Quality Management Plan and the Indigenous Cultural
19 Awareness and Recognition Condition; HCA, (RSBC 1996, c. 182).

20 **15.3 KWIKWETLEM FIRST NATION**

21 **15.3.1 COMMUNITY PROFILE**

22 Kwikwetlem First Nation is a Central Coast Salish Indigenous Group situated along the
23 Coquitlam River in southwestern British Columbia. Kwikwetlem First Nation's ancestral
24 language is *hən̓q̓əm̓iḥən̓* (Down River dialect of Halkomelem). The word Kwikwetlem
25 (*kʷikʷəɬəm*) translated into English means "Red Fish Up the River", referring to the sockeye
26 salmon run that once flourished in the Coquitlam River and sustained the Kwikwetlem First
27 Nation's people for thousands of years²⁰⁸. The cities of Coquitlam and Port Coquitlam take their
28 name after the Kwikwetlem First Nation people.

²⁰⁸ Kwikwetlem First Nation. 2022. Our People. <https://www.kwikwetlem.com/our-people.htm>. Accessed April 8, 2022.

1 Kwikwetlem First Nation has two reserves, IR 1 is located at the confluence of the Coquitlam
2 and Fraser Rivers at the ancient village site of *slakaya'nc*, and IR 2 is located 2.5 km up the
3 Coquitlam River at the ancient village site of *setlama'kmən*. The latter serves as the
4 administrative and governmental hub providing Kwikwetlem First Nation public services and
5 contains a residential sub-division. Kwikwetlem First Nation has 128 registered members, of
6 which about one third of the members live on Kwikwetlem First Nation's own reserve lands²⁰⁹.
7 TMJ area does not overlap any Kwikwetlem First Nation reserve lands.

8 Through the EA process for the South Fraser Perimeter Road Project, Kwikwetlem have stated
9 their traditional territory centers on the Coquitlam Lake Watershed, including the upper and
10 lower Coquitlam River. The territory extends to the east side of Pitt Lake and includes both
11 sides of the lower Pitt River. To the west, the territory extends along Possum Creek, across Port
12 Moody Inlet to Stony Creek, and across Sapperton Heights to the north arm of the Fraser River.
13 The southern extent of the territory extends from the west end of Barnston Island to the east
14 end of Annacis Island and includes that portion of the Fraser uplands two km south of the
15 Fraser River^{210*}. Kwikwetlem First Nation people have a strong connection to the lands and
16 waters of their home. Traditionally, Kwikwetlem First Nation is a fishing community, many
17 members continue to work today in the fishing industry. Kwikwetlem First Nation carries on the
18 legacy of its ancestors as stewards of the land, water, and resources within their traditional
19 territory. Leading as advocates for the environment as well as local natural and cultural
20 resources, Kwikwetlem First Nation consults with everyone undertaking significant
21 development in their traditional territory. Kwikwetlem First Nation's asserted traditional
22 territory is approximately four km east of TMJ.

23 15.3.2 KWIWKETLEM FIRST NATION'S INVOLVEMENT IN THE CONSULTATION

²⁰⁹ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Kwikwetlem First Nation. https://fnp-pnpn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=560&lang=eng, accessed December 9, 2021.

²¹⁰EAO. July 27, 2008. SFPR Project Assessment Report. <https://www.projects.eao.gov.bc.ca/api/public/document/5888e56c817b85ae43cf7a92/download/South%20Fraser%20Perimeter%20Road%20Project%20Assessment%20Report%20and%20Appendices%20dated%20Jun%2027%2008..pdf>

* Noting as of July 2008, Kwikwetlem has indicated that as they have never undertaken a comprehensive Traditional Use Study, this description of their traditional territory is a provisional one, setting provisional or draft boundaries for the territory and, as such is subject to modification as further information becomes available or when a comprehensive Traditional Use Study is completed

1 PROCESS

2 Initially Kwikwetlem First Nation was not included in the Section 11 Order list of Indigenous
3 Groups for TMJ, and then the EAO later became aware of Kwikwetlem First Nation's interests
4 related to TMJ during the Application Review phase for TMJ. While not involved during earlier
5 phases of the EA, Kwikwetlem First Nation later identified an interest in understanding the
6 intent behind the proposed mitigations on the project, including requesting greater Indigenous
7 oversight in the conditions and that the EAO require TJLP to develop a plan that would commit
8 to a reasonable timeline for review of draft plans by Nations to ensure Free, Prior, and
9 Informed Consent is achieved. On September 20, 2021, the EAO and Kwikwetlem First Nation
10 met to discuss the opportunities for Kwikwetlem First Nation's involvement in the EA, and
11 Kwikwetlem First Nation's concerns regarding TMJ's impact on Aboriginal Interests. During the
12 meeting the parties discussed Kwikwetlem First Nation's concerns related to the limited
13 opportunities for engagement to date on the EA for TMJ, as well as potential impacts to climate
14 change due to marine shipping.

15 On November 23, 2021, the EAO received a letter from TJLP that described recent
16 developments in the LNG bunkering/ bunker vessel markets and implications for the TMJ EA
17 timeline. Then on December 2, 2022, the EAO approved a *Section 24(4) Order* to extend the
18 review period for TMJ to allow for TJLP to conduct the BVSA. On December 7, 2021, the EAO
19 invited Kwikwetlem First Nation, via email, to participate as a Schedule C Indigenous Group for
20 the BVSA-related analysis to be undertaken for TMJ prior to referral. On January 6, 2022,
21 Kwikwetlem First Nation responded the EAO by requesting that it be added to the list of
22 Schedule C Indigenous Groups for the remainder of the TMJ EA. Kwikwetlem First Nation was
23 added to Schedule C by Section 13 Order on January 19, 2022. As specified in Section 12.2 of
24 the Section 11 Order, the EAO provided Kwikwetlem First Nation notification of, and relevant
25 information at, key milestones during the EA process for TMJ so that Kwikwetlem First Nation
26 could be informed of the progress of the EA and could raise any issues to the EAO for
27 discussion.

28 The EAO is of the view that it has approached consultation with Kwikwetlem First Nation with
29 the intent to identify potential impacts and consider ways to address any potential TMJ-related
30 impacts identified by Kwikwetlem First Nation to their Aboriginal Interests. This included
31 meeting with Kwikwetlem First Nation and providing Kwikwetlem First Nation with the
32 opportunity to provide feedback on the EAO's draft part C of the Assessment Report updates
33 related to the BVSA, including the EAO's assessment on potential impacts to Kwikwetlem First
34 Nation's Aboriginal Interests. The EAO notified Kwikwetlem regarding the public comment
35 period for the EAO's BVSA-related updates to the Assessment Report for TMJ, and invited
36 Kwikwetlem to review the draft report in advance of the comment period, including identifying

- 1 any potential impacts to Kwikwetlem First Nation's Aboriginal Interests that were not
- 2 adequately assessed or considered Part C.

3 **15.3.3 POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

4 The following sections focus on potential impacts of the Project to Kwikwetlem First Nation's
5 Aboriginal Interests. A discussion of the EAO's assessment approach is provided in the EAO's
6 Consultation Process Methodology section of Part C. The EAO considered information available,
7 including from public sources as well as relevant issues raised by Kwikwetlem First Nation
8 during the EA process, in the following assessment of the potential impacts of TMJ on
9 Kwikwetlem First Nation's Aboriginal Interests

10 **A. POTENTIAL IMPACTS ON FISHING**

11 Kwikwetlem First Nation identifies itself as a fishing community, with members that have
12 descended from ancestors known as skilled canoe builders, and master sturgeon and salmon
13 fishers²⁰⁸. The EAO understands that salmon, from the Fraser and Coquitlam Rivers, were of
14 great importance to the Kwikwetlem people; however, the construction of the Coquitlam Dam
15 in 1904 led to the virtual extinction of the Coquitlam River sockeye salmon run²⁰⁸. Kwikwetlem
16 First Nation identify that fishing is still a major occupation for its members, And Kwikwetlem
17 First Nation currently maintains a DFO-licensed Fraser River salmon fishery for FSC purposes
18 upstream of the proposed TMJ site, from Douglas Island to the Pattullo Bridge²¹¹. The EAO is
19 aware that historically Kwikwetlem First Nation harvested salmon, sturgeon, eulachon, trout,
20 catfish and carp in the Coquitlam, Fraser, and Pitt rivers²¹². Currently the south side of the
21 Fraser River, between Pattullo and Golden Ears bridges, and the north Fraser River shoreline,
22 from the Pitt River to New Westminster, are used for fishing for salmon, eulachon, and
23 sturgeon by Kwikwetlem first Nation. Community members target several species of salmon
24 (e.g., Chinook, chum, sockeye, Jack spring), steelhead, eulachon, sturgeon, cutthroat trout,
25 brook trout, rainbow trout, carp, catfish, red-sided shiner, three-spine stickleback, and crayfish.

²¹¹ Government of Canada – Fraser River Indigenous fisheries archived reports, Lower Fraser River license opening times (Communal licenses) for “2020”. Available at: <https://www.pac.dfo-mpo.gc.ca/fm-gp/fraser/docs/archiv-reports-rapports/indigenous-autochtone/LFOpenings/2020COM-eng.pdf>. Accessed May 26, 2022.

²¹² BC Environmental Assessment Office (2017). Appendix C.01 – Kwikwetlem First Nation – Decision Materials for TMX Expansion Project.
<https://www.projects.eao.gov.bc.ca/api/public/document/58923186b637cc02bea16453/download/Appendix%20C.1%20-%20Kwikwetlem%20First%20Nation.pdf>.

1 Marine and freshwater shellfish gathered include freshwater clams and scallops. Drift nets, gills
2 nets, dip nets, and hook and line are typically used for fishing.

3 The EAO understands through Kwikwetlem First Nation's submissions for the TMX federal panel
4 review process, that the preservation, protection and revitalizing the health of the Fraser River,
5 its tributaries and the fish, plants, birds, and other life that rely on it are of paramount
6 importance to Kwikwetlem First Nation²¹³. Kwikwetlem First Nation consider that the Fraser
7 River and its tributaries provide critical habitat to numerous fish species still relied upon by
8 Kwikwetlem members, and as stated by one of Kwikwetlem First Nation's members – “these
9 waters provide us food and work”²¹⁴. Kwikwetlem First Nation identified that as “people of the
10 river” the rivers and tributaries in Kwikwetlem First Nation territory provide Kwikwetlem First
11 Nation with key locations for freshwater fishing and food collection, and other cultural activities
12 (e.g., spiritual activities, gathering plants and medicines). The EAO is not aware that
13 Kwikwetlem First Nation currently harvest in the lower Fraser River near the TMJ site.

14 The EAO evaluated the potential effects on fishing rights attributable to TMJ, which are
15 summarized in [Section 13.3.1](#) of Part C. The EAO is satisfied that the key impacts to biophysical
16 components resulting in changes to fish quantity and quality, changes in access to fishing
17 resources, and changes to social, cultural, and spiritual values associated with traditional fishing
18 activities summarized in that section apply to Kwikwetlem First Nation. The following section
19 focuses on the specific issues and potential impacts to the Kwikwetlem First Nation's Aboriginal
20 right to fish.

²¹³ Kwikwetlem First Nation. 2017. [A85517-2 Kwikwetlem Regulatory Support Letter - A5T2A2](#). Accessed June 20, 2022.

²¹⁴ Kwikwetlem First Nation. 2015. [C199-1-1 - Letter to Panel Seeking to File Late Evidence - A4S9A6](#). Accessed June 20, 2022.

- 1 • As described in the Accidents and Malfunctions section of Part B of this report, the EAO
2 is satisfied that potential accidents and malfunction associated with TMJ have been
3 adequately identified and assessed for this EA. The EAO concludes that impacts from
4 potential accidents and malfunctions on environmental VCs, such as fish and fish habitat
5 vegetation and wildlife and wildlife habitat, would be low to moderate. The EAO is
6 recommending KMMs under CEAA 2012 for an Emergency Response Plan and a Marine
7 Shipping Emergency Response Outreach Program. The EAO is also proposing conditions
8 requiring the development of a CEMP and OEMP, which would include emergency
9 response planning and spill prevention for the marine terminal area. The EAO notes that
10 where monitoring or reporting would be required for conditions, these documents
11 would be posted to the EAO's public website; and
- 12 • The EAO is recommending KMMs under CEAA 2012, including the Fish Mitigations to
13 Reduce Harm and Mortality, Fish Habitat Offset Plan, and Vessel Traffic Management
14 Plan and concludes that effects to fish and fish habitat from TMJ would not be
15 significant within the LAA/RAA.

16 **Conclusion**

17 In consideration of the available information, the EAO's consultation with Kwikwetlem First
18 Nation, Kwikwetlem First Nation's engagement with TJLP, TJLP's commitments, the EAO's
19 proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012,
20 TMJ is expected to result in a negligible-to-minor impact on Kwikwetlem First Nation's right to
21 fish.

22 The key factors that were considered in support of the EAO's conclusion on the impacts to the
23 right to fish are summarized as follows:

24 **Biophysical:**

- 25 • The EAO's conclusions in the Fish and Fish Habitat in Part B that TMJ would have
26 potential to result in low to moderate magnitude residual effects to fish and fish habitat
27 at the TMJ site, and low magnitude residual effects to sturgeon from vessel strikes; and
- 28 • The lower Fraser River is highly industrial and the TMJ area is previously disturbed.

29 **Geospatial (places, site, and access):**

- 30 • The importance of fishing on the Fraser River and that Kwikwetlem First Nation's
31 members currently fish upstream of the TMJ site; and
- 32 • During construction (just over three years in duration) and operations (30 years
33 minimum) Indigenous mariners and fishers would avoid entering and remaining in the
34 marine terminal area and TMJ-related vessel activity may result in short-term,

1 temporary disruptions to Kwikwetlem First Nation members traveling on the Fraser
2 River within the vicinity of the TMJ site.

3 **Social, Cultural and Experiential:**

- 4 • As outlined in the Current Use of Lands and Resources for Traditional Purposes section
5 in Part B, potential negligible to low magnitude impacts to the change in noise and visual
6 quality during construction and to changes in visual quality and potential concerns
7 about safety during operations in the Fraser River; and
- 8 • Preservation, protection and revitalizing the health of the Fraser River, its tributaries
9 and the fish, plants, birds, and other life that rely on it are of paramount importance to
10 Kwikwetlem First Nation.

11 **Mitigations:**

- 12 • Proposed mitigations to reduce impacts to Kwikwetlem First Nation's right to fish
13 include mitigations to reduce impacts to noise and visual quality in the CEMP and OEMP
14 as well as the recommended key mitigations under CEAA 2012, specifically the Fish
15 Mitigation to Reduce Harm and Mortality, the Fish Habitat Offset Plan, and follow-up
16 programs, the Marine Communication Plan, the Marine Access and Transportation Plan
17 and the Vessel Traffic Management Plan.

18 The EAO is aware that Kwikwetlem First Nation has a policy that there be no further loss of fish
19 habitat, and that Kwikwetlem requests to be consulted regarding any specific losses of fish
20 habitat and that all habitat compensation and mitigation Project options must be identified and
21 agreed to by Kwikwetlem First Nation²¹⁰.

- 22 • The EAO's is recommending a KMM for the Fish Habitat Offset Plan, which would
23 require TJLP to develop the plan in consultation with Schedule B Indigenous Groups, and
24 to the satisfaction of Fisheries and Oceans Canada prior to construction. The EAO notes
25 that the consultation requirements on the Fish Habitat Offset Plan (KMM) would not
26 apply to Kwikwetlem First Nation as a Schedule C Indigenous Group for TMJ.
- 27 • During the EA, TJLP indicated that TMJ would support recovery of fish in the Fraser River
28 by providing funding to the Indigenous-led FNFLF, of which Kwikwetlem First Nation is a
29 participant, as described in [Section 13.1](#) of Part C.

30

1 **B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING**

2 The EAO is aware through Kwikwetlem First Nation's submissions on the TMX panel review
3 process that, the south side of the Fraser River between the Pattullo and Golden Ears bridges is
4 used for hunting deer, and the north Fraser River shoreline from the Pitt River to New
5 Westminster is used for hunting deer, lynx, duck, beaver, geese, grouse, pheasant, mink, rabbit
6 and bear²¹². The EAO is also aware that plants, berries, and roots gathered are used by
7 Kwikwetlem First Nation for food and medicinal purposes and wood and bark are harvested for
8 both ritual and utilitarian objects, such as canoes, nets, baskets, and masks. Community
9 members gather red cedar wood, bark and root, yellow cedar, cascara bark, yew wood and
10 bark, Douglas fir, birch, cottonwood, cherry bark, crabapple, alder, sap, balsam, stinging nettle,
11 cattail, salal, devil's club, Labrador tea, "frog leaf", salmon berries and shoots, huckleberry,
12 cranberry, blueberry, blackberry, Saskatoon berry and wood, hazelnut, big leaf maple, Oregon
13 grape, and Wapato, and most of these plants are collected from sloughs, riverbanks and upland
14 environment The EAO is aware through Kwikwetlem First Nation's submissions on the TMX
15 panel review process that, the south side of the Fraser River between the Pattullo and Golden
16 Ears bridges is used for hunting deer, and the north Fraser River shoreline from the Pitt River to
17 New Westminster is used for hunting deer, lynx, duck, beaver, geese, grouse, pheasant, mink,
18 rabbit and bear²¹². The EAO is also aware that plants, berries, and roots gathered are used by
19 Kwikwetlem First Nation for food and medicinal purposes and wood and bark are harvested for
20 both ritual and utilitarian objects, such as canoes, nets, baskets, and masks. Community
21 members gather red cedar wood, bark and root, yellow cedar, cascara bark, yew wood and
22 bark, Douglas fir, birch, cottonwood, cherry bark, crabapple, alder, sap, balsam, stinging nettle,
23 cattail, salal, devil's club, Labrador tea, "frog leaf", salmon berries and shoots, huckleberry,
24 cranberry, blueberry, blackberry, Saskatoon berry and wood, hazelnut, big leaf maple, Oregon
25 grape, and Wapato, and most of these plants are collected from sloughs, riverbanks and upland
26 environment²¹².

27 The EAO evaluated the potential effects on hunting, trapping, and gathering rights attributable
28 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
29 [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical components resulting in
30 changes to wildlife and vegetation quantity and quality, changes in access to hunting, trapping
31 and gathering areas, and changes to social, cultural, and spiritual values associated with
32 traditional hunting, trapping and gathering activities summarized in that section apply to
33 Kwikwetlem First Nation and Kwikwetlem First Nation did not raise specific issues and concerns
34 with potential impacts of TMJ relating to hunting, trapping, and gathering, noting that the EAO
35 added Kwikwetlem First Nation to Schedule C Indigenous Groups for TMJ in January 2022.

36

1 **Conclusion**

2 In consideration of the available information, the EAO's consultation with Kwikwetlem First
3 Nation, Kwikwetlem First Nation's engagement with TJLP, TJLP's commitments, the EAO's
4 proposed EAC conditions if an EAC is issued and the recommended KMMs under *CEAA 2012*,
5 TMJ is expected to result in a negligible impact on Kwikwetlem First Nation's right to hunt, trap
6 and gather.

7 The key factors that were considered in support of the EAO's conclusion on the impacts to the
8 right to hunt, trap and gather are summarized as follows:

9 **Biophysical:**

- 10 • The EAO's conclusions at the TMJ site on adverse residual effects to wildlife and
11 vegetation (see respective chapters in Part B) which indicate negligible to low
12 magnitude residual effects on loss or alteration of wildlife habitat, sensory disturbance
13 from noise and light, and mortality; as well as low magnitude residual effects on
14 wetland and riparian ecosystems; and
15 • Terrestrial wildlife species of cultural importance Indigenous Groups have either not
16 been found within the TMJ area or are not anticipated to be affected by the TMJ-related
17 activities.

18 **Geospatial (places, sites and access):**

- 19 • Construction (just over three years in duration) and operation (30 years) is unlikely to
20 cause disruptions to Kwikwetlem First Nation members access to areas traditionally
21 used for hunting, trapping, and gathering activities at the TMJ site; and
22 • The upland portion of the TMJ site is situated on fee simple (private) land.

23 **Social, Cultural and Experiential:**

- 24 • Potential impacts to experience in the vicinity of the TMJ site due to a change in noise
25 and visual quality (see respective chapters in Part B) during construction and operation
26 which are anticipated to be negligible to low in magnitude in the Fraser River.

27 **Mitigations:**

28 Proposed conditions to mitigate impacts to Kwikwetlem First Nation's right to hunt, trap and
29 gather are the vegetation and wetland management, wildlife and wildlife habitat management,
30 light and noise management components of the CEMP and OEMP. The EAO is also proposing
31 these mitigations as KMMs under *CEAA 2012* which would include the requirements for
32 vegetation and wetland creation and restoration, lighting, noise and wildlife and wildlife habitat
33 management and monitoring.

1 C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS

2 Kwikwetlem First Nation identify that its sovereignty is drawn from the Creator, the *siłém̓ xé-ls*
3 (transformers), and *šxʷ?áyám* (deep-time histories), which grant Kwikwetlem First Nation the
4 responsibility to govern its territory in accordance with its customary laws²⁰⁸. Kwikwetlem First
5 Nation holds and administers the Kwikwetlem First Nation Heritage Policy (KFNHP) which
6 stipulates the rights of the Nation to approve professional archaeologists to apply for permits
7 and work plans under the Heritage Conservation Act for any works within the *kʷikʷəłəm*
8 territory²¹⁵. According to the KFNHP, Kwikwetlem First Nation asserts an inherent right to
9 govern all lands, waters, and resources within its Territory, and seeks to protect, manage, and
10 preserve heritage sites, heritage objects, heritage places and resources in its territory,
11 according to traditional values and practices. Kwikwetlem First Nation are stewards of
12 generations to come and hold a responsibility to protect, promote and enhance Kwikwetlem
13 lands, resources, and culture in perpetuity.

14 The EAO is aware through Kwikwetlem First Nation's submission through the TMX federal
15 review panel process, that as the "people of the river", the rivers and tributaries in Kwikwetlem
16 First Nation's Territory provide Kwikwetlem people with key locations for spiritual activities,
17 and other cultural activities (in addition to locations for plant and medicine collection,
18 freshwater fishing, and food collection)²¹². Kwikwetlem First Nation have identified that these
19 practices allow for the transfer of knowledge from one generation from the next.

20 The EAO evaluated the potential effects on other cultural and traditional interests attributable
21 to TMJ, which apply broadly to Indigenous Groups. These potential effects are summarized in
22 [Section 13.3.3](#). The EAO is satisfied that the key impacts to biophysical, geospatial, and social,
23 cultural, and spiritual values associated with potential pathways to effects to impacts to other
24 traditional and cultural Aboriginal Interests that are summarized in that section apply to
25 Kwikwetlem First Nation. Kwikwetlem First Nation did not raise specific issues and concerns
26 with potential impacts of TMJ relating to its other cultural and traditional Interests with respect
27 to the EA for TMJ, noting that the EAO added Kwikwetlem First Nation to Schedule C Indigenous
28 Groups for TMJ in January 2022.

29 Conclusion

30 In consideration of the available information, consultation with Kwikwetlem First Nation,
31 Kwikwetlem First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed

²¹⁵ Kwikwetlem First Nation. 2022. <https://www.kwikwetlem.com/sumiqwuelu-riverview.htm>. Accessed June 20, 2022.

1 EAC conditions if an EAC is issued, TMJ is expected to result in a negligible impact on
2 Kwikwetlem First Nation's other traditional and cultural interests.

3 The key factors that were considered in support of EAO's conclusion on the impacts to other
4 traditional and cultural interests are summarized as follows:

5 **Cultural Heritage Resources:**

- 6 • The EAO's conclusions in Heritage Resources chapter of Part B did not predict residual
7 effects to Heritage Resources (Section 7.1) from erosion due to wake effects along the
8 shorelines of the Fraser River in the RAA; and
- 9 • The lower Fraser River is highly industrial and the TMJ site is previously disturbed (this
10 factor increases the seriousness of impact of TMJ).

11 **Geospatial (places, sites, and access):**

- 12 • Construction and operations are unlikely to cause disruptions to Kwikwetlem First
13 Nation's access to cultural sites and uses by Kwikwetlem First Nation in the Fraser River
14 area;
- 15 • The rivers and tributaries in Kwikwetlem First Nation territory provide key locations for
16 spiritual and other cultural activities; and
- 17 • The small number of TMJ-related vessels relative to current vessel traffic are predicted
18 to have a negligible to low effect on cultural activities in the MSA area in terms of access
19 from relatively infrequent and short duration disruptions to access due to the regularly
20 occurring transit of vessels to and from TMJ's marine terminal area.

21 **Social, Cultural, Experiential:**

- 22 • The EAO's conclusions on Noise in Part B which found sensory disturbances from noise
23 are anticipated to be negligible to low magnitude, temporary and short-term;
- 24 • The EAO's conclusions on Visual Quality in Part B which found a negligible to low impact
25 to the existing visual landscape character in the Fraser River;
- 26 • The practice of cultural, traditional, and spiritual activities associated with rivers and
27 tributaries allows for the transfer of knowledge from one generation to the next; and
- 28 • Kwikwetlem First Nation are stewards of generations to come and hold a responsibility
29 to protect, promote and enhance Kwikwetlem lands, resources, and culture in
30 perpetuity.

31 **Mitigations:**

- 32 • Proposed provincial conditions to mitigate impacts to cultural heritage are the
33 development of the Cultural and Archaeological Resources Management Plan for the
34 TMJ site, the Lighting Management, Noise and Vibration Management and Air Quality

- 1 Management as part of the CEMP and OEMP as well as the Water Quality Management
- 2 Plan and the Indigenous Cultural Awareness and Recognition Condition; and
- 3 • Heritage Conservation Act, (RSBC 1996, c. 182).

4 **15.4 MÉTIS NATION BRITISH COLUMBIA**

5 **15.4.1 COMMUNITY PROFILE**

6 Métis people are one of three “Aboriginal peoples of Canada” within the meaning of S. 35 (2) of
7 the *Constitution Act, 1982*²¹⁶. Métis people are descendants of unions between European men
8 (explorers, fur traders and pioneers) and Aboriginal women that occurred in the eighteenth-
9 century. Métis Nation British Columbia (MNBC) is the Métis governing body in BC that
10 represents the interests of over 19,000 citizens in 40 Métis Chartered Communities from seven
11 regions in the Province. MNBC indicates that it also represents the interests of nearly 90,000
12 self-identified Métis people in British Columbia. According to the *Métis Nation British*
13 *Columbia’s Consultation Guidebook*²¹⁷ the MNBC Ministry of Natural Resources will advocate
14 and manage consultation, and where necessary consult directly with the Métis Chartered
15 Communities. Since 2003 when the Métis leadership ratified the *Métis Nation BC Constitution*,
16 MNBC has developed laws, regulations, and policies for maintaining, protecting, and furthering
17 the Aboriginal Interests of Métis in British Columbia.

²¹⁶ Métis Nation - Library and Archives Canada: <https://www.bac-lac.gc.ca/eng/discover/aboriginal-heritage/metis/Pages/introduction.aspx> (September 2020).

²¹⁷ <https://www.mnbc.ca/wp-content/uploads/2020/07/Consultation-Guidelines-Approved-FINAL-with-signature.pdf> (Adopted June 2020)

1 15.4.2 MÉTIS NATION BRITISH COLUMBIA'S INVOLVEMENT IN THE 2 CONSULTATION PROCESS

3 The EAO sent a notification email to MNBC on May 6, 2015 noting that TMJ was to be subject to
4 a provincial EA pursuant to the Act. As set out in section 14.2 of the Section 11 Order for TMJ,
5 Section 5(e) of the EAO and the Agency's Memorandum of Understanding on Substitution of
6 Environmental Assessments (2013) states that any consultation activities conducted with Métis
7 or organizations representing Métis in British Columbia will be conducted on behalf of the
8 Government of Canada and are not an acknowledgement by British Columbia that it owes a
9 duty of consultation or accommodation to Métis in British Columbia under Section 35 of the
10 Constitution Act, 1982.

11 The EAO set out its notification approach, consistent with opportunities provided to Indigenous
12 Groups listed in Schedule C of the Section 11 Order for TMJ, in a letter to MNBC dated July 28,
13 2015. As specified in section 12.2 of the Section 11 Order, the EAO provided MNBC notification
14 of, and relevant information at, key milestones during the EA process for TMJ so that MNBC
15 could be informed of the progress of the EA and could raise any issues to the EAO for
16 discussion.

17 The EAO issued the final AIR on November 29, 2016 and notified MNBC. The EAO initiated the
18 180-day Application Review period on March 20, 2019 and notified MNBC by email. The EAO
19 also notified MNBC regarding the start of the public comment period for TMJ on March 26,
20 2019, and invited MNBC to review and comment on the Application and MNBC provided
21 feedback the EAO on TJLP's Application. On June 5, 2020, the EAO invited MNBC to review the
22 EAO's draft Part C Assessment Report, including the EAO's draft assessment of potential
23 impacts to Métis Nation British Columbia's Aboriginal Interests.

24 A summary of TJLP's engagement activities with MNBC is provided in the Application and in
25 TJLP's Aboriginal Consultation Reports.

26 15.4.3 MÉTIS CONCERNS

27 MNBC reported that Métis have used, and continue to use, the area in and around the
28 proposed TMJ site for traditional harvesting activities. MNBC told the EAO that the
29 endangerment or destruction of harvest resources threatens Métis subsistence practices, and
30 given the communal nature of Métis resource distribution, its impact is potentially widespread
31 throughout the Métis community.

1 MNBC reported Métis harvesting salmon, ling cod, eulachon, sturgeon, Dolly Varden and
2 halibut. Salmon remains the primary species harvested in sites along the Fraser River as well as
3 the Ladysmith Harbour, Samsun Narrows and along the southwestern portion of Pender Island.
4 Ling cod was harvested on the western side of the Strait of Georgia and south of Steveston
5 Jetty. Eulachon, sturgeon, and Dolly Varden were harvested in Canoe Passage and in the lower
6 Fraser River. MNBC reported Métis harvesting crab west of the Westshore Terminals, Sturgeon
7 Bank, Boundary Bay and at various locations throughout the Gulf Islands. Also Métis harvested
8 are prawns, clams, oysters, sea cucumber, sea urchin and squat lobster.

9 MNBC reported harvesting deer by Métis on Galiano Island and otter near the mouth of the
10 Fraser River. Pacific Black Brant was reported to be harvested in Boundary Bay, Galiano Island,
11 south of the BC Ferries Tsawwassen Terminal, the inter-causeway area and south of Brunswick
12 point. Ducks and grouse were also harvested on Galiano Island. MNBC reported Métis gathering
13 firewood used for fuel along the causeways for the Roberts Bank terminals and BC Ferries
14 Tsawwassen Terminal as well as from the beach north of the Roberts Bank causeway.

15 MNBC also identified a number of Métis cultural sites including birth, death, burial and
16 gathering sites primarily located in and around the Gulf Islands. Burial sites have previously
17 been identified by MNBC representatives in the Strait of Georgia in the vicinity of Steveston
18 Jetty.

19 MNBC raised the following concerns regarding TMJ:

- 20 • Concern regarding TMJ effects on benthic communities and fish in the vicinity of TMJ as
21 MNBC noted that land use mapping data shows Métis use the proposed project area
22 and shipping area for harvesting fish. MNBC was of the view that there was limited
23 information on the benthic communities and noted that there was not sufficient
24 information to determine potential risk.
 - 25 ○ TJLP provided an overview of the benthic sampling program and assessment that
26 was conducted for the Application and referenced the various documents that
27 delineated the taxonomy of the benthic samples.
 - 28 ○ See [section 13.3.1](#) of Part C for a detailed discussion of the analysis and
29 resolution of concerns related to impacts to fish and fish habitat. As discussed in
30 that section, the EAO is recommending KMMs under CEAA 2012, including the
31 Fish Mitigations to Reduce Harm and Mortality (which would include mitigations
32 to limit in water works to least risk fish windows, or undertake additional
33 mitigation measures as determined by a QP if works occur outside of these
34 windows) and a Fish Habitat Offset Plan which would identify offsets that are
35 greater and of higher fisheries value (higher productivity) than the habitat that
36 would be directly lost by TMJ and include a monitoring program.

- 1 • Concern regarding TMJ effects on wildlife and vegetation in the vicinity of TMJ as MNBC
2 noted that land use mapping data shows Métis use the proposed project area and
3 shipping area for harvesting birds, mammals, invertebrates and plants.
- 4 ○ See [section 13.3.2](#) for a detailed discussion of the analysis and resolution of
5 concerns related to hunting, trapping and gathering. As discussed in that section,
6 the proposed mitigation measures to address the effects of TMJ on wildlife and
7 vegetation include the vegetation and wetland management, wildlife and wildlife
8 habitat management, light management and noise management components of
9 the CEMP and OEMP. These plans would reduce the impacts of visual, noise and
10 air quality impacts to the experiential aspects of hunting, trapping, and
11 gathering.
- 12 • Concern regarding TMJ effects on cultural sites in the vicinity of TMJ as MNBC noted
13 that Métis have identified cultural sites within the proposed project area through
14 mapping research.
- 15 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution to
16 concerns regarding access and use of cultural sites in the vicinity of TMJ. As
17 discussed in that section, the proposed condition to mitigate for potential
18 impacts to heritage resources is the Cultural and Archaeological Resources
19 Management Plan which will involve TJLP addressing Indigenous concerns
20 around access, both in terms of ensuring Indigenous access to sites during
21 construction and prohibiting unauthorized access by the public.

22 **Conclusion**

23 In consideration of the information available to the EAO, the EAO's consultation with Métis
24 Nation British Columbia, TJLP's commitments, the EAO's proposed EAC conditions if an EAC is
25 issued and the recommended KMMs under CEAA 2012, the EAO is of the view that the
26 concerns raised by the Métis Nation British Columbia in relation to TMJ have been adequately
27 addressed.

28

1 **16 SCHEDULE D: IMPACTS TO ABORIGINAL** 2 **INTERESTS BY INDIGENOUS GROUP**

3 **16.1 MAA-NULTH FIRST NATIONS**

4 **16.1.1 COMMUNITY PROFILE**

5 Since time immemorial, Maa-nulth First Nations continue to occupy and utilize resources
6 located on and along the west coast of Vancouver Island. Maa-nulth First Nations culture is
7 deeply rooted to the lands, waters and resources within their respective Hahoulthee
8 (traditional territories) and guided by the core Nuu-chah-nulth principles of *ʔiisaak* (utmost
9 respect), *ʔuuʔatuk* (taking care of) and *hišuk ma cawak* (everything is one). Nuu-chah-nulth
10 culture includes matters relating to Maa-nulth First Nations history, feasts, ceremonies, naming
11 of individuals, symbols, songs, dances, and stories. Citizens of Maa-nulth First Nations call
12 themselves Maa-nulth-aht in their Nuu-chah-nulth language. Each of the Maa-nulth First
13 Nations are also members of the Nuu-cha-nulth Tribal Council.

14 Maa-nulth First Nations are water people, with villages on the west coast of Vancouver Island
15 that have existed there for thousands of years. To this end, the word “Maa-nulth” means
16 “villages along the coast”. Nuu-chah-nulth communities related to their territorial seas in the
17 same manner as terrestrial communities relate to their lands, including an understanding of
18 where to go to secure the necessary resources of life²¹⁸. During historic times, it was often
19 necessary for Nuu-chah-nulth people to forage in the marine environment using heavy wooden
20 canoes²¹⁹. Also prior to extensive logging in the area, large schools of salmon were recounted to
21 occur off the historical salmon-bearing streams and rivers along the west coast of Vancouver
22 Island (e.g., Kyuquot, Esperanza, Nootka Sound, Estevan, Raphael Point, Bear Island, Leonard
23 Light) during the spring and summer²²⁰. Additionally, in February and March herring could be
24 found spawning in large quantities in all the channels, bays, and inlets, and along the shores. In
25 the fall, the Nuu-chah-nulth families commonly camped at mouths of streams and rivers to
26 prepare smoked salmon for the winter²²⁰.

²¹⁸ The First Nations of Maa-nulth Treaty Society. Maa-Nulth-Aht: The Marine Economic Highway of a Water People. Shared with the EAO March 9, 2022.

²¹⁹ Umeek Atleo, E.R., 2004. *Tsawalk – A Nuu-chah-nulth Worldview*. UBC Press: Vancouver, BC. pp. 14.

²²⁰ Ibid. pp. 98.

- 1 The Maa-nulth First Nations are comprised of the following five distinct self-governing Treaty
2 Nations that entered into the Maa-nulth First Nations Final Agreement (“Maa-nulth Treaty”)²²¹,
3 a modern comprehensive agreement concluded with Canada and British Columbia under the BC
4 Treaty Commission process that took effect April 1, 2011: Huu-ay-aht First Nations,
5 Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations, Toquaht Nation, Uchucklesaht Tribe, and
6 Yuułuʔiłʔatḥ Government.
- 7 Huu-ay-aht First Nations territory is located in the Barkley Sound region on the west coast of
8 Vancouver Island, at the entrance to Alberni Inlet. As of October 2021, Huu-ay-aht First Nations
9 had a registered population of 725 people²²².
- 10 Toquaht Nation territory is located in and around Barkley Sound on Vancouver Island. As of
11 October 2021, Toquaht Nation’s registered population was 153 people²²³.
- 12 Uchucklesaht Tribe territory is located is located in and around Barkley Sound on Vancouver
13 Island. As of October 2021, Uchucklesaht Tribe’s registered population was 243 people²²⁴.
- 14 Yuułuʔiłʔatḥ Government (Ucluelet First Nation) territory is located in and around Barkley
15 Sound on Vancouver Island. As of October 2021, Yuułuʔiłʔatḥ Government population was 674
16 people²²⁵.

²²¹ Maa-nulth First Nations Final Agreement. 2008. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/consulting-with-first-nations/agreements/final_maanulth.pdf

²²² Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Maa-nulth First Nations. Huu-ay-aht First Nations. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=663&lang=eng. Accessed November 9, 2021.

²²³ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Maa-nulth First Nations. Toquaht Nation. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=666&lang=eng. Accessed November 9, 2021.

²²⁴ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Maa-nulth First Nations. Uchucklesaht Tribe. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=667&lang=eng. Accessed November 9, 2021.

²²⁵ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Maa-nulth First Nations. Yuułuʔiłʔatḥ (Ucluelet) Government. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=668&lang=eng. Accessed November 9, 2021.

1 Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations territory is located on the North Western section of
2 Vancouver Island south of the Brooks Peninsula and North of Nootka Island. As of October
3 2021, Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations registered population was 582 people²²⁶.

4 The Maa-nulth Treaty establishes government-to-government relationships between Canada,
5 British Columbia (BC) and Maa-nulth First Nations based on mutual respect and sets out
6 Maa-nulth First Nations rights and benefits respecting land and resources, and self-government
7 over its lands and resources and its citizens. The Maa-nulth Treaty is a living agreement that
8 provides certainty for all parties with respect to ownership and management of lands and
9 resources and the exercise of federal, provincial and Maa-nulth First Nations governmental
10 powers and authorities. As stated in the Maa-nulth Treaty, BC and Canada acknowledge the
11 aspirations of Maa-nulth First Nations to preserve, promote and develop the culture, heritage,
12 language and economies of the Maa-nulth First Nations and the Maa-nulth-aht to participate
13 more fully in the economic, political, cultural and social life of BC in a way that preserves and
14 enhances the collective identity of the Maa-nulth-aht as the Maa-nulth First Nations and to
15 evolve and flourish as self-sufficient and sustainable communities. As set out in the Maa-nulth
16 Treaty, Maa-nulth First Nations have a Treaty right to self-government; each Maa-nulth First
17 Nations maintains their individual government structure, constitution, and the authority to
18 make laws.

19 The Maa-nulth Treaty reflects that Maa-nulth First Nations have used, occupied, and governed
20 their traditional territories from time immemorial and outlines all of the section 35 rights of
21 each of the five Maa-nulth First Nations, including the right to harvest fish and aquatic plants
22 (including intertidal bivalves), for FSC purposes in the Maa-nulth Domestic Fishing Area (MDFA).
23 The Maa-nulth Treaty provides harvesting allocations for pacific salmon (chinook, Coho, pink,
24 sockeye), herring, halibut, rockfish, groundfish, sablefish, and inter-tidal bivalves within the
25 MDFA. The Maa-nulth Treaty also includes all marine animals in the definition of “fish”; as such,
26 issues related to harvesting of marine mammals are considered in the potential impacts to
27 fishing section. Maa-nulth First Nations also have a right to trade and barter resources
28 harvested with other Maa-nulth citizens or Aboriginal groups and the Maa-nulth Treaty also
29 sets out the right for each of the Maa-nulth First Nations to benefit economically. As outlined in
30 the Maa-nulth Fisheries Operational Guidelines, Maa-nulth First Nations Fish Allocation for
31 Fraser sockeye salmon may be harvested outside of the MDFA in accordance with the Fraser

²²⁶ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Maa-nulth First Nations. Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=638&lang=eng. Accessed November 9, 2021.

1 Sockeye Salmon Workplan. More information about Maa-nulth First Nations fisheries is
2 included in sections below.

3 Under the Maa-nulth Treaty, each of the Maa-nulth First Nations also has the right to harvest
4 wildlife and migratory birds within the Wildlife Harvest Area and the Migratory Bird Harvest
5 Area.²²⁷ There are two Maa-nulth Bird and Wildlife Harvest Areas in Kyuquot Sound and Barkley
6 Sound. The southeastern corner of those around Barkley Sound are adjacent to a small part of
7 the MSA area.

8 The MSA noted that there are many sites of cultural importance to Maa-nulth First Nations
9 located near the MSA area, but the locations of sites are not publicly reported. The MSA noted
10 the traditional capital village of Kiix?in, a National Historic Site, is a Huu-ay-aht site of
11 importance located just north of the MSA area.

12 **16.1.2 MAA-NULTH FIRST NATIONS INVOLVEMENT IN THE CONSULTATION** 13 **PROCESS**

14 Consultation with Indigenous Groups identified in Schedule D began in July of 2019 when EAO
15 sent a letter to these Schedule D Indigenous Groups inviting comments on the draft Section 13
16 Order, including consultation processes and opportunities. On August 6, 2019, at the request of
17 Canada, the EAO issued a Section 13 Order to amend the geographic scope for the assessment
18 of the marine shipping route and added the Indigenous Groups identified in Schedule D First
19 Nations, which included Maa-nulth First Nations. For the review of the MSA, the EAO led
20 consultation activities with the Indigenous Groups identified in Schedule D. The EAO invited
21 Maa-nulth First Nations to participate in the Marine Shipping Working Group and met with
22 Maa-nulth Treaty Society during the course of the MSA review.

23 As described in the community profile section above, the Maa-nulth Treaty establishes
24 government-to-government relationships between Canada, BC and Maa-nulth First Nations
25 based on mutual respect and sets out Maa-nulth First Nations rights and benefits respecting
26 land and resources, and self-government. Maa-nulth First Nations and BC entered into a
27 Reasonable Opportunity Agreement on May 22, 2014,²²⁸ setting out a process through which
28 the parties would fulfill the Treaty provisions that relate to ensuring that Maa-nulth First

²²⁷ Maa-nulth First Nations Final Agreement Appendices. http://www.maanulth.ca/downloads/treaty/2009_maa-nulth_final_agreement_appendices_english.pdf

²²⁸ Maa-nulth First Nations and British Columbia Reasonable Opportunity Agreement. 2014. http://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/consulting-with-first-nations/agreements/maa-nulth_roa_side_agreement_signed_05_22_2014.pdf

1 Nations are not denied a reasonable opportunity to harvest fish and aquatic plants within the
2 MDFA by any authorizations made by BC. Based on information provided by Maa-nulth First
3 Nations and the EAO's review of the Reasonable Opportunity Annual Reports and the MSA, the
4 EAO understands that the marine shipping lanes do not overlap with areas identified as an
5 "Important Harvest Area" under the Reasonable Opportunity Agreement but vessels from the
6 project would pass through the MDFA.

7 Maa-nulth First Nations felt they encountered challenges with ensuring a sufficient level of
8 consultation occurred during the EA with respect to the MSA for TMJ. Maa-nulth First Nations
9 expressed concerns regarding the EAO's consultation process, including review timelines with
10 short-notice, which is a challenge with limited internal capacity, especially during the COVID-19
11 pandemic. The EAO is of the view it has been responsive to Maa-nulth First Nations' concerns
12 about the consultation process and based on discussion with Maa-nulth First Nations, extended
13 the timeline for comment submission on the draft Assessment Report. The EAO understands
14 that Maa-nulth First Nations appreciated the pause in the EA process for TJLP to provide
15 additional information (i.e., the MSA review) and the small delay (11 days) to the start of the
16 public comment of the EAO's draft Assessment Report at Maa-nulth First Nations' request. The
17 EAO heard from Maa-nulth First Nations that even with the extensions, timelines remained a
18 challenge given other active marine projects and the volume of information to review and also
19 because Maa-nulth First Nations would traditionally spend the winter in the bighouse
20 deliberating issues, which did not align with the timelines for TMJ.

21 During the MSA review, Maa-nulth First Nations raised concerns that the MSA should be scoped
22 to 200 nm, including the MDFA (67 nm²²⁹); about the consultation process for the scoping
23 decision; about the use of information from the RBT2 process; insufficient assessment of
24 impacts due to LNG carrier spill or accident; and that cumulative impacts of development on
25 the health of the ocean ecosystems should be included in the assessment. Maa-nulth proposed
26 scoping the assessment to 200 nm for a variety of reasons, including language in CEEA 2012
27 referencing the EEZ and federal jurisdiction within the EEZ. Maa-nulth First Nations consider
28 marine shipping beyond 12 nm, and beyond 67 nm, has the potential to impact Maa-nulth First
29 Nations and that scoping to 200 nm is necessary to ensure a fulsome assessment of those
30 impacts. Maa-nulth First Nations also identified concerns about relying on information from the
31 RBT2 reports, where Maa-nulth First Nation had identified gaps, including inadequate
32 modelling of potential accidents and malfunctions. Further information related to concerns

²²⁹ According to the Maa-nulth Treaty, the outer boundary of the MDFA (i.e., 67 nm) was negotiated as the approximate distance seaward at which Maa-nulth-aht standing in a *capac* (pronounced "chapuch"; canoe) could still see the mountain tops of the Vancouver Island mountain range.

1 raised by Indigenous Groups with respect to scoping of the MSA and reliance on information
2 from RBT2 and TMX processes is provided in [Section 13.2](#) of this Report.

3 The EAO also understands that Maa-nulth First Nations considered that upstream GHG
4 emissions should have been included in the EAO's conclusions on GHG management and that
5 the no baseline case for upstream GHG emissions was unfounded given the uncertain economic
6 viability of shipping that volume of LNG via truck and ISO container. The EAO acknowledges that
7 Maa-nulth First Nations is concerned about the cumulative effects of GHG emissions from
8 marine shipping and is of the view that any increase in GHG emissions from a major project
9 such as TMJ is significant, given the current GHG emission levels and their resulting impact on
10 climate change. The EAO understands that Maa-nulth First Nations disagrees with the EAO's
11 conclusions on the significance for cumulative effects of GHG management for TMJ.

12 The issue of direct GHG emissions from TMJ, and upstream GHG emissions – in addition to
13 mitigations for direct emissions from TMJ – are addressed in the GHG management chapter in
14 [Section 5.2](#) of Part B of this Report. The EAO is proposing Condition 20: GHG Reduction Plan,
15 which would require measures for TJLP to reduce GHGs, including development of triggers that
16 would cause TJLP to take corrective action to reduce GHGs, and describe how TMJ would
17 achieve any municipal, provincial, national or international government GHG regulations or
18 objectives that are made mandatory for TMJ. The EAO has reflected Maa-nulth First Nations'
19 perspectives on the EAO's assessment of GHG management for TMJ in [Section 13.2.3](#) of Part C.

20 Maa-nulth First Nations also submitted further information requests in accordance with their
21 core principles *?iisaak* (utmost respect), *?uu?atuk* (taking care of), and *hišuk ma cáwak*
22 (everything is one). Maa-nulth First Nations' information requests were related to their
23 concerns about accidents and malfunctions, ship-sourced pollution, threats from invasive
24 species, governance, stewardship, and potential impacts to Maa-nulth First Nations' Treaty
25 rights and other interests, including rights to harvest species that utilize the Fraser River
26 watershed. Maa-nulth indicated that, while the MSA reported TMJ vessels would not be
27 expected to intersect both of Maa-nulth First Nations' northern and southern areas of the
28 MDFA, Maa-nulth First Nations provided a map to the RBT2 Panel demonstrating container
29 vessels travel through both the southern and northern fishing areas. Maa-nulth First Nations
30 also raised concerns that the MSA's cumulative effects assessment was weak and that
31 proposed mitigations did not include any long-term investments by TJLP towards health of the
32 ocean. During the EA, TJLP provided information related to their expected contractual
33 arrangements for LNG vessels at the request of Maa-nulth First Nations. Also, Maa-nulth First
34 Nations identified that, in order to advance reconciliation and the principles of the UN
35 Declaration on the Rights of Indigenous Peoples and the TRC's Calls to Action, Canada, BC and
36 TJLP should engage with Maa-nulth First Nations on economic benefit sharing before decisions
37 were made on whether or not to grant approvals for TMJ.

1 The EAO met with the Maa-nulth Treaty Society and the EAO and Agency met several times by
2 videoconference with Maa-nulth Treaty Society to discuss the responses to the information
3 requests, provincial conditions, KMMs recommended under CEAA 2012, and the EAO's draft
4 Assessment Report. The EAO coordinated a multi-agency videoconference between Maa-nulth
5 First Nations, the EAO, the Agency, TC, DFO and the BC ENV to discuss potential for impacts to
6 Maa-nulth First Nations from shipping-related introductions of aquatic invasive species. The
7 EAO and Agency followed up on Maa-nulth's information requests through federal authorities
8 on the Working Group to provide more detailed responses, identify key contacts with federal
9 authorities, and to clarify or fact check information as required. Maa-nulth First Nations told
10 the EAO that a finding of residual effects should trigger a consent seeking process with Maa-
11 nulth regarding proposed mitigation and accommodation measures. Maa-nulth First Nations
12 requested that the EAO's referral materials reflect the concerns raised by Maa-nulth First
13 Nations regarding regulatory gaps at the federal level (e.g., marine economics, marine invasive
14 species, spill capacity and response regimes).

15 During the MSA review the EAO invited Maa-nulth First Nations to review and provide
16 comments on the EAO's draft Assessment Report, including the EAO's conclusions on potential
17 impacts to Maa-nulth First Nations Treaty rights and other interests and its views on adequacy
18 of consultation. The EAO also invited Maa-nulth First Nations' feedback on the draft CPD, draft
19 Certificate Conditions, and recommended KMMs under CEAA 2012. As outlined in the Section
20 13 Order for TMJ, the EAO provided an opportunity for Maa-nulth First Nations to submit their
21 views regarding the draft Assessment Report should Maa-nulth First Nations disagree with the
22 EAO conclusions or the way that the EAO has reflected the views of Maa-nulth First Nations in
23 the referral materials. A description of EAO-led consultation activities with Indigenous Groups is
24 provided in [Section 12.4](#) of Part C.

25 Maa-nulth First Nations identified that the EAO's methodologies for the impacts assessment
26 that are outlined in [Section 12.2](#) of this Report, specifically the structure of the assessment,
27 difficult to reconcile with their sacred principle *hišuk ma cāwak* (everything is one). Maa-nulth
28 First Nations also identified that the EAO's draft Assessment Report focused the narrative on
29 specific treaty rights and did not reflect Maa-nulth First Nations worldview and lacked
30 discussion or provided insufficient discussion of their concerns around accidents and
31 malfunctions and the linkages between Maa-nulth First Nations territory and the impacts felt
32 elsewhere in the lower mainland. Maa-nulth First Nations identified that previous concerns
33 raised regarding the consultation process were not reflected and that the report did not tell the
34 Maa-nulth First Nations story as Maa-nulth First Nations would.

35 Maa-nulth First Nations identified environmental, cultural, and economic interests with respect
36 to potential impacts from TMJ, and that there were still outstanding questions and concerns
37 across all three categories. Maa-nulth First Nations indicated a disagreement with the EAO's

1 conclusion that TMJ would have negligible impact because there was the potential for
2 significant cumulative effects to occur. Maa-nulth First Nations consider that the ecosystem is
3 in a state of unbalance and additional incremental shipping would be significant. The EAO also
4 recognizes that there are outstanding impacts, in particular regarding cumulative effects, and
5 these outstanding impacts are reflected in the EAO's conclusions in Part B and Part C for TMJ.

6 The EAO understands that during the MSA review TJLP participated in an information-sharing
7 event with Maa-nulth First Nations, including topics such as shipping-related concerns, invasive
8 species, and contracting arrangements. During the review of TJLP's BVSA Report, TJLP met
9 with Maa-nulth First Nations to discuss the assessment for the BVS, and Maa-nulth First Nations
10 participated in four of the Working Group meetings. During the Working Group meetings
11 regarding the BVSA, Maa-nulth raised questions and concerns regarding potential effects of
12 increased bunker traffic on the distribution of vessels in the MSA area and on culturally
13 important marine species that utilize the Fraser River watershed (e.g., SRKW and salmon), and
14 also questioned why cumulative effects were not assessed for the increased bunker vessel
15 traffic.

- 16 • As described in Section 13.3.1.1 of Part C, the EAO did not assess for potential BVS-
17 related impacts within the MSA because the BVS is not anticipated to affect the number
18 of vessels in the MSA (see Section 2.2.2 of Part A for more details).
- 19 • The EAO did not predict any changes to its cumulative effects conclusions when
20 comparing the BVSA to the Application scenario, considering the conservative nature of
21 the assessment methods. While the EAO is of the view that the potential impacts
22 related from TMJ have been avoided, minimized, and accommodated to the extent
23 possible for the purposes of the EA, the EAO also recognizes that there are outstanding
24 impacts, in particular cumulative effects, and these outstanding impacts are reflected in
25 the EAO's conclusions, including the EAO's conclusions on the fishing component of
26 Current Use of Resources and Lands for Traditional Purposes, and on Indigenous cultural
27 heritage use of SRKW (see [Section 11.4](#) of Part B).

28
29 The EAO is of the view that it has approached consultation with Maa-nulth First Nations at the
30 deeper end of the spectrum, with the intent to identify potential impacts and consider ways to
31 address any potential impacts to Aboriginal Interests that were identified by Maa-nulth First
32 Nations within the MSA area. The Maa-nulth Treaty outlines the consultation requirements for
33 federal and provincial environmental assessments under sections 22.2 and 22.3, respectively.
34 With respect to the MSA analysis of TMJ, the EAO is of the view that it has fulfilled BC's
35 obligations in relation to Provincial Projects as set out in paragraph 22.3.1 of the Maa-nulth
36 Final Agreement by ensuring Maa-nulth First Nations were: a) provided with timely notice of,
37 and relevant available information; b) consulted regarding the potential environmental effects;

1 and c) received an opportunity to participate in the environmental assessment. Also, in
2 accordance with paragraph 22.3.2 of the Maa-nulth Final Agreement, the EAO is of the
3 perspective that it has provided substantial responses to views provided by Maa-nulth First
4 Nations during the MSA for TMJ.

5 The EAO is also of the view that, through Substitution, it has carried out consultation in
6 accordance with paragraph 22.2.2 of the Maa-nulth Final Agreement, which sets out
7 requirements related to Federal Projects. During the MSA for TMJ, the EAO ensured Maa-nulth
8 First Nations were provided an opportunity to comment on the MSA conducted under CEAA
9 2012, including scope of the assessment, environmental effects and any mitigation measures or
10 follow-up programs to be implemented. The EAO is of the perspective that Maa-nulth First
11 Nations were given full and fair consideration to any comments made throughout MSA of TMJ,
12 and the EAO and the Agency have been responsive to the comments, before making any
13 decisions to which those comments pertain.

14 **16.1.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER VALUES**

15 The following sections focus on potential impacts of TMJ to Maa-nulth First Nations' Treaty
16 rights and other values. A discussion of the EAO's assessment approach is provided in the
17 Impacts Assessment Methods section of Part C. Maa-nulth First Nations expressed concern that
18 EAO's methods for assessment of potential impact to Maa-nulth First Nations' Treaty Rights did
19 not reflect recognition of use and occupation nor economic or governance interests that stem
20 from those rights under the Maa-nulth Treaty. The EAO would like to clarify that consideration
21 of use and occupation as described in [Section 12.2](#) is related to assessment of asserted
22 Aboriginal title claims, not established Treaty rights. The EAO's assessment of potential impacts
23 to Maa-nulth First Nations' established Treaty rights are provided below and the EAO believes
24 the methods used were consistent with the Maa-nulth Treaty.

25 The EAO considered information available, including from public sources as well as relevant
26 issues raised by Maa-nulth First Nations and citizens during the EA process (in meetings, letters
27 and Working Group comments), in the following assessments of the potential impacts of TMJ
28 on Maa-nulth First Nations Treaty rights and other interests. The following sections focus on
29 potential impacts of TMJ to Maa-nulth First Nations based on the EAO's assessment, and
30 mitigations and accommodations to address potential impacts to their Treaty rights. It is
31 important to note that as the EAO developed this report, its reflection of Maa-nulth First
32 Nations worldview, values and culture is limited to the written information available to the EAO
33 and what was heard during the consultation process.

1 A. POTENTIAL IMPACTS ON RIGHT TO HARVEST FISH AND AQUATIC PLANTS

2 The Maa-nulth Treaty provides harvesting allocations for pacific salmon (chinook, Coho, pink,
3 sockeye), herring, halibut, rockfish, groundfish, sablefish, and intertidal bivalves within the
4 MDFA. The Maa-nulth Treaty also includes all marine animals in the definition of “fish”; as such,
5 issues related to harvesting of marine mammals are considered in this section. As outlined in
6 the Maa-nulth Fisheries Operational Guidelines, Maa-nulth Fish Allocation for Fraser sockeye
7 salmon may be harvested outside of the MDFA in accordance with the Fraser Sockeye Salmon
8 Workplan. There are eight Maa-nulth intertidal bivalve harvesting areas, all of which are
9 outside of the MSA RSA.

10 Maa-nulth First Nations also have a right to trade and barter resources harvested with other
11 Maa-nulth members or Aboriginal groups and the Treaty also sets out the right for each of the
12 Maa-nulth First Nations to benefit economically through such opportunities as commercial
13 fishing licenses, communal commercial bivalve harvesting, or operating shellfish aquaculture
14 tenures, for example. Outside of the Treaty, Maa-nulth First Nations also hold commercial
15 fishing licenses in accordance with a Harvest Agreement and commercial shellfish aquaculture
16 tenures. The EAO understands that Maa-nulth First Nations fishers and harvesters use small
17 vessels for access to or harvesting from nearshore areas. In addition to those species
18 mentioned above, the EAO understands that Maa-nulth First Nations harvest tuna, which is
19 caught in the summertime. To access fishing or harvesting locations further offshore, Maa-nulth
20 First Nations citizens use larger vessels and the EAO understand that Maa-nulth First Nations
21 considers all of the MDFA as important areas for fishing, including Swiftsure Bank and La
22 Perouse Bank. The EAO heard from Maa-nulth First Nations that Swiftsure Bank represents a
23 pinch point due to the levels of vessel traffic in the outbound shipping lane that overlaps the
24 area.

25 During the MSA review, TJLP produced a figure for the MSA that predicted an overlap of two
26 percent between the MSA area and the southern (i.e., Barkley Sound) area of the MDFA, which
27 includes Swiftsure Bank ([Figure 22](#)). The shipping lanes go through a portion of the MDFA and
28 beyond 12 nm the trans-oceanic traffic would continue through the MDFA following similar
29 routes, but the vessels can take variable courses (i.e., not constrained by the shipping lanes but
30 navigating under the collision regulations). According to the figure, if TMJ-related LNG carriers
31 followed the typical great circle route to Asia, then the vessels would only transect the
32 southern Barkley Sound area of the MDFA, and not enter the northern Kyuquot Sound area. As
33 shown in the figure, the projected markets for bunker vessels are along the west coast of the
34 US, so bunker vessels would track south as soon as they leave the Strait of Juan De Fuca. As the
35 BVSA contemplates an increase in local bunkering and no changes to export routes, the
36 shipping routes described in the MSA and the figure have not changed. Maa-nulth First Nations
37 stated that reporting a small percentage of overlap served to minimize the potential for impacts

1 to Maa-nulth First Nations' fishing rights, and that the assessment's suggestions on the
2 proposed shipping routes was not supported by evidence.

3 Maa-nulth First Nations shared a map that was submitted by Maa-nulth First Nations through
4 the RBT2 Panel process showing container vessel traffic traverses through both the southern
5 (i.e., Barkley Sound) and northern (i.e., Kyuquot Domestic Fishing Areas) of the MDFA²³⁰. The
6 report assesses the container traffic through MDFA direct from and to Deltaport Terminal from
7 Jan 2018 – Dec 2018 based on both satellite- and terrestrial-based Automatic Identification
8 System (AIS) data. The report showed that a proportion of Deltaport Terminal container vessel
9 traffic travelled through both Barkley and Kyuquot Sound fishing areas, but the majority of
10 vessel traffic followed the typical great circle track to Asia. Maa-nulth First Nations identified
11 that the data used to produce that map does not distinguish between inbound and outbound
12 traffic, and they have not been provided data specific to LNG carriers which suggest an
13 outbound route outside of their MDFA.

14 The EAO understands, based on information provided through the RBT2 Panel process by Maa-
15 nulth First Nations, that container vessel traffic can take alternative routes, resulting in some
16 vessels travelling through both of the southern Barkley Sound and norther Kyuquot Sound
17 Domestic fishing areas of the MFDA. The EAO understands that the factors controlling global
18 trade patterns are complex, resulting in some degree of uncertainty in predicting the extent to
19 which TMJ-related LNG carriers would traverse through Maa-nulth First Nations' southern and
20 northern fishing areas in the MDFA beyond the 12 nm.

²³⁰ National Strategies – Marine GeoAnalytics. 2019. Container Traffic Analysis as part of RBT2 Undertaking #62.
<https://www.ceaa-acee.gc.ca/050/evaluations/document/130693>

1

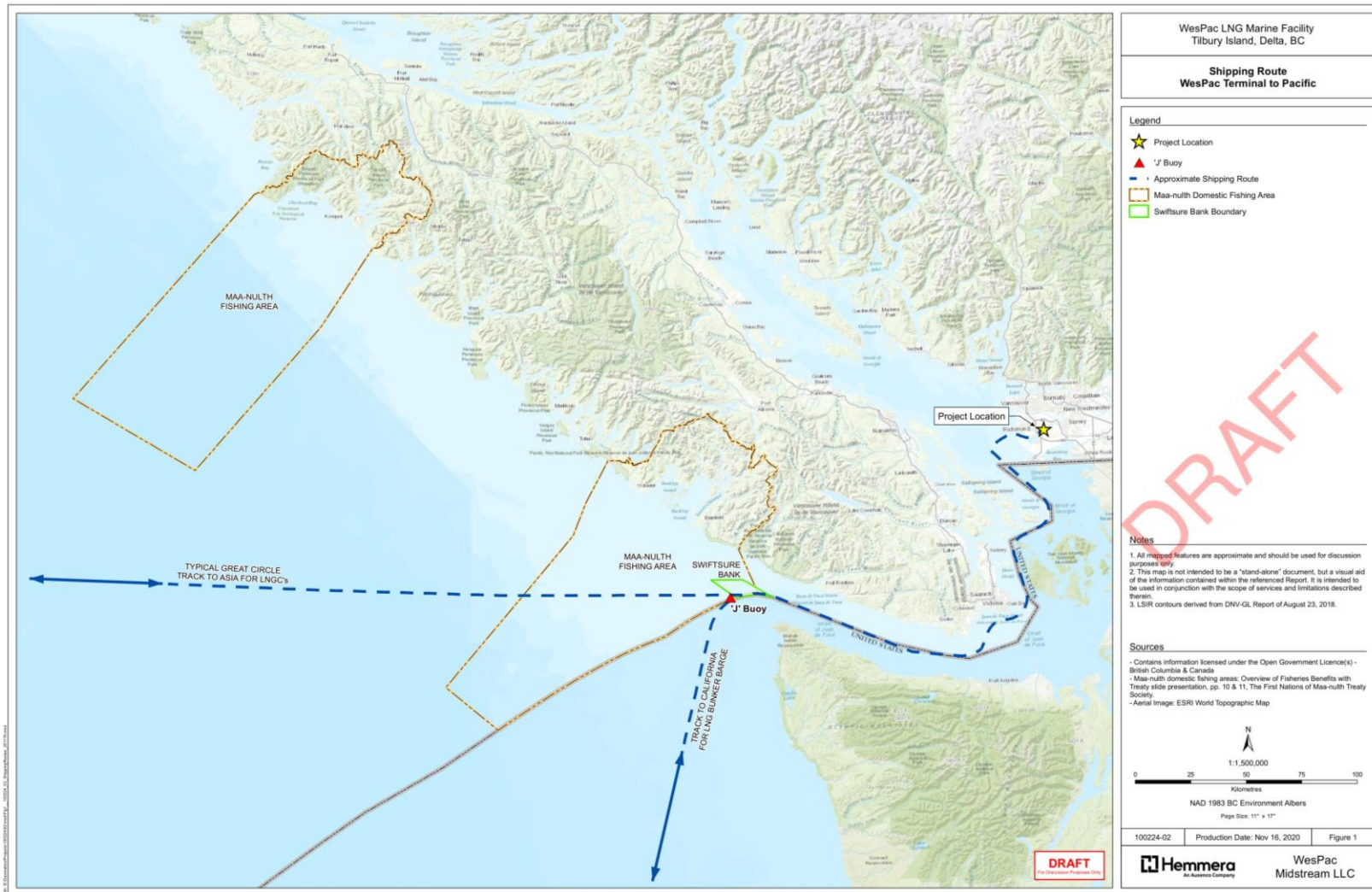


Figure 21: Locations of Maa-Nulth First Nations southern Barkley and northern Kyuquot Sounds areas within the Maa-nulth Domestic Fishing Area

*Note Figure 22 does not show the most direct great circle track to Asia, please see text above for more details.

1 • In the Current Use of Lands and Resources for Traditional Purposes and Cultural
2 Heritage assessment in Part B the EAO concluded that TMJ-related vessels would cause
3 negligible to low magnitude residual effects due to TMJ-related vessel traffic during
4 operations affecting access, visual quality, noise, and vessel wake (with an increasing
5 magnitude of effect the closer one is to the vessels). While the EAO understands there is
6 some degree of uncertainty associated with predicting the TMJ-related LNG carrier
7 vessel routes beyond 12 nm, the EAO acknowledges that similar effects due to TMJ-
8 related marine shipping affecting access, visual quality, noise, and vessel wake may
9 occur beyond 12 nm in either the southern or northern fishing areas of the MDFA. The
10 EAO considers that TMJ's contribution to international vessel traffic bound for Asia
11 would be relatively limited (i.e., the MSA estimated 68 LNG carriers calling on the jetty,
12 resulting in 136 inbound and outbound trips annually). The EAO is proposing a KMM
13 under CEAA 2012 for TMJ to develop a Marine Communication Plan for TMJ (from the
14 jetty out to 12 nm), in consultation with Indigenous Groups, including procedures to
15 inform Indigenous Groups of traffic schedules, for Indigenous Groups to submit any
16 feedback on potential adverse effects on navigation as a result of TMJ, and for TJLP to
17 document and respond to any feedback received in a timely manner

18 During consultation, Maa-nulth First Nations expressed to the EAO that their culture is rooted
19 in their lands, waters and resources and any harm to these would be an adverse impact to their
20 culture. The EAO understands that Maa-nulth First Nations need access to their traditional
21 territories to conduct marine harvesting as this is integral to their way of life. Additionally, Maa-
22 nulth First Nations identified that the expression of their culture and traditions in a meaningful
23 way honours their core Nuu-chah-nulth principles as well as their ancestors.

24 Maa-nulth First Nations identified main threats to their way of life and existence as a distinct
25 peoples, which include continued industrialization of the Salish Sea, ongoing decline of both
26 local forestry and fisheries economies and ongoing alienation from natural resources without
27 benefit to their communities. Maa-nulth First Nations described salmon as essential to their
28 culture and explained the importance of salmon fishing to their communities, and there is a
29 connection to the Fraser River through the salmon and steelhead that is harvested by Maa-
30 nulth First Nations. Maa-nulth First Nations also encounter White sturgeon from time to time,
31 but they have indicated that the natal stream is unknown, and they feel it warrants further
32 genetic study. Maa-nulth First Nations expressed concerns about the cumulative effects of
33 marine shipping on fish and fish habitat, including effects to fish habitat due to piles, dredging,
34 vibrodensification and scour protection at marine terminal area and changes in fish behaviour
35 due to underwater noise during construction or mortality to sturgeon due to vessel strikes.
36 Maa-nulth First Nations also expressed concerns about the cumulative effects of the marine

1 shipping industry on their treaty rights, interests, culture and wellbeing and are of the view that
2 any impact due to marine shipping is significant, given the volume of existing and proposed
3 future vessel traffic through the Maa-nulth Domestic Fishing Area.

- 4 • The EAO appreciates Maa-nulth First Nations governance and stewardship of the lands
5 and waters. The EAO understands that Maa-nulth First Nations have strong connections
6 to the marine environment in the Salish Sea, which are connected to watersheds
7 supporting Maa-nulth First Nations fisheries;
- 8 • The EAO understands that Maa-nulth First Nations disagreed with the EAO's conclusions
9 on the significance for cumulative effects to fish and fish habitat and Indigenous health
10 and wellbeing for TMJ; and
- 11 • The EAO evaluated the potential effects on fishing rights attributable to TMJ as
12 summarized in [Section 13.3.1](#), which included considering the potential pathways of
13 effects based on review of information from the RBT2 process and TMX. The EAO is
14 satisfied that the key impacts to biophysical components resulting in changes to fish
15 quantity and quality, changes in access to fishing resources, and changes to social,
16 cultural, and spiritual values associated with traditional fishing activities are summarized
17 in [Section 13.3.1](#), and would apply to Maa-nulth First Nations. The EAO concludes in the
18 Fish and Fish Habitat chapter of Part B ([Section 5.6](#)) that residual effect from TMJ on fish
19 and fish habitat would not be expected in MSA RSA.

20 The EAO heard from Maa-nulth First Nations that there is a 'fear factor' associated with use of
21 the marine environment that exists in their communities, especially because citizens may not
22 have technologies onboard their vessels for marine situational awareness when accessing
23 fishing areas. This is particularly concerning on inclement weather days, or in the event a dense
24 fog can roll in on the water reducing visibility for Maa-nulth First Nations harvesters. The EAO
25 notes information in the RBT2 panel report where Maa-nulth First Nations raised safety
26 concerns for fishers travelling in smaller vessels when encountering larger vessels. Maa-nulth
27 First Nations told the EAO that they are engaged in various initiatives provided through the
28 Canada's Ocean's Protection Program for capacity building in marine safety, but the COVID-19
29 pandemic and overlapping timeframes has made meaningful engagement in all of the various
30 programs challenging. Also, despite these challenges, Maa-nulth First Nations continue to try to
31 engage in all relevant regional initiatives.

- 32 • The EAO considers that the safety of small vessels with large vessels and wake effects
33 were assessed in the Accidents and Malfunctions Section of Part B and that the
34 regular and relatively short-duration passage of TMJ-related vessels would include
35 monitoring of compliance with maritime regulations and legislation such as the
36 Canada Shipping Act and the Collision Regulations;
- 37 • TJLP has stated that TMJ's influence on TMJ-related vessel operations would be

1 limited beyond TMJ's marine terminal area (including the location and operation of
2 international shipping lanes), but TJLP has committed to a Marine Communication
3 Plan out to 12 nm that would be developed in consultation with Schedule B and D
4 Indigenous Groups and include a communication procedure to inform Indigenous
5 Groups of vessel schedules and provide a complaint submission process; and

- 6 • The EAO acknowledges Maa-nulth First Nations worldview and perspective that
7 harvesters find the presence and sounds of LNG carriers disturbing for safety and/or
8 aesthetic reasons and that may result in a loss of opportunity to harvest or reduce
9 quality of experience while harvesting or have potential impacts to knowledge and
10 language transmission; The EAO also considers that the TMJ-specific mitigation
11 measures would not reduce impacts to safety concerns and quality of experience
12 because some Indigenous people may find the presence and sounds of LNG carriers
13 disturbing for safety and/or aesthetic reasons, or for other reasons.

14 Additional concerns raised by Maa-nulth First Nations regarding potential impacts on the right
15 to fish due to TMJ are provided below. Maa-nulth First Nations informed the EAO that the
16 concerns shared over the course of the EA were not exhaustive:

- 17 •
- 18 • During the course of the MSA, Maa-nulth First Nations stated they are very concerned
19 about the cumulative impacts of development on the health of the ocean and that the
20 collapsing steelhead, chinook and resident killer whale populations are signs of an
21 imbalance in the marine environment. As such, they noted that any potential for
22 cumulative effects should be thoroughly assessed and responded to prior to a decision
23 being made on TMJ. Maa-nulth First Nations also noted that the ecosystem is in a state
24 of unbalance and that additional incremental shipping from TMJ would be cumulatively
25 significant.
 - 26 ○ The EAO concluded in the Marine Mammals section of Part B that TMJ would
27 result in low to moderate magnitude residual effects on marine mammals and
28 significant cumulative effects to SRKWs due to underwater vessel noise. The EAO
29 is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
30 Plan that would require TJLP to incorporate contractual measures to support
31 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal
32 slowdown initiatives (as amended) or a future equivalent and annual reporting
33 on TJLP's participation in regional environmental management measures and
34 cumulative effects monitoring to protect SRKW, where feasible. The seasonal
35 slowdown initiatives currently request vessels to slow down in key SRKW
36 foraging areas such as Swiftsure Banks, Boundary Pass. See [Section 13.3.3](#) for a
37 detailed discussion of the analysis and resolution of concerns related to the

- 1 effects on whales.
- 2 ○ The EAO understands that Maa-nulth First Nations have strong connections to
- 3 the marine environment in the Salish Sea, which are connected to watersheds
- 4 supporting Maa-nulth First Nations fisheries. The EAO appreciates Maa-nulth
- 5 First Nations governance and stewardship of the lands and waters. The EAO
- 6 notes that the existing regional Government of Canada initiatives in [Section](#)
- 7 [13.1.1](#) are available to support Indigenous groups to undertake stewardship
- 8 activities and improve the understanding of environmental and cumulative
- 9 effects in the Salish Sea. The EAO notes that these programs are broad in nature
- 10 and are not intended to mitigate or accommodate for the specific potential
- 11 impacts to Indigenous mariners and fishers navigating in proximity to TMJ
- 12 vessels within the established Traffic Separations.
- 13 ○ As discussed in [Section 13.3.1](#), the proposed mitigation measures to address
- 14 potential impacts to fish are included in the EAO's proposed key mitigation
- 15 under CEAA 2012, including Fish Mitigations to Reduce Harm and Mortality, and
- 16 Fish Habitat Offset Plan. Of note, the monitoring and mitigation plan would
- 17 include monitoring for in-water works occurring outside of the DFO fisheries
- 18 window to support the implementation of mitigation and monitoring for
- 19 eulachon, salmon species and species at risk prior to initiation of works outside
- 20 of the instream work window. The EAO did not predict residual impacts to fish or
- 21 fish habitat from TMJ in the MSA RSA.
- 22 ● Maa-nulth First Nations expressed concerns that invasive species represent a threat to
- 23 their territories, having already experienced issues with invasive green crab. Maa-nulth
- 24 First Nations are concerned that increases in marine shipping in their territory will
- 25 increase the risk of pollution and also terrestrial (e.g., giant Asian hornet) or marine
- 26 invasive species introductions. Maa-nulth First Nations sought clarity on the roles and
- 27 responsibilities related to the management of invasive species, including what are the
- 28 rules and requirements with respect to hull cleaning, anti-fouling systems and propeller
- 29 maintenance. Maa-nulth First Nations wanted to further understand what the Crown
- 30 expected that TJLP's commitments should be to reduce spread of invasive species in the
- 31 MSA. Maa-nulth First Nations requested clarification on the current management
- 32 regime at the federal level, including identifying what are the gaps, how can these gaps
- 33 be filled, and what is the role of Maa-nulth in the management for reducing invasive
- 34 species?
- 35 ○ The EAO understands that TC's role is prevention of introductions of aquatic
- 36 invasive species, while DFO's role is in managing invasive species through leading

1 programs and initiatives to reduce or manage the impacts of those invasive
2 species that have already become established. The EAO notes the provincial
3 government (e.g., BC ENV, BC AGRI, FLNRORD) have a role in managing
4 terrestrial, and to a lesser extent aquatic, invasive species, which includes
5 engagement through Inter-Ministry Invasive Species Working Groups under the
6 *Invasive Species Strategy for BC (2018 – 2022)*²³¹.

- 7
- 8 ○ With respect to preventing the introductions of aquatic invasive species through
9 ballast water, the *International Convention for the Control and Management of*
10 *Ships' Ballast Water and Sediments* was introduced by the International
11 Maritime Organization (IMO) and came into force in September 2017²³². TC
12 confirmed that all new vessels would be built to meet these standards, including
13 on-board equipment to ensure the IMO standards established in the convention
14 are met. TC recognized that it is not possible to get completely 100 % reduction,
15 but standards are set scientifically to minimize the risks of aquatic invasive
16 survival as outlined in the convention.
 - 17 ○ TC has developed a new Ballast Water Regulations under the *Canada Shipping*
18 *Act, 2001* to bring the IMO Convention into force in Canada. TC identified that
19 the new Ballast Water Regulations were developed in consideration of Canada's
20 unique coastline and will require ships to complete mid-water ballast exchange
21 at least 200 nm from shore and within minimum water of a depth of 2000 m and
22 Canada has been recognized as a world leader this area. The EAO considers that
23 the potential introduction of invasive species from ballast water discharge would
24 be sufficiently managed through adherence to federal regulations.
 - 25 ○ Through dialogues, Maa-nulth First Nations identified a concern that under some
26 circumstances, due to safety, vessels may be required to undertake a ballast
27 water exchange in alternatively designated areas within Canada's EEZ, but it was
28 unclear if those designated areas would overlap with, or would be nearby to,

²³¹ Inter-Ministry Invasive Species Working Group. 2014. Invasive Species Strategic Plan.
https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/prov_is_strategy.pdf

²³² International Maritime Organization. International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM). [https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-\(BWM\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx)

1 their MDFA. TC committed to following up with Maa-nulth First Nations with
2 additional information around the locations of the designated alternative
3 exchange sites.

- 4 ○ With respect to biofouling, TC identified that at present there are no
5 international or domestic mandatory requirements for vessels above 24 meters.
6 However, efforts are underway in identifying best practices, challenges and
7 measures with aim of developing a policy framework in regard to ships
8 biofouling, including in water cleaning. The IMO adopted the *2011 Guidelines for*
9 *the Control and Management of Ships' Biofouling to Minimize the Transfer of*
10 *Invasive Aquatic Species*²³³, which TC is currently reviewing. Through these
11 conversations, TC identified a possible opportunity for Maa-nulth First Nations to
12 engage through upcoming public review of a draft voluntary guidance document
13 on in-water cleaning of vessel hulls greater than 24 m that TC is currently
14 working, which includes best practices relevant to authorities, including ports, to
15 help decide if they should allow in-water cleaning of vessels over 24 m and
16 outline best practices to mitigate risks associated with these activities. The
17 guidelines consider hull cleaning as an effective activity and important means to
18 manage biofouling, provided it is conducted properly as the activity does present
19 biosecurity and water quality risks due to buildup of persistent chemicals from
20 antifouling paint in the substrate below.

21 Information and follow-up related to Maa-nulth First Nations' other information requests are
22 provided in sections to follow.

23 **Conclusion**

24 The EAO predicts that TMJ-related marine shipping effects would have a negligible-to-minor
25 impact on Maa-nulth First Nations' right to harvest fish and aquatic plants. The EAO considers
26 TMJ-related increases to vessel traffic during operations would be incremental compared to
27 existing baseline conditions of the established Traffic Separation Scheme of the Salish Sea.
28 However, in consideration of the available information; the EAO's consultation with Maa-nulth
29 First Nations; Maa-nulth First Nations' engagement with TJLP; TJLP's commitments; and the
30 EAO's proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA
31 2012, the EAO concludes that TMJ-related marine shipping effects combined with cumulative

²³³ Resolution MEPC.207(62). 2011. [https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/RESOLUTION%20MEPC.207\[62\].pdf](https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/RESOLUTION%20MEPC.207[62].pdf).

1 effects in the MSA area is expected to result in minor-to-moderate impact on Maa-nulth First
2 Nations' right to harvest fish and aquatic plants for domestic purposes.

3 The EAO predicts that TMJ-related shipping activities during operations would interact with
4 current baseline levels of cumulative effects to access to fishing areas and the experience of
5 fishing in, or adjacent to, the shipping lanes. These cumulative effects in the MSA area
6 combined with the importance of Maa-nulth First Nations' right to harvest fish and aquatic
7 plants. The EAO understands that Maa-nulth First Nations disagree with the EAO's
8 determination of not significant conclusions to the fishing component of Maa-nulth First
9 Nation's Current Use of Lands and Resources for Traditional Purposes, and that Maa-nulth First
10 Nations told the EAO that their Treaty rights are not dependent on current use, and residual
11 effects to Maa-nulth First Nations extend beyond defined shipping lanes.

12 Maa-nulth First Nations told the EAO that their views on the impact levels should be reflected
13 in the report and that Maa-nulth First Nations considers the declining fish stocks and Northern
14 and SRKW populations suggest the marine environment is reaching its threshold, such that
15 Maa-nulth First Nations considers any additional effects on a right or interest linked to the
16 marine environment are significant. Maa-nulth First Nations identified significant cumulative
17 effects given the number of vessels already passing through Maa-nulth First Nations' waters,
18 including Swiftsure Bank and other fishing areas within or adjacent to marine routes beyond
19 the MSA area, include La Perouse Bank.

20 • The EAO considered Maa-nulth First Nations' perspectives on cumulative effects and
21 Maa-nulth First Nations' ability to meaningfully practice their fishing rights in the MSA
22 area. The EAO acknowledges that there are already vessels transiting the shipping lanes
23 which can impact Indigenous fishers' access to and quality of experience of fishing.
24 While the EAO recognizes there is some uncertainty when considering how cumulative
25 effects impact Aboriginal Interests and practice of Treaty Rights, the EAO agrees with
26 Maa-nulth First Nations, that any increase in vessel traffic at fishing areas within or
27 adjacent with marine shipping routes would potentially be more serious when
28 combined with past, present, and reasonably foreseeable shipping activities.

29 The key factors that were considered in support of the EAO's conclusion on the potential
30 impacts to Maa-nulth First Nations rights to harvest fish and aquatic plants for domestic
31 purposes are summarized as follows:

32 **Biophysical:**

33 • The EAO's conclusions in the Fish and Fish Habitat chapter in Part B do not predict any
34 residual or cumulative effects to fish and fish habitat in the MSA area;

- 1 • The EAO's conclusions in the Marine Mammals chapter in Part B do not predict any
2 significant residual or cumulative effects to marine animals harvested by Maa-nulth First
3 Nations in the MSA area, as identified in the Maa-nulth Treaty;
- 4 • The MSA area, including Swiftsure bank, is a heavily utilized marine environment with
5 occasionally high levels of marine traffic in the shipping lanes;
- 6 • Maa-nulth First Nations view the cumulative effects from TMJ to their treaty fishing
7 rights as significant given the number of vessels already passing through Maa-nulth First
8 Nations' waters; and
- 9 • Maa-nulth First Nations identified significant cumulative effects given the state of the
10 marine environment (i.e., declining fish stocks and southern and norther resident killer
11 whale populations).

12 **Geospatial (places, sites, and access):**

- 13 • Shipping lanes cross the southern limits of the MDFA in the Barkley Sound Domestic
14 fishing area (including Swiftsure Bank) within the MSA; beyond the MSA trans-oceanic
15 traffic continues through the MDFA following similar routes, but the vessels can take
16 variable courses (i.e., not constrained by the shipping lanes but navigating under the
17 collision regulations);
- 18 • Maa-nulth First Nations identified the entire MDFA as an important fishing area,
19 including La Perouse Bank and Swiftsure Bank; Swiftsure bank is intersected by shipping
20 lanes where cumulative effects from shipping traffic is a constraint;
- 21 • The EAO does not anticipate any disruptions to access to terrestrially based aquatic
22 plant harvesting activities (i.e. there are no anticipated interactions between shipping
23 and shore-based harvesting); and
- 24 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
25 segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
26 Separation Scheme and that TMJ-related vessel transits during operations (minimum 30
27 years) would result in negligible to low magnitude effects due to relatively infrequent
28 and short-duration disruptions to access to fishing areas in the Salish Sea.

29 **Social, Cultural and Experiential:**

- 30 • Harvesting fish and aquatic plants is integral to the culture of Maa-nulth First Nations,
31 and Maa-nulth First Nations have the right to harvest fish and aquatic plants for FSC
32 purposes. Each Maa-nulth First Nations has the right to trade, barter and sell fish in the

- 1 commercial marketplace²³⁴;
- 2 • Maa-nulth First Nations are already experiencing stress from marine shipping projects,
3 and are of the view the cumulative effects from TMJ to their culture, wellbeing, trade
4 and bartering rights as significant;
- 5 • The importance of salmon fishing to Maa-nulth First Nations communities and the
6 cumulative impacts of development on the health of the ocean and that the collapsing
7 ecosystem are signs of an imbalance in the marine environment;
- 8 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
9 traffic during operations affecting visual quality, noise, and vessel wake (with an
10 increasing magnitude of effect the closer one is to the vessels); and
- 11 • Potential concerns regarding safety of small vessels with large vessels, as assessed in the
12 Accidents and Malfunctions and Effects of the Environment section in Part B of this
13 Report.

14 **Mitigations:**

- 15 • Proposed mitigations to reduce impacts to Maa-nulth First Nations' right to harvest fish
16 and aquatic plants for domestic purposes include the Marine Communications Plan
17 recommended as KMMs under CEAA 2012; and
- 18 • The EAO acknowledges that these mitigation measures would not reduce impacts for
19 baseline conditions and/ or impact of future projects, which are a source of issues for
20 many Indigenous Groups.

21

22 **B. POTENTIAL IMPACTS ON RIGHT TO HARVEST WILDLIFE AND MIGRATORY BIRDS**

23 The EAO evaluated the potential effects on the right to harvest wildlife and migratory birds
24 attributable to TMJ in [Section 13.3.2](#) above that apply broadly to Indigenous Groups. The EAO is
25 satisfied that the key impacts to biophysical components resulting in changes to wildlife and
26 quality, changes in access to harvesting areas, and changes to social, cultural, and spiritual
27 values associated with traditional harvesting activities that apply to the Maa-nulth First Nations
28 are summarized in [Section 13.3.2](#).

29 **Conclusion**

²³⁴ as set out in *Ahousaht Indian Band and Nation v. Canada (Attorney General)*, 2013 BCCA 300.

1 In consideration of the available information in [Section 13.3.2](#), the EAO's consultation with
2 Maa-nulth First Nations, Maa-nulth First Nations' engagement with TJLP, TJLP's commitments,
3 the EAO's proposed EAC conditions if an EAC is issued and the recommended KMMs under
4 CEAA 2012, TMJ is expected to result in negligible impact on Maa-nulth First Nations' right to
5 harvest wildlife and migratory birds.

6 The key factors that were considered in support of the EAO's conclusion on impacts to the right
7 to harvest wildlife and migratory birds included the EAO's conclusions on adverse residual
8 effects to wildlife in the MSA area predict negligible to low magnitude mortality of select
9 marine bird species. The EAO also considered that in the MSA area, operations (30 years in
10 duration) may cause infrequent, short-term, temporary disruptions to marine-based harvesting
11 along the proposed LNG vessel route and negligible effects on Indigenous access to terrestrial
12 harvesting sites that are accessed by boat from the pilot station at Sand Heads to the 12 nm
13 territorial limit. The EAO understands that Maa-nulth First Nations agrees with the EAO's
14 residual effects assessment but are uncertain about the EAO's significance determination for
15 the potential effects to migratory and marine birds from TMJ in Part B of this report.

16 To mitigate potential impacts to Maa-nulth First Nations right to harvest wildlife and migratory
17 birds, the EAO is recommending a KMM under CEAA 2012 for a Marine Communication Plan,
18 including procedures to inform Indigenous Groups of traffic schedules and for Indigenous
19 Groups to submit any feedback on potential adverse effects on navigation as a result of TMJ.
20 The EAO also considered that the small relative increase due to TMJ-related vessel traffic would
21 have a negligible effect to experiential aspects of wildlife and migratory bird harvesting from
22 changes to visual quality and noise in the MSA and that all TMJ related vessels would adhere to
23 the Marine Regulations and Legislation regulating vessel noise and lighting.

24 **C. POTENTIAL IMPACTS ON RIGHT TO CULTURE AND HERITAGE**

25 Maa-nulth First Nations have the right to practice the Nuu-chah-nulth culture and to use the
26 Nuu-chah-nulth language in a manner consistent with the Treaty. Nuu-chah-nulth culture
27 includes matters relating to Maa-nulth history, feasts, ceremonies, naming of individuals,
28 symbols, songs, dances, stories and much more. In the "Marine Economic Highway of a Water
29 People" the resources of the sea were identified as building the economic foundation that has
30 sustained generations of Nuu-chah-nulth people. Maa-nulth First Nations identified that Nuu-
31 chah-nulth culture, values, internal organization, and individual places in Nuu-chah-nulth
32 society were based on their relationship with their territorial waters and that this important
33 connection is reflected in Nuu-chah-nulth art, spiritual practices and the communal principles
34 that govern Nuu-chah-nulth lives²¹⁸.

35 Through the RBT2 and TMJ processes, Maa-nulth First Nations expressed the importance of the
36 SRKW to Maa-nulth First Nations. During the RBT2 process Maa-nulth First Nations explained

1 that SRKW are important Maa-nulth cultural elements, including stories, teachings, cosmology
2 and long-standing symbols of family and kinship. The EAO recognizes the cultural significance
3 SRKW hold to Maa-nulth First Nations. Maa-nulth First Nations also raised concerns through
4 review of TMJ about cumulative impacts to the health and balance of the marine environment,
5 including collapsing resident killer whale populations.

6 Maa-nulth First Nations expressed concerned about the cumulative effects of the marine
7 shipping industry on SRKWs, including that vessel strikes and harm to prey should also be
8 identified as a pathway for residual effects. The EAO understands that Maa-nulth First Nations
9 disagree with the EAO's significance determination for residual effects to SRKWs for TMJ in part
10 B of this report and that Maa-nulth are of the view that any harm to SRKWs due to a major
11 project such as TMJ is significant, given the small and declining population.

12 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
13 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
14 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
15 pathways to impacts based on review of publicly available information from RBT2 and TMX
16 processes, and any information provided by Indigenous Groups during the MSA review. The
17 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
18 experience and SRKWs would be the pathways to impacts to Maa-nulth First Nations' other
19 traditional and cultural interests.

- 20 • See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of concerns
21 related to the effects on whales. As discussed in [Section 13.3.3](#), the EAO concluded that
22 TMJ would not result in significant residual effects to Marine Mammals; however, the
23 EAO notes that the current baseline of cumulative effects to SRKWs are already high and
24 that TMJ would contribute additional residual effects from shipping noise and potential
25 avoidance behaviour by SRKWs to ships, such that cumulative effects to SRKWs are
26 considered significant; and
- 27 • The EAO is recommending as a KMM under CEAA 2012 a Vessel Traffic Management
28 Plan that would require TJLP to incorporate contractual measures to support
29 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
30 initiatives (or future equivalent), and annual reporting on TJLP's participation in regional
31 environmental management measures and cumulative effects monitoring to protect
32 SRKW, where feasible The seasonal slowdown initiatives currently request vessels to
33 slow down in key SRKW foraging areas such as Swiftsure Banks, Haro Strait and
34 Boundary Pass. The EAO notes several regional initiatives and measures have been
35 implemented by the Government of Canada to better understand and manage
36 cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

1 During the MSA review, Maa-nulth First Nations requested more information about the
2 potential for TMJ-related vessels to have the best available technology related to underwater
3 noise and emissions. Maa-nulth also requested more information about requirements for
4 propellor maintenance as that relates to underwater noise, and to better understand all the
5 players involved, including the ship builders, customers, and recipients of LNG, as well as the
6 roles, responsibilities, and oversight that Canada or the province would have, or potential role
7 or commitment of TJLP in overseeing the process of industry standards.

- 8 • In response, TJLP provided Maa-nulth First Nations with a diagram outlining the
9 potential contracting relationships related to LNG export proposed by TMJ, which
10 outlined the primary and third-party contracts. The diagram that TJLP provided showed
11 that TMJ would not have a direct contract with the shipper or the shipowner, and TJLP
12 has stated that TMJ's influence on ship building contracts would be limited;
- 13 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
14 Plan that would require TJLP to incorporate contractual measures to support
15 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
16 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
17 participation in regional environmental management measures and cumulative effects
18 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
19 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
20 Banks, Haro Strait and Boundary Pass;
- 21 • The EAO also notes the existing regional Government of Canada initiatives and
22 measures noted in [Section 13.1.1](#) of this document as being key to reducing baseline
23 cumulative effects to SRKWs; and
- 24 • The EAO understands that TMJ-related LNG carriers would be purpose built, and marine
25 shipping associated with TMJ would be required to meet the international standards
26 and Canadian regulations set out by Canada's compliance-based marine safety and
27 security system, which is designed to protect life, property, and the marine
28 environment.

29 Conclusion

30 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
31 impacts on Maa-nulth First Nations' Right to culture and heritage, although the EAO
32 acknowledges that there is uncertainty in the relationship between incremental increases in
33 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
34 the available information, the EAO's consultation with Maa-nulth First Nations, Maa-nulth First
35 Nations' engagement with TJLP, TJLP's commitments and the EAO's proposed EAC conditions if
36 an EAC is issued, and the recommended KMMs under CEAA 2012, the impacts from TMJ

1 combined with cumulative effects in the MSA area is expected to result in moderate-to-serious
2 impacts on Maa-nulth First Nations' Right to culture and heritage.

3 SRKW The EAO understands that Maa-nulth First Nations views such cumulative effects to Maa-
4 nulth First Nations culture and heritage as significant, given importance of fish, fishing and
5 SRKW to their culture. The EAO considered Maa-nulth First Nations' perspectives on cumulative
6 effects and Maa-nulth First Nations' ability to meaningfully practice their culture and heritage in
7 the MSA area. The EAO acknowledges that there are already vessels transiting the shipping
8 lanes which can impact Indigenous mariners' access to and quality of experience while on the
9 water and the EAO's conclusions of significant cumulative effects to SRKWs was a key factor
10 considered in the EAO's seriousness determination. The EAO notes several regional initiatives
11 and measures have been implemented by the Government of Canada to better understand and
12 manage cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

13 The key factors that were considered in support of the EAO's conclusion on the impacts to
14 other traditional and cultural interests are summarized as follows:

15 **Culture and Heritage Resources:**

- 16 • The EAO's conclusions in the Heritage Resources section of Part B did not predict
17 residual effects on Heritage Resources ([Section 7.1](#)) from erosion due to wake effects
18 along the shorelines of the MSA area;
- 19 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
20 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
21 cumulative effects to SRKWs due to underwater noise;
- 22 • The MSA area is a heavily utilized marine environment; and
- 23 • Maa-nulth First Nations identified significant cumulative effects given the state of the
24 marine environment (i.e., declining fish stocks and Southern and Northern Resident
25 Killer Whale populations).

26 **Geospatial:**

- 27 • Many sites of cultural importance may be present in the MSA area with locations are
28 not publicly known. One known site is the historic village Kiix'in located just north of the
29 MSA area;
- 30 • The EAO's conclusions in the Current Use section in Part B found that TMJ-related vessel
31 transits would be regular and of relatively short duration passing through areas in the
32 Salish Sea; and
- 33 • Maa-nulth First Nations identified significant cumulative effects given the number of

1 vessels already passing through Maa-nulth First Nations' waters and the state of the
2 marine environment.

3 **Social, Cultural, Experiential:**

- 4 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
5 traffic during operations affecting visual quality, noise, and vessel wake (with an
6 increasing magnitude of effect the closer one is to the vessels);
- 7 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
8 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
9 Part B; and
- 10 • Maa-nulth First Nations' cultural and spiritual interest in marine species, including
11 SRKW.

12 **Mitigations:**

- 13 • Proposed mitigations for potential impacts to traditional and cultural interests are the
14 recommended key mitigations under CEAA 2012 for a Marine Communications, and
15 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
16 Program;
- 17 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
18 Plan that would require TJLP to incorporate contractual measures to support
19 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
20 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
21 participation in regional environmental management measures and cumulative effects
22 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
23 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
24 Banks, Haro Strait and Boundary Pass;
- 25 • The EAO acknowledges that these mitigation measures would not reduce impacts for
26 baseline conditions and/ or impact of future projects, which are a source of issues for
27 many Indigenous Groups.

28 **D. POTENTIAL IMPACTS ON OTHER VALUES**

29 *Economic Impacts and Governance*

30 Through letters to, and meetings with, the EAO during the TMJ EA, Maa-nulth First Nations
31 have expressed their concerns about cumulative impacts, and how this might impact their use
32 of the marine environment. Maa-nulth First Nations have noted that the further
33 industrialization of the Salish Sea, the decline of both the fishery and forestry economy on the

1 West Coast of Vancouver Island and the ongoing alienation of resources from our traditional
2 territories without economic benefits to their communities, pose a danger to their way of life
3 and existence as distinct peoples. Through the TMJ EA and the RBT2 process, Maa-nulth First
4 Nations explained that there were already constraints on their commercial fisheries, and any
5 increase in vessels would exacerbate this. While outside their territories, Maa-nulth First
6 Nations also expressed concern about the environmental impacts of fracking as this relates to
7 one of their principles, *hišuk ma cáwak* (everything is connected). Please see the EAO's
8 response to concerns related to climate change and upstream natural gas activities in [Section](#)
9 [13.2.3](#) of this Report.

10 As stated in the Maa-nulth Treaty, Canada and BC acknowledge the aspirations of the Maa-
11 nulth First Nations to preserve, promote and develop the culture, heritage, language and
12 economies of the Maa-nulth First Nations and the aspirations of the Maa-nulth First Nations
13 and the Maa-nulth-aht to participate more fully in the economic, political, cultural and social
14 life of British Columbia in a way that preserves and enhances the collective identity of the Maa-
15 nulth-aht as the Maa-nulth First Nations and to evolve and flourish as self-sufficient and
16 sustainable communities. The RBT2 Panel Report (2020) noted that Maa-Nulth First Nations'
17 business and economic development potential relied on the marine environment and Maa-
18 nulth First Nations considers that intrusions on Maa-nulth First Nations' traditional territories
19 are intrusions on their ability to use, enjoy and profit from those territories. In addition to
20 fishing for FSC purposes, Maa-nulth First Nations also engage in commercial and recreational
21 fishing industries, seafood processing, numerous shellfish aquacultures, growing oysters,
22 seaweed, kelp and different shellfish, marinas, and ecotourism. Through the MSA for TMJ, Maa-
23 nulth First Nations identified that access to adequate, long-term, stable funding is needed to
24 restore the Maa-nulth First Nations' rightful place as stewards within their Territories.

25 In Part B, Land and Marine Resource Use ([Section 8.2](#)) and Current Use of Lands and Resources
26 for Traditional Purposes ([Section 11.4](#)), the EAO concludes that TMJ-related vessel movements
27 would result in negligible to low impacts to commercial fishing, including commercial harvesting
28 areas in Maa-nulth First Nations' Southern Domestic Fishing Area that overlap the shipping
29 lanes (i.e., Swiftsure Bank). The EAO also predicted that residual effects to the experience of
30 commercial and non-commercial marine users conducting their activities are expected to
31 diminish with increased distance from TMJ vessels in transit and are predicted to be negligible
32 in magnitude. Maa-nulth First Nations told the EAO that the Maa-nulth Treaty provides a right
33 to convert commercial fishing licences to constitutionally protected rights. The EAO
34 understands that Maa-nulth First Nations view the cumulative effects from TMJ to their treaty
35 fishing and trade and bartering rights as significant, given the volume of existing and proposed
36 future vessel traffic through the Maa-nulth Domestic Fishing Area. Due to use of TMJ-related
37 operations requiring use of Maa-nulth First Nations' territories for marine shipping, and

1 necessary to advance reconciliation, the principles of the UN Declaration on the Rights of
2 Indigenous Peoples and the Truth and Reconciliation Commission's Call to Action, Maa-nulth
3 First Nations stated that they should share in the economic benefits of commercial use of their
4 territory. In response to this request, the EAO clarified that the role of the EAO is to neutrally
5 lead EAs and that it is not within the EAO's mandate to create frameworks or policies for
6 economic benefit sharing. However, the EAO shared Maa-nulth First Nations' interest in this
7 matter with MIRR and provided treaty relations staff contact information so that Maa-nulth
8 First Nations could discuss the matter further with MIRR. The EAO understands that dialogue
9 regarding this matter is ongoing between Maa-nulth Treaty Society, Maa-nulth First Nations
10 governments and the federal and provincial governments.

11 During the EA for TMJ, Maa-nulth First Nations requested to be consulted on draft provincial
12 conditions and to be included within the definition of Indigenous Groups with respect to the
13 provincial TOC. The EAO considers, that where federal conditions capture key mitigations for
14 potential TMJ-related effects to fish and fish habitat and shipping-related effects within the
15 broader MSA area, provincial conditions are more focused on project activities within the
16 marine terminal area (i.e., the jetty site). For these reasons, the EAO would not require that
17 that TJLP consult with Maa-nulth on development of management plans pursuant to provincial
18 conditions. The EAO notes that where monitoring or reporting would be required for provincial
19 conditions, these documents would be posted to the EAO's public website. The EAO is
20 recommending as KMMs under CEAA 2012 for a Vessel Traffic Management Plan, Marine
21 Communications Plan, and Marine Shipping Emergency Response Outreach Program for
22 potential shipping-related effects. The EAO is also recommending that Maa-nulth First Nations
23 be consulted in the development of these plans / mitigations, which will inform the Agency's
24 development of federal conditions for TMJ.

25 *Accidents and Malfunctions*

26 Maa-nulth First Nations also raised concerns regarding potential impacts of an accident or
27 malfunction involving a TMJ-related LNG carrier and a bunker fuel spill on the environment and
28 traditional resources at different locations in the shipping lanes and across seasons. The EAO
29 has noted Maa-nulth First Nations concerns through the RBT2 process with respect to accidents
30 and malfunctions in their territories and the potential implications this might have for current
31 and future governance and stewardship. During the MSA review for TMJ, Maa-nulth First
32 Nations posed questions about specific-activities and agency roles and responsibilities related
33 to marine shipping emergency preparedness and response processes. In response, TJLP and
34 Canada Coast Guard (CCG) provided additional information regarding the roles of VFPA, CCG,
35 TC, Western Canada Marine Response Corporation (WCMRC) and local authorities in
36 emergency response and preparedness regarding shipping-related accidents and malfunctions.

1 The EAO also understands that provincial ministries, health authorities, and local and
2 Indigenous governments would work closely with these federal agencies to coordinate spill
3 response activities.

4 Maa-nulth First Nations also requested further dialogue and information regarding LNG carrier
5 route jurisdiction and whether Canada had jurisdiction to establish mandatory shipping lanes
6 beyond 12 nm. In response, Maa-nulth First Nations was provided with additional information
7 from TC regarding the current feasibility study that is exploring options to assessment potential
8 amendments to the Traffic Separation Scheme (TSS) /structural routing measures within SRKWs
9 critical habitat; however, TC was not making regulatory or strategic decisions about
10 amendments to the TSS or as a part of this study. While TC may be relying on the study to
11 inform future decisions, such decisions would be subject to further consultations to avoid,
12 mitigate or accommodate impacts to rights and TC is committed to engaging with Indigenous
13 communities to ensure impacts and benefits of potential feasibility options are considered.

14 With respect to accidents and malfunctions, Maa-nulth First Nations also raised concerns
15 related to the adequacy of the assessment methods used to determine potential impacts due
16 to bunker oil spill, including the volume of bunker fuel and single location and season used in
17 the modelling. Maa-nulth also requested more information related to the facilitate the
18 integration of plans for responding to incidents in transit into existing emergency response
19 systems, primarily the CCG's Incident Integrated Response Plans regime in the event of a spill
20 involving bunker fuel. In response TJLP noted that a conservative volume was used for
21 modelling of results of a bunker fuel spill. The assessment considered baseline information for
22 the entire MSA area, as well as seasonal variation. TJLP also provided further information
23 regarding the existing environmental enforcement regimes that govern the shipping activities in
24 the MSA. TC confirmed that in Canada, shipowners can be held liable for the cost of prevention
25 and response measures taken with respect to spills under Section 771 of the *Marine Liability*
26 *Act*.

27 TJLP noted that, specific to oil pollution, polluters are financially responsible, even if an incident
28 is accidental. Shipowners are liable (responsible), up to a limit based on the size of their ship,
29 for eligible claims of loss or damage, whether the pollution was caused by oil carried as cargo or
30 used in the operation of the ship²³⁵. Shipowners are required to have insurance for all of their
31 vessels that are 1,000 gross tonnes or larger in case of oil pollution damage caused by the oil

²³⁵ Eligible claims include: pollution prevention measures; clean-up costs; property damage; fisheries losses; subsistence losses; tourism losses; and environmental remediation. For more information on compensation visit: <https://tc.canada.ca/en/marine-transportation/marine-safety/marine-liability-compensation-oil-spills>

1 they use as fuel or in the operations of the vessel. Tanker owners are required to have
2 insurance if they carry 2,000 tonnes or more of persistent oil as cargo. If the costs of a
3 persistent oil spill caused by an oil tanker were more than the tanker owner's limit of liability,
4 additional compensation could be paid by international funds financed by industry and
5 distributed by the International Oil Pollution Compensation Funds (IOPC Funds). The Ship-
6 Source Oil Pollution Fund (SOPF) under the *Marine Liability Act* compensates for damages
7 exceeding shipowner's liability and there is no limit to the amount of compensation available
8 from the SOPF for eligible claims²³⁵. The EAO is recommending a Marine Shipping Emergency
9 Response Outreach Program as a KMM under CEAA 2012 to facilitate the integration of plans
10 for responding to incidents in transit into existing emergency response systems, primarily the
11 CCG's Incident Integrated Response Plans. Further information regarding the potential impact
12 of a bunker spill, as well as other impacts of TMJ-related vessels, is provided in the Accidents
13 and Malfunctions and Effects of Environment on the Project Section of this Report.

14 In consideration of the available information, the EAO's consultation with Maa-nulth First
15 Nations, Maa-nulth First Nations' engagement with TJLP, TJLP's commitments, the EAO's
16 proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012,
17 the EAO is of the view that the concerns raised regarding potential TMJ-related impacts on
18 Maa-nulth First Nations' other values have been adequately considered and addressed at this
19 stage of review.

20 **16.2 PACHEEDAHT FIRST NATION**

21 **16.2.1 COMMUNITY PROFILE**

22 Pacheedaht (meaning "Children of the Sea Foam") Territory is located on the southwest coast
23 of Vancouver Island, bounded on the east near Point No Point and Sheringham Point and on the
24 west near Cullite Creek and Bonilla Point, and extending inland to include the drainages of the
25 rivers and streams on Vancouver Island between the two locations. Pacheedaht First Nation
26 reported that they have continuously occupied their territory for at least the past several
27 centuries with their livelihood, culture, and spirituality based primarily on the marine
28 environment. The pre-contact population of Pacheedaht First Nation was approximately 1,500
29 people, with villages and camps spread along shorelines and rivers. As of November 2021,
30 Pacheedaht First Nation now has a registered population of 289 people, 95 of those living on

1 reserve²³⁶. The MSA noted that there are historic and current permanent and temporary
2 Pacheedaht First Nation residences up the San Juan River, in Port San Juan and along the outer
3 coast of Pacheedaht territory.

4 All coastal areas are of concern to Pacheedaht First Nation, as the contiguous shoreline is
5 interrelated with the Strait of Juan de Fuca. Pacheedaht First Nation traded marine resources
6 with other Nations and white explorers and traders. Pacheedaht First Nation practiced whaling
7 and sea otter and commercial fur seal hunting beginning in the 1870s. Traditional seasonal
8 movements (seasonal tasks) of Pacheedaht First Nation were determined by the availability and
9 abundance of marine resources, particularly fish, and specifically salmon. The EAO understands
10 that Pacheedaht First Nation consider that the central importance of control over, use and
11 access of Pacheedaht First Nation's marine territory, and in particular *łučii?aa?aq* (Swiftsure
12 Bank), is illustrated by the location of historical Pacheedaht villages and campsites. For
13 example, the large permanent Pacheedaht historic village of *Qala:yit* (current location of Cullite
14 IR3 that is east of Bonilla Point) provided Pacheedaht First Nation with excellent access to
15 *łučii?aa?aq* (Swiftsure Bank), and other prime fishing and marine mammal hunting grounds,
16 and seafood gathering sites²³⁷.

17 Pacheedaht First Nation asserts Aboriginal title to its traditional territory and rights to self-
18 governance, fish, hunt, trap, gather, and perform other cultural practices. Pacheedaht First
19 Nation fish vast quantities for FSC purposes. A large portion of the Pacheedaht First Nation diet
20 is comprised of traditional foods, whereas other First Nations must supplement their harvesting
21 activities with intertribal trade to maintain traditional diets. Pacheedaht First Nation fish
22 throughout the offshore portion of Pacheedaht First Nation's territory.

23 Impacts to whales, their migration or feeding patterns threaten Pacheedaht First Nation's rights
24 to engage in spiritual belief systems. The Makah Tribe (in Washington State) reasserted its right
25 to hunt whales in the late 1990s, Pacheedaht First Nation may follow suit. Traditional whale
26 meat improves First Nations' health and whaling rituals could reinvigorate spiritual connections.
27 Pacheedaht First Nation has the right and responsibility to preserve such resources for youth
28 and future generations. Service-based businesses (e.g., restaurants, hotels, and whale
29 watching, hiking, and canoe tours) rely on shoreline areas of Pacheedaht First Nation's territory.

²³⁶ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Pacheedaht First Nation. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=658&lang=eng, accessed December 16, 2021.

²³⁷ Pacheedaht Heritage Project, Pacheedaht First Nation Treaty Department, and Traditions Consulting Services, Inc. 2019 Updated – Pacheedaht RBT2 Traditional Use and Occupancy Study. <https://iaac-aeic.gc.ca/050/documents/p80054/132555E.pdf>. Accessed June 21, 2022.

1 Intact natural beauty, water and air quality, soundscape, biodiversity, and safety are required
2 for Pacheedaht First Nation to take advantage of tourism opportunities.

3 Pacheedaht First Nation is currently in the BC Treaty negotiation process (negotiating at a
4 common table with Ditidaht). Of the six-stage process, Pacheedaht First Nation is in stage 5
5 (Negotiation of an Agreement-in-Principle) of the BC Treaty process.

6 The MSA for TMJ stated that Pacheedaht First Nation rely heavily on marine resources and the
7 marine environment and they continue to harvest extensively for FSC purposes, with Swiftsure
8 Bank as a prime harvesting location. Pacheedaht First Nation identify Swiftsure Bank as its main
9 source of their traditional wealth, that the area was traditionally under mutual control with
10 neighbouring Ditidaht and Makah, and that harvesting at Swiftsure provided a variety of
11 resources important for not only subsistence, but also as trade goods and wealth of Pacheedaht
12 citizens. The EAO is aware that traditional trade routes extended in four directions from
13 Pacheedaht First Nation Territory, and that some of the traditional products Pacheedaht First
14 Nation supplied for trade were produced from resources harvested from Swiftsure Bank,
15 especially halibut, whale, fur seal, dogfish, salmon, and groundfish. It is noted that the
16 resources harvested at Swiftsure Bank are preferred by Pacheedaht citizens and are perceived
17 to be healthier and more abundant and thus remain significant to Pacheedaht First Nation.

18 Pacheedaht First Nation has reported that the re-routing of the international shipping lanes in
19 2005 to intersect Swiftsure Bank has caused significant interference with Pacheedaht First
20 Nation's ability to conduct marine harvesting at Swiftsure bank and that marine traffic presents
21 risks to fishers from vessel wakes and the threat of collision. Pacheedaht First Nation has
22 informed the EAO that from their vantage any increase to levels of large marine vessel traffic
23 within their territory would have significant adverse effects on community members and that
24 the level of risk to Pacheedaht First Nation harvesters has already surpassed a critical threshold,
25 resulting in loss of opportunity to harvest in preferred locations at preferred times. They have
26 also noted that the frequency of existing vessel traffic is at such a level as to make it very
27 difficult for Pacheedaht First Nation fishers to schedule fishing to avoid large vessels, even if
28 schedules are known ahead of time.

29 **16.2.2 PACHEEDAHT FIRST NATION INVOLVEMENT IN THE CONSULTATION** 30 **PROCESS**

31 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
32 sent a letter to these groups, inviting comments on the draft Section 13 Order, including
33 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
34 EAO amended the geographic scope for the assessment of the marine shipping route under a
35 Section 13 Order and added the Indigenous groups identified in Schedule D which included

1 Pacheedaht First Nation. For the review of the MSA, the EAO led consultation activities with the
2 Indigenous Groups identified in Schedule D and, as part of this work, invited Pacheedaht First
3 Nation to participate in the Marine Shipping Working Group.

4 As part of the Marine Shipping Working Group, the EAO invited Pacheedaht First Nation to
5 review and provide comments on TJLP's MSA Supplemental Analysis, the EAO's draft
6 Assessment Report (including Part C of the Assessment Report), the draft CPD, draft provincial
7 Certificate Conditions and the draft KMMs recommended under CEAA 2012. The EAO consulted
8 Pacheedaht First Nation and sought to resolve concerns raised by Pacheedaht First Nation
9 during the EA for TMJ. To this end, the EAO revised its draft referral materials to include
10 additional information related to Pacheedaht First Nation's perspectives on the EA consultation
11 process and key concerns raised by Pacheedaht First Nation regarding cumulative effects from
12 marine shipping in the Salish Sea, impacts to SRKWs and TMJ-related impacts to Pacheedaht
13 First Nation's Aboriginal Interests.

14 As part of the Marine Shipping Working Group, Pacheedaht First Nation was invited to
15 participate in working group meetings and teleconferences during the MSA supplemental
16 analysis review stages. During the EA, the EAO offered to meet directly with Pacheedaht First
17 Nation to discuss TMJ, EA process, the draft assessment on impacts to rights, draft provincial
18 Certificate Conditions and draft KMMs recommended under CEAA 2012 and any potential
19 concerns with TMJ. The EAO is of the view that it has approached consultation with Pacheedaht
20 First Nation at the deeper end of the spectrum, with the intent to identify potential impacts and
21 consider ways to address any potential impacts to Aboriginal Interests that were identified by
22 Pacheedaht First Nation within the MSA area.

23 Pacheedaht First Nation considered that the consultation opportunities offered to the Schedule
24 D Indigenous groups were limited for the EA of TMJ, and while Pacheedaht First Nation has
25 participated in the EAO's assessment of TMJ through opportunity to review and comment on
26 the MSA and draft assessment report, Pacheedaht First Nation does not view this process as
27 consultation because it did not permit for open dialogues and exchanges required to meet
28 Pacheedaht First Nation's view of meaningful consultation with the Crown. The EAO is of the
29 view it has been responsive to Pacheedaht First Nation's concerns regarding consultation and
30 potential impacts of TMJ and has provided opportunities for dialogue and exchange during the
31 MSA review for TMJ. The EAO is also aware that TJLP has invited Pacheedaht First Nation to
32 engage in the development of a Marine Communications Protocol for TMJ, and that
33 Pacheedaht First Nation and TJLP met on March 25, 2022 to discuss the Bunkering Vessel
34 Scenario Assessment.

35 Pacheedaht First Nation also expressed concerns that the EAO has limited ability to address
36 many measures suggested by Pacheedaht First Nation that would avoid or mitigate TMJ-related

1 impacts to their Aboriginal Interests. Pacheedaht First Nation suggested altering the behaviour
2 of shipping traffic, improving the capabilities of Pacheedaht fishers, and Improving emergency
3 response capability in Pacheedaht Territory as potential mitigation measures to reduce
4 potential impacts from TMJ. To this end, Pacheedaht First Nation requested meetings with
5 representatives from relevant departments of the Crown, including TC, DFO, the CCG and the
6 BC ENV in their June 19, 2020 letter to the EAO and Agency. In response to Pacheedaht First
7 Nation's request the EAO facilitated a meeting on July 6, 2021 with Pacheedaht First Nation and
8 representatives from the TC and the Canadian Coast Guard to discuss the issues and concerns
9 raised by Pacheedaht First Nation regarding potential TMJ-related impacts on
10 Pacheedaht First Nation's Aboriginal Interests, proposed mitigation of TMJ-related shipping
11 traffic, governance of Pacheedaht marine territory and protecting SRKWs. The EAO understands
12 that Pacheedaht First Nation is also engaging these federal agencies through the RBT2 process
13 and these such conversations pertain to broader, non-EA level regional marine-shipping issues.

14 After the meeting, Pacheedaht First Nation provided copies of the confidential information that
15 was presented and prepared by Pacheedaht in relation to its Aboriginal rights and title in the
16 marine territory including in relation to SRKW. Pacheedaht First Nation provided this
17 information in confidence to the EAO and IAAC to assist with the assessment of impacts from
18 TMJ. In response, the EAO made updates to Part C of the Assessment Report (this Report) and
19 shared the changes in draft to Pacheedaht First Nation to confirm the information and
20 Pacheedaht First Nation's perspectives and views had been accurately reflected in the updated
21 referral materials to be provided to provincial and federal Ministers for decision at the end of
22 Application Review.

23 On September 3, 2021 Pacheedaht First Nation provided the EAO with a separate submission
24 for the decision makers for TMJ. In the letter, Pacheedaht First Nation identified that the EAO's
25 draft conclusion statement for TMJ fails to bring the Ministers' attention to the important
26 findings made by the EAO regarding cumulative effects from TMJ, including how cumulative
27 effect may be experienced by Pacheedaht First Nation. The letter re-iterated Pacheedaht First
28 Nation's serious concerns regarding cumulative effects from increased shipping traffic, and that
29 Pacheedaht First Nation view that any increased levels of large marine vessel traffic would have
30 significant adverse effects to Pacheedaht First Nation's Aboriginal interests, and there is an
31 existing level of risk to Pacheedaht harvesters in the Strait of Juan de Fuca, especially at
32 Swiftsure Bank. In the letter Pacheedaht First Nation emphasized the potential for cumulative
33 effects should be at the forefront of the Ministers' decision-making in relation to TMJ, that
34 there is a continued call for a comprehensive regional cumulative effects assessment for
35 Pacheedaht First Nation's marine territory, and in the absence of a regional cumulative effects
36 assessment for Pacheedaht's territory, cumulative effects must be fully considered in the
37 review of TMJ (and other individual projects) to avoid the risk of cumulative effects continuing

1 to go unaddressed. The EAO updated the referral materials to include Pacheedaht First Nations
2 views on cumulative effects and updated the EAO's conclusion in Part D of this report
3 recognizing that there are outstanding impacts, in particular regarding cumulative effects,
4 which are reflected in the EAO's conclusions in Part B and Part C of this assessment report for
5 TMJ.

6 The EAO understands there are opportunities for Pacheedaht First Nation to participate in the
7 Whales Initiative's TSS Feasibility Study, SRKW recovery measures, CEMS and QVI. For some
8 initiatives funding is available through OPP's CFPF. Pacheedaht First Nation is also eligible for
9 the MSET initiative, the Indigenous and Multi-Stakeholder Advisory Group and Technical
10 Working Groups for the Salish Sea Initiative. As detailed in [Section 13.1.1](#) above, MSET provides
11 funding to eligible Indigenous communities for equipment to enhance the safety of certain
12 Indigenous vessels and for training to build understanding around safety on the water.
13 Pacheedaht First Nations identified that existing regional initiatives are not intended and do not
14 accommodate the concerns of Pacheedaht First Nation in relation to TMJ.

15 The EAO also understands that TC has been working closely with Pacheedaht First Nation as an
16 OPP Enhanced Maritime Situational Awareness (EMSA) initiative pilot host community to
17 support local and collaborative planning, analysis and decision making. EMSA helps coastal
18 Indigenous communities better plan vessel routes, identify sensitive areas, enhance local
19 marine safety, and protect the environment. CCG is also continuing engagement with
20 Pacheedaht First Nation through the Port Renfrew Multi-Purpose Marine Response Facility
21 Project under the TMX initiative Co-Developing Community Response (CDCR). The EAO notes
22 that these programs are broad in nature and are not intended to mitigate or accommodate for
23 the specific potential impacts to Indigenous mariners and fishers navigating in proximity to TMJ
24 vessels within the Traffic Separation Schemes.

25 **16.2.3 POTENTIAL IMPACTS TO ABORIGINAL RIGHTS AND INTERESTS**

26 The following sections focus on potential impacts of TMJ to Pacheedaht First Nation's
27 Aboriginal Interests, and mitigations and accommodations to address potential impacts.
28 Information related to the EAO's impact assessment methods is provided in [Section 12.2](#) of this
29 Report. The EAO considered information available, including from public sources as well as
30 relevant issues raised by the Pacheedaht First Nation during the EA process (in meetings, letters
31 and Working Group comments), in the following assessments of the potential impacts of TMJ
32 on Pacheedaht First Nation's Aboriginal Interests.

1 A. POTENTIAL IMPACTS ON FISHING

2 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
3 summary of this information in [Section 13.3.1](#). In addition to any information provided through
4 the TMJ MSA process, the EAO also considered relevant information related to potential
5 shipping-related effects based on review of RBT2 and TMX processes. The EAO is satisfied that
6 the key impacts to biophysical components resulting in changes to fish quantity and quality,
7 changes in access to fishing resources, and changes to social, cultural, and spiritual values
8 associate with traditional fishing activities that apply to Pacheedaht First Nation are
9 summarized in [Section 13.3.1](#).

10 The MSA reported on Pacheedaht First Nation's traditional use and occupancy study prepared
11 for the RBT2 process²³⁷. It noted that Pacheedaht First Nation identified 270 fishing sites
12 distributed throughout the study area, including all areas of Port San Juan, up the San Juan
13 River and Gordon River, as well as both inshore and offshore along the outer coast. The same
14 study identified 119 seafood gathering sites in Port San Juan and along the outer coast. As
15 noted above, Swiftsure Bank is a key and preferred fishing area for Pacheedaht First Nation and
16 would require them to enter the shipping lanes to access some areas of Swiftsure Bank.

17 During the MSA for TMJ, Pacheedaht First Nation raised concerns regarding the potential for
18 marine shipping impacts to Pacheedaht First Nation's fishing rights, including the potential for
19 serious cumulative effects on access to and quality of experience of fishing and safety for
20 Pacheedaht harvesters, especially at Pacheedaht First Nation's preferred fishing locations at
21 Swiftsure Bank. The MSA area, including Swiftsure Bank, is a heavily utilized marine
22 environment with occasionally high levels of marine traffic in the shipping lanes and
23 Pacheedaht First Nation stated that the frequency of existing vessel traffic at Swiftsure is so
24 high as to make it "practically impossible" for Pacheedaht fishers to schedule fishing activities
25 to avoid vessels even if this schedule were known to Pacheedaht fishers.

26 Pacheedaht First Nation is of the perspective that effects of any increase to levels of large
27 marine vessel traffic within Pacheedaht territory would have significant adverse effects on
28 Pacheedaht people and that the level of risk to Pacheedaht First Nation harvesters has already
29 surpassed a critical threshold, resulting in loss of opportunity to harvest in preferred locations at
30 preferred times and that the LNG-laden vessels associated with TMJ would heighten these
31 existing risks significantly. Pacheedaht First Nation is also of the perspective that the MSA
32 underestimated the risk of wakes from large vessels on Pacheedaht First Nation marine
33 harvesters due to insufficient modelling in three specific zones, including Swiftsure Bank, and
34 identified a concern that the EAO relied on the Collision Regulation in its conclusion on
35 potential impacts from TMJ-related vessels to Indigenous fisheries access to harvesting areas at
36 Swiftsure bank or when crossing shipping lanes.

- 1 • The EAO respectfully acknowledges Pacheedaht First Nation’s worldview and
2 perspective that there are currently existing cumulative effects which have already
3 affected Pacheedaht First Nation’s ability to exercise their fishing rights as preferred
4 within Pacheedaht First Nation’s asserted traditional territory. As described in the
5 Current Use assessment in Part B, the EAO concluded that TMJ would have the potential
6 to contribute significant cumulative effects (that already occur at baseline) to access to
7 and the experience of current use for fishing for Pacheedaht First Nation at Swiftsure
8 Bank. The EAO predicts TMJ shipping activities could result in infrequent and short-
9 duration interruptions to Pacheedaht First Nation’s access and experience of current use
10 for fishing occurring regularly during operations (30 years minimum);
- 11 • The EAO agrees with TJLP’s assessment that TMJ-related vessel wakes are predicted to
12 be within the natural variation of wave heights in the Salish Sea and that TMJ-related
13 vessel movements would represent a less than 2 percent increase in vessel traffic within
14 the Swiftsure Bank fishing area, with anticipated interactions with Pacheedaht First
15 Nation fishers to be intermittent and of short duration. The EAO acknowledges that
16 wakes generated by TMJ vessels would be larger the closer one is to the vessel and that
17 the presence of LNG carriers may be considered disturbing for safety or other reasons
18 by Indigenous people, which could lead to reduced opportunities to practice Aboriginal
19 rights in and around the shipping lanes;
- 20 • The EAO considers that the safety of small vessels with large vessels and wake effects
21 were assessed in the Accidents and Malfunctions and Effects of the Environment
22 Sections of Part B and that the regular and relatively short-duration passage of TMJ-
23 related vessel through the Salish Sea would include monitoring of compliance with
24 maritime regulations and legislation such as the *Canada Shipping Act* and the Collision
25 Regulations;
- 26 • The EAO is proposing a KMM under CEAA 2012 for TMJ to have a Marine
27 Communication Plan for TMJ (from the site out to 12 nm), including procedures to
28 inform Indigenous Groups of traffic schedules, for Indigenous Groups to submit any
29 feedback on potential adverse effects on navigation as a result of TMJ, and for TJLP to
30 document and respond to any feedback received in a timely manner. Pacheedaht First
31 Nation informed the EAO that this type of mitigation would not be effective for
32 mitigating the impacts of marine shipping at Swiftsure Bank due to the high volume of
33 shipping traffic already occurring there;
- 34 • TJLP has stated that TMJ’s influence on TMJ-related vessel operations would be limited
35 beyond TMJ’s marine terminal area (including the location and operation of
36 international shipping lanes), but TJLP has committed to a Marine Communication Plan

- 1 out to 12 nm that would be developed in consultation with Schedule B and D Indigenous
2 Groups and include a communication procedure to inform Indigenous Groups of vessel
3 schedules and provide a complaint submission process;
- 4 • Due to the nature of Pacheedaht First Nation’s concerns about cumulative effects, the
5 EAO acknowledges that the TMJ-specific mitigations would not reduce impacts for
6 baseline conditions and / or impact of future projects, which are a source of issues for
7 many Indigenous Groups. The EAO also considers that the TMJ-specific mitigation
8 measures would not reduce impacts to quality of experience because some Indigenous
9 people may find the presence and sounds of LNG carriers disturbing for safety and/or
10 aesthetic reasons, or for other reasons. The EAO acknowledges that shipping-related
11 access interruptions and concerns about safety could then lead to reduced
12 opportunities for cultural transmission, including Indigenous language acquisition by
13 younger generations while undertaking traditional harvesting activities on land or on the
14 water, and in particular, while fishing; and
 - 15 • The EAO notes that existing regional Government of Canada initiatives associated with
16 the OPP (i.e., CEMS, EMSA and CFPF) and accommodations originating from TMX (i.e.,
17 CDCR, SSI and MSET) are designed to improve Indigenous communities participation in
18 marine safety systems in Canada and may collectively reduce effects within the region.
19 Although these initiatives are not TMJ-specific, the EAO recognizes that these programs
20 are working towards a better understanding of cumulative effects in the Salish Sea and
21 illustrate the substantial efforts that are being undertaken by the Crown in relation to
22 past and future impacts that contribute to the “current state”.
- 23 Pacheedaht First Nation also raised concern regarding lack of information regarding monitoring
24 and follow-up programs related to effects of marine shipping on Pacheedaht First Nation
25 marine harvesting as well as concern regarding difficulty for Pacheedaht First Nation fishers due
26 to lack of technology to predict the location and course of shipping traffic and respond to traffic
27 in a timely way.
- 28 • The EAO has recommended a KMM under CEAA 2012 for a Marine Communication Plan
29 that would require TJLP to notify Indigenous Groups of project activities in advance of
30 ship movements to reduce potential interactions with other vessels and crafts in the
31 area and develop procedures for Indigenous Groups to provide feedback on adverse
32 effects related to navigation, including requirement for TJLP to document and respond
33 to feedback in a timely manner; and
 - 34 • The EAO is aware that TC has been working closely with Pacheedaht First Nation as an
35 OPP EMSA initiative pilot host community to support local and collaborative planning,
36 analysis and decision making. The EAO also understands that CCG is also continuing

1 engagement with Pacheedaht First Nation through the Port Renfrew Multi-Purpose
2 Marine Response Facility Project under the TMX CDCR. The EAO is also aware of the
3 MSET initiative, which provides funding to eligible Indigenous communities for
4 equipment to enhance the safety of certain Indigenous vessels and for training to build
5 understanding around safety on the water. The EAO notes that these programs are
6 broad in nature and are not intended to mitigate or accommodate for the specific
7 potential impacts to Indigenous mariners and fishers navigating in proximity to TMJ
8 vessels within the established Traffic Separation Schemes.

9 **Conclusion**

10 The EAO predicts that TMJ-related marine shipping effects would have a negligible-to-minor
11 impact on Pacheedaht First Nation's right to fish. The EAO considers TMJ-related increases to
12 vessel traffic during operations would be incremental compared to existing baseline conditions
13 of the established Traffic Separation Scheme of the Salish Sea. However, in consideration of the
14 available information, the EAO's consultation with Pacheedaht First Nation, TJLP's engagement
15 with Pacheedaht First Nation, TJLP's commitments, the EAO's proposed EAC conditions if an
16 EAC is issued, and the recommended KMMs under CEAA 2012, the EAO concludes that TMJ-
17 related marine shipping effects combined with cumulative effects in the MSA area is expected
18 to result in a moderate-to-serious impact on Pacheedaht First Nation's right to fish. The EAO
19 predicts that TMJ-related shipping activities during operations would interact with current
20 baseline levels of cumulative effects to access to fishing areas and the experience of fishing in,
21 or adjacent to, the shipping lanes. These cumulative effects in the MSA area combined with the
22 importance of Swiftsure Bank as the key fishing area for Pacheedaht First Nation and the
23 location of the shipping lanes overlapping this area increase the seriousness of impact of TMJ
24 on Pacheedaht's First Nation's right to fish.

25 The EAO considered Pacheedaht First Nation's perspectives on cumulative effects and
26 Pacheedaht First Nation's ability to meaningfully practice their fishing rights in the MSA area.
27 The EAO acknowledges that there are already vessels transiting the shipping lanes which can
28 impact Indigenous fishers' access to and quality of experience of fishing. The EAO understands
29 that shipping-related access interruptions and concerns about safety currently contribute to
30 reduced opportunities for cultural transmission, including Indigenous language acquisition by
31 younger generations while undertaking traditional harvesting activities including fishing. While
32 the EAO recognizes there is some uncertainty when considering how cumulative effects impact
33 Aboriginal Interests, the EAO agrees with Pacheedaht First Nation, that any increase in vessel
34 traffic at Swiftsure Bank would potentially be more serious when combined with past, present
35 and reasonably foreseeable shipping activities.

1 The EAO understands there are opportunities for Pacheedaht First Nation's participation in the
2 Whales Initiative's TSS Feasibility Study, CEMS, MSET, or the Indigenous and Multi-Stakeholder
3 Advisory Group and Technical Working Groups for the Salish Sea Initiative. For some initiatives
4 funding is available through the OPP's CPF. The EAO also understands that TC has been
5 working closely with Pacheedaht First Nation as an OPP EMSA initiative pilot host community to
6 support local and collaborative planning, analysis and decision making. EMSA helps coastal
7 Indigenous communities better plan vessel routes, identify sensitive areas, enhance local
8 marine safety, and protect the environment. CCG is also continuing engagement with
9 Pacheedaht First Nation through the Port Renfrew Multi-Purpose Marine Response Facility
10 Project under the TMX initiative CDCR. The EAO notes that these programs are broad in nature
11 and are not intended to mitigate or accommodate for the specific potential impacts to
12 Indigenous mariners and fishers navigating in proximity to TMJ vessels within the established
13 Traffic Separation Scheme in the Salish Sea.

14 The key factors that were considered in support of the EAO's conclusion on the impacts to the
15 right to fish are summarized as follows:

16 **Biophysical:**

- 17 • The EAO's conclusions in the Fish and Fish Habitat chapter in Part B which does not
18 predict any residual effects to fish and fish habitat in the MSA area; and
- 19 • The MSA area, including Swiftsure bank, is a heavily utilized marine environment with
20 occasionally high levels of marine traffic in the shipping lanes.

21 **Geospatial:**

- 22 • Swiftsure bank is intersected by shipping lanes, where cumulative effects from shipping
23 traffic is a constraint on Pacheedaht First Nation's ability to exercise their fishing rights,
24 including both direct and indirect impacts to access, safety, and quality of experience;
- 25 • While Pacheedaht First Nation has identified other fishing sites that do not require
26 crossing the shipping lanes to access, Swiftsure Bank is a prime resource harvesting
27 location and important site for knowledge transfer for Pacheedaht First Nation;
- 28 • The EAO's conclusions in the Current Use chapter of Part B that TMJ would result in an
29 incremental increase (i.e., 0.2 – 1.1 % for segments A – D) in vessel traffic when
30 compared to baseline conditions in the Traffic Separation Scheme and that TMJ-related
31 vessel transits during operations (minimum 30 years) would result in negligible to low
32 magnitude effects due to relatively infrequent and short-duration disruptions to access
33 to fishing areas in the Salish Sea; and
- 34 • The predicted overlap of TMJ-related shipping activities with cumulative effects from

1 current and reasonably foreseeable shipping activities that would further constrain
2 Pacheedaht First Nation's ability to exercise their fishing rights, such that impacts may
3 be compounded at Swiftsure Bank.

4 **Social, Cultural and Experiential:**

- 5 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
6 traffic during operations affecting visual quality, noise, and vessel wake (with an
7 increasing magnitude of effect the closer one is to the vessels);
- 8 • The predicted overlap of TMJ-related shipping activities with cumulative effects from
9 current and reasonably foreseeable shipping activities that would further constrain
10 Pacheedaht First Nation's ability to exercise other cultural, social and experiential
11 components of their fishing rights, including intergenerational knowledge transfer, such
12 that impacts may be compounded at Swiftsure Bank;
- 13 • Pacheedaht First Nation consider Swiftsure Bank was its primary traditional harvesting
14 site for some resources supplied for trade (e.g., whale, halibut, fur seal, salmon, and
15 groundfish), and was important not only to the subsistence but trade and wealth of
16 Pacheedaht citizens; and
- 17 • Pacheedaht First Nation stated that the degree of vessel traffic at Swiftsure has already
18 surpassed a critical threshold in terms of safety risk and impacts on the experience of
19 fishing, resulting in a loss of opportunity to harvest in preferred locations at preferred
20 times.

21 **Mitigations:**

- 22 • Proposed mitigations for impacts to Pacheedaht First Nation's right to fish include the
23 Marine Communications Plan recommended as KMMs under CEAA 2012; and
- 24 • While the EAO is of the view that the potential impacts on Pachedaht First Nation's
25 fishing rights have been avoided, minimized, and accommodated to the extent possible
26 for the purposes of the EA, the EAO also recognizes that there are outstanding impacts,
27 in particular regarding cumulative effects, and these outstanding impacts are reflected
28 in the EAO's conclusions in Part B and Part C for TMJ.

29 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

30 The EAO evaluated the potential effects on hunting, trapping and gathering activities
31 attributable to TMJ in [Section 13.3.2](#) above that apply broadly to Indigenous groups. The EAO is
32 satisfied that the key impacts to biophysical components resulting in changes to wildlife and
33 vegetation quantity and quality, changes in access to hunting, trapping and gathering areas, and

1 changes to social, cultural, and spiritual values associated with traditional hunting, trapping and
2 gathering activities that apply to Pacheedaht First Nation are summarized in [Section 13.3.2](#).

3 The MSA noted that Pacheedaht First Nation harvested a variety of marine birds, including
4 ducks such as mallard, surf scoter, common merganser, bufflehead, and common goldeneye,
5 brant and swans. Ducks and other intertidal birds are hunted on beaches, rocky shorelines,
6 marshes, river estuaries, tidal zones, and tidal flats and are an important winter food source.

7 **Conclusion**

8 In consideration of the available information in [Section 13.3.2](#), which outlines the potential
9 effect to hunting, trapping and gathering; consultation with Pacheedaht First Nation; TJLP's
10 engagement with Pacheedaht First Nation; TJLP's commitments; the EAO's proposed EAC
11 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
12 to result in negligible impact on Pacheedaht First Nation's right to hunt, trap and gather.

13 The key factors that were considered in support of EAO's conclusion on the impacts to the right
14 to hunt, trap and gather included the EAO's conclusions on adverse residual effects to wildlife
15 in the MSA area predict negligible to low magnitude mortality of select marine bird species. The
16 EAO also considered that in the MSA area, operations (30 years in duration) may cause
17 infrequent, short-term, temporary disruptions to marine-based hunting along the proposed
18 LNG vessel route and negligible effects on Indigenous access to terrestrially based hunting,
19 trapping, and gathering sites that are accessed by boat from the pilot station at Sand Heads to
20 the 12 nm territorial limit. To mitigate potential impacts to Pacheedaht First Nation's right to
21 hunt, trap and gather, the EAO is recommending a KMM under CEAA 2012 for a Marine
22 Communication Plan, including procedures to inform Indigenous Groups of traffic schedules
23 and for Indigenous Groups to submit any feedback on potential adverse effects on navigation as
24 a result of TMJ. The EAO also considered that the small relative increase due to TMJ-related
25 vessel traffic would have a negligible effect to experiential aspects of hunting, trapping, and
26 gathering from changes to visual quality and noise in the MSA and that all TMJ related vessels
27 would adhere to the Marine Regulations and Legislation regulating vessel noise and lighting.

28 **C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS**

29 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
30 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
31 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
32 pathways to impacts based on review of publicly available information from RBT2 and TMX
33 processes, and any information provided by Indigenous Groups during the MSA review. The
34 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of

1 experience and SRKWs would be the pathways to impacts to Pacheedaht First Nation's other
2 traditional and cultural interests.

3 The MSA reports on a traditional use and occupancy study for the RBT2 process wherein
4 Pacheedaht First Nation identified canoe routes and travel corridors extending from the head
5 of Port San Juan, following the coast and beyond Pacheedaht First Nation's territory, in addition
6 to routes that access Swiftsure Bank and across the Strait of Juan de Fuca to Neah Bay.
7 Pacheedaht First Nation has reported extensive trade with the Makah Tribe, including a long
8 history of travel across the Strait of Juan de Fuca to maintain trade, relationships, and other
9 cultural practices. Pacheedaht First Nation has raised concerns about safety while traveling
10 across the Strait of Juan de Fuca, especially at Swiftsure Bank, arising from large vessel traffic
11 and wake.

12 The EAO is aware that Swiftsure Bank is one of Pacheedaht First Nation's preferred areas to
13 exercise their Aboriginal rights and title, that is still heavily used today; essential to support
14 Pacheedaht diet, culture, and traditional economy; and is the site of hereditary fishing
15 protocols. As described in the 2020 RBT2 Panel Report , Pacheedaht First Nation reported that
16 concerns regarding safety and well-being from existing vessel traffic was preventing them from
17 bringing children and youth there, which was causing lost opportunities to transfer
18 knowledge²³⁸. Pacheedaht First Nation reported that noise from large vessels in addition to the
19 safety issues was diminishing the experience of their cultural practices.

20 The EAO understands that Swiftsure Bank is one of Pacheedaht First Nation's preferred areas to
21 exercise its Aboriginal rights and title, and that Pacheedaht First Nation's historical control and
22 use at Swiftsure Bank provided resources for not only subsistence, but also trade resources and
23 wealth for Pacheedaht citizens. As described in the community profile section, the EAO is aware
24 that the location of Pacheedaht First Nation's historical village and campsites provided
25 Pacheedaht First Nation with access to its marine territory, including Swiftsure Bank.
26 Pacheedaht First Nation consider that its Aboriginal interests in its marine territory include
27 Aboriginal title and governance rights (e.g., decision making, authority and jurisdiction,
28 management, and stewardship roles and responsibilities), as well as fishing rights for all
29 purposes, including FSC, cultural, and economic fisheries. The EAO is aware that Pacheedaht
30 First Nation are active in economic ventures related to the fishing industry that provide
31 culturally based employment for Pacheedaht First Nation citizens.

²³⁸ Review Panel for the Roberts Bank Terminal 2 Project. 2020. Federal Review Panel Report for the Roberts Bank Terminal 2 Project. <https://iaac-aeic.gc.ca/050/documents/p80054/134506E.pdf>. Reference No. 2062. Accessed June 22, 2022.

1 The EAO is aware that Pacheedaht First Nation is culturally, spiritually, and hereditarily
2 connected to many marine mammals found in the Strait of Juan de Fuca, and that whale in
3 general are central to Pacheedaht First Nations culture, mythology, and cosmology. To
4 Pacheedaht First Nation, Orca are regarded with great spiritual significance to governance, and
5 are central to Pacheedaht First Nation's oral tradition and cultural practices, such as the wolf
6 ritual. Pacheedaht First Nation has informed the EAO that SRKW plays an important role in
7 Indigenous culture and that TMJ-related shipping would impact this culture.

8 Pacheedaht First Nation raised the following concerns regarding potential impacts related to
9 traditional and cultural interests due to TMJ:

- 10 • Concern that increase in vessel traffic will worsen effects that have occurred, preventing
11 Pacheedaht First Nation families from being able to travel to Swiftsure Bank on small
12 vessels (e.g., herring skiffs), with TMJ failing to reflect Pacheedaht First Nation people's
13 view, understanding and experience.

14 The EAO does not dispute Pacheedaht First Nation's worldview and perspective that effects
15 have already occurred due to vessel traffic that prevent families from being able to travel to
16 Swiftsure Bank on small vessels. As described in the Current Use assessment in Part B, the EAO
17 concluded that that regular TMJ-related vessel transits during operations (30 years minimum)
18 could cause relatively infrequent and short-duration interruptions to access and quality
19 experience. TMJ-related shipping combined with cumulative effects from other marine shipping
20 could result in significant cumulative effects to cultural heritage at Swiftsure Bank for
21 Pacheedaht First Nation members. See the EAO's conclusions in the Current Use of Lands and
22 Resources for Traditional Purposes chapter for more information.

- 23 ○ The EAO is proposing KMMs under CEAA 2012 for a Marine Communication plan
24 that would require TJLP to communicate traffic schedules, and have a process for
25 Indigenous Groups to submit any feedback on potential adverse effects on
26 navigation as a result of TMJ, and for TJLP to document and respond to any
27 feedback received in a timely manner. TJLP has stated that TMJ's influence on
28 TMJ-related vessel operations would be limited beyond TMJ's marine terminal
29 area (including the location and operation of international shipping lanes), TJLP
30 has committed to a Marine Communication Plan out to 12 nm that would be
31 developed in consultation with Schedule B and D Indigenous Groups and include
32 a communication procedure to inform Indigenous Groups of vessel schedules
33 and provide for a complaint submission process.

- 34 • The EAO also is aware that TC has been working closely with Pacheedaht First Nation as
35 an OPP EMSA initiative pilot host community to support local and collaborative
36 planning, analysis and decision making. The EAO also understands that CCG is also

1 continuing engagement with Pacheedaht First Nation through the Port Renfrew Multi-
2 Purpose Marine Response Facility Project under the TMX CDCR. The EAO notes that
3 these, and other existing regional Government of Canada initiatives associated with the
4 OPP (e.g., CEMS or CFPF) and accommodations originating from TMX (e.g., SSI or MSET)
5 are designed to improve Indigenous communities participation in marine safety systems
6 in Canada and may collectively reduce effects within the region. However, the EAO
7 acknowledges that these programs are broad in nature and are not intended to mitigate
8 or accommodate for the specific potential impacts to Indigenous mariners and fishers
9 navigating in proximity to TMJ vessels within the established Traffic Separation Scheme
10 of the Salish Sea.

- 11 • Concern regarding TMJ's contribution to cumulative adverse effects on SRKWs, which
12 are a species of incredible cultural and spiritual significance to Pacheedaht First Nation
13 people. Concern that the MSA Application failed to address potential for impacts on
14 cultural heritage values related to SRKWs.
 - 15 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of
16 concerns related to TMJ's potential effects on whales. As discussed in [Section](#)
17 [13.3.3](#), the EAO concluded that TMJ would not result in significant residual
18 effects to Marine Mammals; however, the EAO notes that the current baseline of
19 cumulative effects to SRKWs are already high and that TMJ would contribute
20 additional residual effects from shipping-related underwater noise and potential
21 avoidance behaviour by SRKWs to ships, such that there is a potential for
22 cumulative effects to SRKWs to be significant.
 - 23 ○ In Part B section on Current Use of Land and Resources for Traditional Purposes
24 and Cultural Heritage, the EAO concluded that TMJ would have significant
25 adverse cumulative effects on intangible cultural heritage, for Indigenous Groups
26 that have a cultural and spiritual connection to SRKWs, including Pacheedaht
27 First Nation.
 - 28 ○ TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
29 limited beyond TMJ's marine terminal area, but TJLP has committed to a Vessel
30 Traffic Management Plan that would require TJLP to incorporate contractual
31 measures to support participation of TMJ-related vessels in the VFPA-led ECHO
32 Program seasonal slowdown initiatives (as amended) or a future equivalent, and
33 annual reporting on TJLP's participation in regional environmental management
34 measures and cumulative effects monitoring to protect SRKW, where feasible.
35 The seasonal slowdown initiatives currently request vessels to slow down in key
36 SRKW foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass.

- 1 ○ The EAO also notes several Government of Canada initiatives and measures have
2 been implemented to better understand and manage cumulative effects on the
3 recovery of SRKWs (see [Section 13.1.1](#)).

4 Additional issues and concerns with potential impacts related to traditional and cultural
5 interests were raised by Pacheedaht First Nation during the EAs of RBT2 and TMX.

- 6 • Concern about the effect of a vessel's wake on intertidal shoreline habitat,
7 archaeological sites, and shoreline erosion.
- 8 ○ It was determined that the TMJ-related vessel wake would be within natural
9 variation of the wave heights in this area, see the Vessel Wake Section of Part B.
- 10 • Concern that vessel traffic has potential to disturb Pacheedaht First Nation connection
11 to lands and water and ability to transfer traditional knowledge, including knowledge
12 regarding traditional fishing and harvesting, especially regarding Swiftsure Bank;
13 Concern regarding visual impacts of increased marine traffic decreasing the enjoyment
14 of Pacheedaht First Nation members at traditional use sites.
- 15 ○ In Part B the EAO predicted that vessel transits would result in negligible to low
16 magnitude effects to access to areas for resource harvesting for cultural
17 purposes due to relatively infrequent and short-duration access disruption and
18 visual quality, noise, and vessel wake (with an increasing magnitude of effect the
19 closer one is to the vessels).
- 20 ○ The EAO acknowledges that wakes generated by TMJ vessels would be larger the
21 closer one is to the vessel and that the presence of LNG carriers may be
22 considered disturbing for safety or other reasons by Indigenous people, which
23 could lead to reduced opportunities to practice Aboriginal rights in and around
24 the shipping lanes.
- 25 ○ The EAO considers that the safety of small vessels with large vessels and wake
26 effects were assessed in the Accidents and Malfunctions and Effects of the
27 Environment Sections of Part B and that TMJ-related vessels transiting through
28 the Salish Sea would include monitoring of compliance with maritime regulations
29 and legislation such as the *Canada Shipping Act* and the Collision Regulations.
- 30 ○ TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
31 limited beyond TMJ's marine terminal area (including the location and operation
32 of international shipping lanes), TJLP has committed to a Marine Communication
33 Plan out to 12 nm that would be developed in consultation with Schedule B and
34 D Indigenous Groups and include a communication procedure to inform
35 Indigenous Groups of vessel schedules and provide for a complaint submission

1 process. However, the EAO acknowledges that the TMJ-specific mitigation
2 measures would not reduce impacts to quality of experience because some
3 Indigenous people may find the presence and sounds of LNG carriers disturbing
4 for safety and/or aesthetic reasons, or for other reasons.

- 5 ○ The EAO acknowledges that shipping-related access interruptions and concerns
6 about safety could then lead to reduced opportunities for cultural transmission
7 while undertaking traditional activities in the marine environment.

- 8 ● Concern regarding potential of vessel-related contamination/discharge or damage to
9 resources and habitat (including shoreline and intertidal) relied upon for the exercise of
10 Pacheedaht First Nation's harvesting rights in the event of an accident or malfunction
11 resulting in release of bunker fuel, other contaminants or sewage, especially at
12 Swiftsure Bank. In addition, concern about effects to drinking water sources, such as
13 river estuaries of San Juan and Gordon Rivers, from discharge due to accident or
14 malfunction, as well as overall effects on water quality at cultural and harvesting sites.

- 15 ○ As discussed in the Accidents and Malfunctions and Effects of the Environment
16 section of Part B, vessels would be required to comply with internationally
17 recognized safety standards that include pollution prevention from ships,
18 including Canada's Ballast Water Regulations.

- 19 ○ TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
20 limited beyond TMJ's marine terminal area, TJLP has committed to developing a
21 Marine Shipping Emergency Response Outreach Program that would facilitate
22 the integration of plans for responding to incidents in transit into existing
23 emergency response systems, primarily the CCG's Incident Integrated Response
24 Plans.

- 25 ○ As well, it was determined that with the mitigation measures in place, including
26 navigational requirements, vessel operational procedures, emergency response
27 measures and emergency spill response that would be supported by CCG, that
28 these concerns would be addressed.

- 29 ○ The EAO also understands that CCG is also continuing engagement with
30 Pacheedaht First Nation through the Port Renfrew Multi-Purpose Marine
31 Response Facility Project under the TMX CDCR.

32 Conclusion

33 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
34 impacts on Pacheedaht First Nation's other cultural and traditional interests, although the EAO
35 acknowledges that there is uncertainty in the relationship between incremental increases in

1 shipping, the availability of cultural resources such as SKRW and impacts to cultural interests.
2 The EAO considers TMJ-related increases to vessel traffic in the established TSS of the Salish Sea
3 during operations would be incremental compared to existing baseline conditions. However, in
4 consideration of the available information, the EAO's consultation with Pacheedaht First
5 Nation, TJLP's engagement with Pacheedaht First Nation, TJLP's commitments, the EAO's
6 proposed EAC conditions if an EAC is issued, and the recommended KMMs under CEAA 2012,
7 the EAO concludes that TMJ-related marine shipping effects combined with cumulative effects
8 in the MSA area is expected to result in moderate-to-serious impacts on Pacheedaht First
9 Nation's other traditional and cultural interests. The EAO predicts that TMJ-related marine
10 shipping activities during operations would overlap with current baseline levels of cumulative
11 effects to underwater noise to culturally important SRKWs and access to and quality of
12 experience for cultural-use areas in, or adjacent to, the shipping lanes. These cumulative effects
13 in the MSA area combined with the importance of Swiftsure Bank as a key cultural area for
14 Pacheedaht First Nation and the location of the shipping lanes overlapping this area increase
15 the seriousness of impact of TMJ on Pacheedaht First Nation's other cultural and traditional
16 interests.

17 The EAO considered Pacheedaht First Nation's perspectives on cumulative effects and
18 Pacheedaht First Nation's ability to access and use Swiftsure Bank for other cultural and
19 traditional purposes, including intergenerational knowledge transfer, as Pacheedaht First
20 Nation would prefer to do so. The EAO acknowledges that there is already many vessels
21 transiting the shipping lanes which can impact access and quality of experience for other
22 cultural and traditional purposes. The EAO understands that shipping-related access disruptions
23 and concerns about safety currently contribute to reduced opportunities for cultural
24 transmission and constrain Pacheedaht First Nation's traditional familial and trading/bartering
25 relationships south of the border. While the EAO recognizes there is some uncertainty when
26 considering how cumulative effects impact Aboriginal Interests, the EAO agrees with
27 Pacheedaht First Nation, that any increase in vessel traffic at Swiftsure Bank would potentially
28 be more serious when combined with past, present and reasonably foreseeable shipping
29 activities.

30 The EAO also notes several Federal regional initiatives and measures have been implemented
31 to better understand and manage cumulative effects on the recovery of SRKWs (listed in
32 [Section 13.1.1](#)). The EAO also understands there are eligible opportunities for
33 Pacheedaht First Nation's participation in the Whales Initiative's TSS Feasibility Study, CEMS,
34 MSET, or the Indigenous and Multi-Stakeholder Advisory Group and Technical Working Groups
35 for the Salish Sea Initiative. For some initiatives funding is available through the OPP's CFPF.
36 The EAO also understands that TC has been working closely with Pacheedaht First Nation as an
37 OPP EMSA initiative pilot host community to support local and collaborative planning, analysis

1 and decision making. CCG is also continuing engagement with Pacheedaht First Nation through
2 the Port Renfrew Multi-Purpose Marine Response Facility Project under the TMX initiative
3 CDCR. The EAO notes that these programs are broad in nature and are not intended to mitigate
4 or accommodate for the specific potential impacts to Indigenous mariners and fishers
5 navigating in proximity to TMJ vessels within the established TSS of the Salish Sea.

6 The key factors that were considered in support of EAO's conclusion on the impacts to other
7 traditional and cultural interests are summarized as follows:

8 **Cultural and Heritage Resources:**

- 9 • The EAO's conclusions in Part B found no residual effects to Heritage Resources ([Section](#)
10 [7.1](#)) from erosion due to wake effects along the shorelines of the MSA area
- 11 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
12 moderate magnitude residual effects on marine mammals and significant cumulative
13 effects to due to underwater vessel noise
- 14 • The MSA area, including Swiftsure bank is a heavily utilized marine environment with
15 occasionally high levels of marine traffic in the shipping lanes.

16 **Geospatial:**

- 17 • Swiftsure Bank is a key area for cultural activities including the transmission of
18 knowledge
- 19 • Swiftsure Bank is intersected by shipping lanes, where cumulative effects from shipping
20 traffic is a constraint on Pacheedaht First Nation's ability to access and use the site for
21 other cultural and traditional purposes, including both direct and indirect impacts to
22 access, safety, and quality of experience
- 23 • Pacheedaht First Nation also conducts journeys across the shipping lanes to maintain
24 kinship ties, trade, and other cultural practices at Neah Bay in the United States
- 25 • The EAO's conclusions in the Current Use chapter of Part B that TMJ would result in an
26 incremental increase (i.e., 0.2 - 1.1 % for segments A – D) in vessel traffic when
27 compared to baseline conditions in the Traffic Separation Scheme and that SRKW TMJ-
28 related vessel transits during operations (minimum 30 years) would result in negligible
29 to low magnitude effects due to relatively infrequent and short-duration disruptions to
30 access in the Salish Sea when compared to existing baseline conditions; and
- 31 • The predicted overlap of TMJ-related shipping activities with cumulative effects from
32 current and reasonably foreseeable shipping activities that would further constrain
33 Pacheedaht First Nation's ability exercise other cultural and traditional practices, such

1 that impacts may be compounded at Swiftsure Bank.

2 **Social, Cultural, Experiential:**

- 3 • Potential negligible to low impacts from the incremental increase due to TMJ-related
4 vessel traffic during operations affecting visual quality, noise, and vessel wake (with an
5 increasing magnitude of effect the closer one is to the vessels);
- 6 • Pacheedaht First Nation has noted that the degree of vessel traffic at Swiftsure has
7 already surpassed a critical threshold in terms of safety risk and the experience of
8 conducting cultural activities. This has already had an impact with members avoiding
9 bringing children and young which is causing lost opportunities to transfer knowledge;
- 10 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
11 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
12 Part B;
- 13 • Pacheedaht First Nation identify Aboriginal title and governance rights are inclusive of
14 its marine territory, which includes decision making, authority and jurisdiction,
15 management and stewardship roles and responsibilities.
- 16 • Swiftsure Bank is recognized as an important traditional harvesting area, that is still
17 heavily used today, and is considered by Pacheedaht First Nation to be essential to
18 support Pacheedaht diet and culture (including its trade and economic ventures); and
- 19 • Southern Resident Killer Whales plays an important role in Pacheedaht First Nation's
20 culture.

21 **Mitigations:**

- 22 • Proposed mitigations for potential impacts to traditional and cultural interests, are the
23 recommended key mitigations under CEAA 2012 for a Marine Communications and
24 Vessel Traffic Management Plans and Marine Shipping Emergency Response Outreach
25 Program;
- 26 • The EAO is recommending as KMMs under CEAA 2012 a Vessel Traffic Management Plan
27 that would require TJLP to incorporate contractual measures to support participation of
28 TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown initiatives and
29 annual reporting on TJLP's participation in regional environmental management
30 measures and cumulative effects monitoring to protect SRKW, where feasible; and
- 31 • While the EAO is of the view that the potential impacts on Pachedaht First Nation's
32 fishing rights have been avoided, minimized, and accommodated to the extent possible
33 for the purposes of the EA, the EAO also recognizes that there are outstanding impacts,

1 in particular regarding cumulative effects, and these outstanding impacts are reflected
2 in the EAO's conclusions in Part B and Part C for TMJ.

3 **16.3 DITIDAHT FIRST NATION**

4 **16.3.1 COMMUNITY PROFILE**

5 Ditidaht means “people of *diitiida*.” *Diitiida* was a village at the mouth of the Jordan River (now
6 in Pacheedaht territory) from which the Ditidaht migrated. Ditidaht First Nation traditional
7 territory is located on the west coast of Vancouver Island, stretching from the lands and waters
8 between Bonilla and Pachena Points, extending inland to include Nitinaht and Cowichan Lakes,
9 and extending offshore into the Strait of Juan de Fuca to where it meets the Pacific Ocean and
10 as far as the mountains of Vancouver Island. Ditidaht First Nation assert that they have
11 continuously and extensively occupied their territory since time immemorial and continue to
12 maintain active spiritual connections to their lands and waters. Marine resources were central
13 to the pre-Contact Ditidaht diet and economy. Reserves at Ditidaht were established to ensure
14 access to fishing areas but encompass only a fraction of Ditidaht First Nation territory. Ditidaht
15 First Nation has reported that fisheries regulations and park creation later prevented
16 commercial fishing and limited their rights.

17 As of November 2021, the registered Ditidaht First Nation population was 776 people (168
18 living on their own reserve, 544 living off the reserve and 64 living on other reserves)²³⁹, while
19 the pre-contact population was approximately 30,000 people. Ditidaht First Nation has noted
20 that, since contact, cumulative effects have adversely affected their people, territory, and
21 rights. These include introduced disease, Indian Reserve creation, loss of language and culture
22 through Indian Residential Schools and the Potlatch Ban, industrial logging, park creation, and
23 fishing regulations and industrial fisheries.

24 The Ditidaht First Nation's traditional role is as stewards of their marine territory, which is
25 integral to their rights, culture, spirituality, and livelihoods. Ditidaht First Nation's traditional,
26 spiritual, holistic resource management system called *ooch-ah-uk*, means “to take care of,” and
27 stipulates that you harvest only what the resource can support and that you switch harvests
28 between more abundant species. Ditidaht First Nation view whales as supernatural creatures;
29 whaling was a ritualized, ceremonial, and spiritual practice. Humpback, grey, and northern right

²³⁹ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Ditidaht First Nation. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=662&lang=eng, accessed December 16, 2021.

1 whales were Ditidaht First Nation's preferred species. Commercial whaling increased in the
2 early 1900s, causing a sharp decline in local whale populations and an end to Native whaling.

3 Ditidaht First Nation express their rights to self-governance, self-determination, and Aboriginal
4 title and anticipate future Treaty Rights. Ditidaht First Nation consider that they hold the rights
5 and responsibilities that come with being the traditional stewards of their marine territory,
6 including the right to make management decisions respecting the sustainable harvest of marine
7 resources. Ditidaht First Nation has stated that they have Aboriginal rights and title to their
8 traditional territory, including *łušiiʔaaʔaaq* (Swiftsure Bank), Nitinat Narrows, and the tidal
9 Nitinat Lake. These areas are the basis for Ditidaht First Nations's way of life, rights, culture,
10 economy, and passing on of culture and identity to future generations. Staple foods include
11 salmon, halibut, groundfish, mussels, barnacles, sea urchins, whale, seal, deer, moose, elk,
12 roots, fruits, and berries. Food is harvested based on the season, preserved for the winter, and
13 surpluses exchanged through redistribution in a seasonal round that continues today. Fishing
14 and seafood gathering, both for commercial, food, social, and ceremonial purposes, are critical
15 for Ditidaht First Nation's economy, active expressions of Ditidaht First Nation culture and
16 identity, and tied to sacred and storied landscapes. Ditidaht First Nation has stated that it has
17 the right to access and eat traditional foods and engage in place-based cultural practices.

18 Swiftsure Bank is a crucial and preferred site for marine harvesting and travel for Ditidaht First
19 Nation and is renowned for ecological abundance and cultural values. Ditidaht First Nation
20 people exercise their Aboriginal fishing rights at Swiftsure Bank, which is key to the spiritual,
21 social, ceremonial, and economic aspects of Ditidaht First Nation life. The MSA noted that
22 Ditidaht First Nation share this area with Pacheedaht and the Makah Tribe from Neah Bay (USA)
23 under established protocols.

24 The MSA included details on a Ditidaht First Nation traditional marine use and occupancy study
25 prepared for the TMX process. The Study noted use throughout their territory in areas
26 overlapping the TMJ MSA area and pointed to the way colonization has affected the way
27 Ditidaht First Nation practice their rights and culture and also shows their active and spiritual
28 connection to their lands and marine territory.

29 Ditidaht First Nation is currently in the BC Treaty negotiation process (negotiating at a common
30 table with Pacheedaht). Of the six-stage process, Ditidaht First Nation is in stage 5 (Negotiation
31 of an Agreement-in-Principle) of the BC Treaty process. Negotiations are ongoing and aim to
32 conclude on an agreement in principle with Canada and BC. Ditidaht First Nation have identified
33 that marine management is a significant issue in their discussions within Treaty Negotiations.

1 **16.3.2** **DITIDAHT FIRST NATION INVOLVEMENT IN THE CONSULTATION** 2 **PROCESS**

3 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
4 sent a letter to these groups, inviting comments on the draft Section 13 Order, including
5 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
6 EAO amended the geographic scope for the assessment of the marine shipping route under a
7 Section 13 Order and added the Indigenous groups identified in Schedule D which included
8 Ditidaht First Nation. For the review of the MSA, the EAO led consultation activities with the
9 Indigenous groups identified in Schedule D and, as part of this work, invited Ditidaht First
10 Nation to participate in the Marine Shipping Working Group. The EAO is of the view that it has
11 approached consultation with Ditidaht Nation at the deeper end of the spectrum, with the
12 intent to identify potential impacts and consider ways to address any potential impacts to
13 Aboriginal Interests that were identified by Ditidaht Nation within the MSA area.

14 As part of the Marine Shipping Working Group, the EAO invited Ditidaht Nation to review and
15 provide comments on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report
16 (including Part C of the Assessment Report), the draft CPD, draft Certificate Conditions and
17 recommended KMMs under CEAA 2012. As part of the Marine Shipping Working Group,
18 Ditidaht Nation was invited to participate in Marine Shipping Working Group meetings and
19 teleconferences during the MSA Supplemental Analysis Review stages. The EAO and TJLP met
20 with Ditidaht First Nation during the MSA review to discuss the EA process, and any potential
21 concerns with TMJ.

22 **16.3.3** **POTENTIAL IMPACTS TO ABORIGINAL INTERESTS**

23 The following sections focus on potential impacts of TMJ to Ditidaht First Nation's Aboriginal
24 Interests, and mitigations and accommodations to address potential impacts. Information
25 related to the EAO's impact assessment methods is provided in [Section 12.2](#) of this Report. The
26 EAO considered information available, including from public sources as well as relevant issues
27 raised by Ditidaht First Nation and members during the EA process (e.g., in meetings), in the
28 following assessments of the potential impacts of TMJ on Ditidaht First Nation's Aboriginal
29 Interests.

30 **A. POTENTIAL IMPACTS ON FISHING**

31 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
32 summary of this in [Section 13.3.1](#). In addition, the EAO considered relevant information related
33 to the potential shipping-related effects based on review of the RBT2 Panel and TMX EA

1 processes. The EAO is satisfied that the key impacts to biophysical components resulting in
2 changes to fish quantity and quality, changes in access to fishing resources, and changes to
3 social, cultural, and spiritual values associate with traditional fishing activities that apply to
4 Ditidaht First Nation are summarized in [Section 13.3.1](#).

5 The MSA noted that Ditidaht First Nation harvests a wide variety of shellfish and fish in
6 traditional fishing grounds throughout their territory. Key traditional fishing grounds in and
7 around the shipping lanes include Swiftsure bank (overlaps shipping lanes), Carmanah Point and
8 Bonilla Point (close to shipping lanes – however it does not require crossing the shipping lanes
9 to access these latter two areas). The EAO notes the RBT2 Panel Report (2020) included
10 information about Ditidaht First Nation’s concerns about safety on the water as a result of large
11 vessels due to wave wake and how Ditidaht First Nation has already changed their fishing
12 practices to avoid collisions.

13 During the MSA review for TMJ, Ditidaht First Nation raised concerns related to accidents and
14 environmental emergency spill response preparedness with respect to shipping LNG and posed
15 questions about TJLP’s role in spill response. The EAO has also noted Ditidaht First Nation
16 concerns through the RBT2 process with respect to accidents and emergency spill response,
17 and contamination of the food chain due to shipping-related spills that could impact their
18 members’ health and wellbeing.

19 During the MSA review, TJLP provided through dialogue with Ditidaht First Nation more
20 information about potential risks associated with TMJ shipping-related accidents and
21 malfunctions for TMJ, including that the response in the very unlikely event of an LNG spill
22 would involve different firefighting techniques and LNG is a non-persistent hazardous noxious
23 substance. TJLP also described their role and the role of third-party responder like Western
24 Canada Spill Response in responding to the unlikely event of a bunker oil-related spill.

- 25 • The EAO is recommending development of a Marine Shipping Emergency Response
26 Outreach Program as a KMM under CEAA 2012 that would be scoped to the MSA area,
27 to facilitate the integration of plans for responding to incidents in transit into existing
28 emergency response systems, primarily the CCG’s Incident Integrated Response Plans.
- 29 • The EAO is aware that for TMJ, Ditidaht First Nation consider having access to the
30 correct equipment and training for Ditidaht First Nation vessel operations is high
31 priority, and there is lower interest in information sharing about ship schedules. As
32 mentioned above, the EAO’s recommended KMM under CEAA 2012 for the Marine
33 Shipping Emergency Response Outreach Program would include requirements for the
34 delivery or arrangement by TJLP for LNG safety related courses for Indigenous Groups
35 who may request training.

1 Additional issues and concerns with potential impacts related to fishing were raised by Ditidaht
2 First Nation during the EAs of RBT2 and TMX. These concerns were not raised by Ditidaht First
3 Nation during the TMJ EA but the EAO considers them applicable to the MSA area. During the
4 MSA review for TMJ, Ditidaht First Nation noted that their shipping-related concerns raised for
5 RBT2 were similar for TMJ.

- 6 • Concern regarding the impacts of commercial vessels travelling through Ditidaht First
7 Nation's marine territory on fishing rights. Ditidaht First Nation expressed that the area is
8 approaching tipping point where people no longer feel safe to go out and fish, which then
9 has an effect on knowledge transfer. Ditidaht First Nation's identified that elders or youth
10 are seldomly brought to Swiftsure Bank, which is deteriorating the traditional
11 intergenerational transfer of knowledge concerning fishing at the Swiftsure Bank and this
12 has created significant risks and threats to Ditidaht First Nation's use and interests.
 - 13 ○ The EAO respectfully acknowledges Ditidaht First Nation's worldview and
14 perspective that there are currently existing cumulative effects which have
15 already affected Ditidaht First Nation's ability to exercise their fishing rights as
16 preferred within Ditidaht First Nation's asserted traditional territory. In the
17 Current Use in Part B of this Report the EAO concluded that TMJ would have the
18 potential to contribute significant cumulative effects (that already occur at
19 baseline) to access and the experience of current use for fishing for Ditidaht First
20 Nation at Swiftsure bank. The EAO predicts TMJ shipping activities could result in
21 short-duration interruptions to Ditidaht First Nation access and experience of
22 current use for fishing occurring regularly during operations (30 years minimum).
 - 23 ○ The EAO considers that the safety of small vessels with large vessels and wake
24 effects were assessed in the Accidents and Malfunctions Section of Part B and
25 that the regular and relatively short-duration passage of TMJ-related vessels
26 through the Salish Sea would include monitoring of compliance with maritime
27 regulations and legislation such as the *Canada Shipping Act* and the Collision
28 Regulations.
 - 29 ○ TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
30 limited beyond TMJ's marine terminal area (including the location and operation
31 of international shipping lanes), but TJLP has committed to a Marine
32 Communication Plan out to 12 nm that would be developed in consultation with
33 Schedule B and D Indigenous Groups and include a communication procedure to
34 inform Indigenous Groups of vessel schedules and provide a complaint
35 submission process.
 - 36 ○ With respect to TMJ-specific mitigations measures, the EAO acknowledges that
37 these would not reduce impacts for baseline conditions and/ or impact of future

1 projects, which are a source of issues for many Indigenous Groups. The EAO also
2 considers that the TMJ-specific mitigation measures would not reduce impacts
3 to quality of experience because some Indigenous people may find the presence
4 and sounds of LNG carriers disturbing for safety and/or aesthetic reasons, or for
5 other reasons. The EAO acknowledges that shipping-related access interruptions
6 and concerns about safety could then lead to reduced opportunities for cultural
7 transmission, including Indigenous language acquisition by younger generations
8 while undertaking traditional harvesting activities on land or on the water, and in
9 particular, while fishing.

- 10 ○ The EAO notes that existing regional Government of Canada initiatives
11 associated with the OPP (i.e., CEMS, EMSA and CPFP) and accommodations
12 originating from TMX (i.e., CDCR, SSI and MSET) are designed to improve
13 Indigenous community's engagement participation in marine safety systems in
14 Canada and may collectively reduce effects within the region. Although these
15 initiatives are not TMJ-specific, the EAO recognizes that these programs are
16 working towards a better understanding of cumulative effects in the Salish Sea
17 and illustrate the substantial efforts that are being undertaken by the Crown in
18 relation to past and future impacts that contribute to the "current state".

19 Conclusion

20 The EAO predicts that TMJ-related marine shipping effects would have a negligible-to-minor
21 impact on Ditidaht First Nation's right to fish. The EAO considers TMJ-related increases to vessel
22 traffic during operations would be incremental compared to existing baseline conditions of the
23 established Traffic Separation Scheme in the Salish Sea. However, in consideration of the
24 available information; the EAO's consultation with Ditidaht First Nation; Ditidaht First Nation's
25 engagement with TJLP; TJLP's commitments; the EAO's proposed EAC conditions if an EAC is
26 issued; and the recommended KMMs under CEAA 2012, the EAO concludes that TMJ-related
27 marine shipping effects combined with cumulative effects in the MSA area is expected to result
28 in a moderate-to-serious impact on Ditidaht First Nation's right to fish. The EAO predicts that
29 TMJ-related shipping activities during operations would interact with current baseline levels of
30 cumulative effects to access to fishing areas and the experience of fishing in, or adjacent to, the
31 shipping lanes. These cumulative effects in the MSA area combined with the importance of
32 Swiftsure Bank as the key fishing area for Ditidaht First Nation and the location of the shipping
33 lanes overlapping this area increase the seriousness of impact of TMJ on Ditidaht's First
34 Nation's right to fish.

35 The EAO considered Ditidaht First Nation's perspectives on cumulative effects and Ditidaht First
36 Nation's ability to meaningfully practice their fishing rights in the MSA area. The EAO
37 acknowledges that there are already vessels transiting the shipping lanes which can impact
38 Indigenous fishers' access to and quality of experience of fishing. While the EAO recognizes

1 there is some uncertainty when considering how cumulative effects impact Aboriginal Interests,
2 the EAO agrees with Ditidaht First Nation, that any increase in vessel traffic at Swiftsure Bank
3 would potentially be more serious when combined with past, present and reasonably
4 foreseeable shipping activities.

5 The key factors that were considered in support of the EAO's conclusion on the impacts to the
6 right to fish are summarized as follows:

7 **Biophysical:**

- 8 • The EAO's conclusions in the Fish and Fish Habitat chapter in Part B which does not
9 predict any residual effects to fish and fish habitat in the MSA area; and
- 10 • The MSA area, including Swiftsure bank, is a heavily utilized marine environment with
11 occasionally high levels of marine traffic in the shipping lanes.

12 **Geospatial:**

- 13 • Swiftsure bank is intersected by shipping lanes, where cumulative effects from shipping
14 traffic is a constraint on Ditidaht First Nation's ability to exercise their fishing rights,
15 including both direct and indirect impacts to access, safety, and quality of experience;
- 16 • While Ditidaht First Nation has identified fishing sites that do not require crossing the
17 shipping lanes to access, Swiftsure Bank is a prime resource harvesting location and
18 important site for knowledge transfer for Ditidaht First Nation;
- 19 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
20 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
21 Separation Scheme of the Salish Sea;
- 22 • The EAO's conclusions in the Current Use of Part B that TMJ-related vessel transits
23 during operations (minimum 30 years) would result in negligible to low magnitude
24 effects due to relatively infrequent and short-duration interruptions to access to areas
25 in the Salish Sea; and
- 26 • The predicted overlap of TMJ-related shipping activities with cumulative effects from
27 current and reasonably foreseeable shipping activities that would further constrain
28 Ditidaht First Nation's ability to exercise their fishing rights, such that impacts may be
29 compounded at Swiftsure Bank.

30 **Social, Cultural and Experiential:**

- 31 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
32 traffic during operations affecting visual quality, noise, and vessel wake (with an
33 increasing magnitude of effect the closer one is to the vessels);

- 1 • Ditidaht First Nation’s concerns about safety on the water as a result of large vessels
2 due to wave wake that have caused Ditidaht First Nation to already change their fishing
3 practices to avoid collisions; and
- 4 • The predicted overlap of TMJ-related shipping activities with cumulative effects from
5 current and reasonably foreseeable shipping activities that would further constrain
6 Ditidaht First Nation’s ability to exercise other cultural, social, and experiential
7 components of their fishing rights, including intergenerational knowledge transfer, such
8 that impacts may be compounded at Swiftsure Bank.

9 **Mitigations:**

- 10 • Proposed mitigations for impacts to Ditidaht First Nation’s right to fish include the
11 Marine Communications Plan recommended as KMMs under CEAA 2012; and
- 12 • The EAO acknowledges that these mitigation measures would not reduce impacts for
13 baseline conditions and/ or impact of future projects, which are a source of issues for
14 many Indigenous Groups.

15 In addition to Canada’s marine safety and security system, The EAO notes that existing
16 regional Government of Canada initiatives associated with the OPP (i.e., CEMS, EMSA and
17 CPFPP) and accommodations originating from TMX (i.e., CDCR, SSI and MSET) are designed to
18 improve Indigenous communities engagement participation in marine safety systems in
19 Canada and may collectively reduce effects within the region (See [Section 13.1.1](#) of this
20 Report). However, the EAO acknowledges that these programs are broad in nature and are
21 not intended to mitigate or accommodate for the specific potential impacts to Indigenous
22 mariners and fishers navigating in proximity to TMJ vessels within the established Traffic
23 Separation Scheme of the Salish Sea. The Crown is committed to working with Indigenous
24 people in shaping the initiatives to better understand cumulative effects in the Salish Sea,
25 support informed decision-making, and the development of potential measures to manage
26 cumulative effects by the ongoing collection and analyses of targeted data with Indigenous
27 communities

28 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

29 The EAO evaluated the potential effects on hunting, trapping and gathering rights attributable
30 to TMJ in [Section 13.3.2](#) above that apply broadly to Indigenous Groups. The EAO is satisfied
31 that the key impacts to biophysical components resulting in changes to wildlife and vegetation
32 quantity and quality, changes in access to hunting, trapping and gathering areas, and changes
33 to social, cultural, and spiritual values associated with traditional hunting, trapping and
34 gathering activities that apply to Ditidaht First Nation are summarized in [Section 13.3.2](#).

1 Ditidaht First Nation did not raise specific issues and concerns with potential TMJ impacts
2 related to Ditidaht First Nation's rights to hunt, trap and gather during the TMJ EA.

3 The MSA noted a variety of bird species that Ditidaht First Nation harvested for traditional
4 purposes including mallard duck and other intertidal birds, surf scoter, common merganser,
5 bufflehead duck, common goldeneye, Canada goose, brant, and trumpeter swan. The MSA
6 noted that surf scoter is a traditional winter staple in the diet and Goldeneye is also a favoured
7 species.

8 **Conclusion**

9 In consideration of the available information in [Section 13.3.2](#), which outlines the potential
10 effect to hunting, trapping and gathering; consultation with Ditidaht First Nation; Ditidaht First
11 Nation's engagement with TJLP; TJLP's commitments; the EAO's proposed EAC conditions if an
12 EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected to result in
13 negligible impact on Ditidaht First Nation's right to hunt, trap and gather.

14 The key factors that were considered in support of the EAO's conclusion on the impacts to the
15 right to hunt, trap and gather included the EAO's conclusions on adverse residual effects to
16 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
17 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
18 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
19 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
20 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
21 Heads to the 12 nm territorial limit.

22 To mitigate potential impacts to Ditidaht First Nation's right to hunt, trap and gather, the EAO is
23 recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
24 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
25 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
26 considered that the small relative increase due to TMJ-related vessel traffic would have a
27 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
28 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
29 Regulations and Legislation regulating vessel noise and lighting.

30 **C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS**

31 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
32 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
33 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
34 pathways to impacts based on review of publicly available information from RBT2 and TMX
35 processes, and any information provided by Indigenous Groups during the MSA review. The

1 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
2 experience and SRKWs would be the pathways to impacts to Ditidaht First Nation's other
3 traditional and cultural interests.

4 The MSA reported that orcas hold a particular spiritual significance to Ditidaht First Nation and
5 are revered as sacred. The MSA explained that the sites and species Ditidaht First Nation rely on
6 for traditional purposes and the language, named places and other traditional knowledge
7 associated with them create a link to Ditidaht First Nation territory and identity. Ditidaht First
8 Nation have noted that shipping traffic constrains traditional activities and hinders the
9 transmission of knowledge regarding harvesting techniques. At Swiftsure Bank, the RBT Panel
10 Report (2020) noted that safety concerns were already impacting Ditidaht First Nation's use of
11 the area and were stopping members from bringing their children and youth there. This was
12 creating lost opportunities to teach traditional knowledge.

13 The MSA reported on travel routes that overlap with the shipping lanes including an anchorage
14 and two maritime travel routes that cross the Strait of Juan de Fuca (one from Bonilla Point to
15 Neah Bay and the other from Port Renfrew to Neah Bay). There are other marine travel sites in
16 the MSA (e.g., along Ditidaht's territorial shoreline and within Nitinat Lake). The MSA noted
17 that there were hundreds of cultural sites across the MSA including aquatic and land resource
18 sites (such as fishing, hunting and seafood gathering, trapping, water supply, plant gathering)
19 cultural history sites (e.g., burial sites conflict, reserves, Legendary Being, marker sites,
20 pictograph/petroglyph, sacred and ceremonial, traditional history), settlement activity sites
21 (e.g., burial and dwellings), archaeology sites and travel sites (such as canoe and anchorage
22 points). Ditidaht has explained these sites are integral to their culture and connect them to the
23 landscape.

24 Ditidaht First Nation raised the following concerns regarding potential impacts related to
25 traditional and cultural interests due to TMJ:

- 26 • Concern regarding impact of spill in Ditidaht First Nation territory adversely affecting
27 availability, quality, and safety for the exercise of Ditidaht First Nation's Aboriginal rights
28 and culture.
 - 29 ○ As described in the Accidents and Malfunctions Section of this Report, the MSA
30 predicted TMJ would have moderate residual risk of LNG release causing SRKWs
31 mortality or irreversible damage to heritage resources, which were considered to
32 result in high severity of consequences. However, the likelihood of such an event
33 occurring was estimated to be extremely rare as the release would need to occur
34 in the vicinity of a SRKWs or heritage resource.
 - 35 ○ The EAO concluded in the Fish and Fish Habitat Section of this Report that TMJ
36 would not result in any residual effects to fish or fish habitat in the MSA area.

- 1 ○ TJLP has stated that TMJ’s influence on TMJ-related vessel operations would be
2 limited beyond TMJ’s marine terminal area, but TJLP is committed to developing
3 a Marine Shipping Emergency Response Outreach Program that would facilitate
4 the integration of plans for responding to incidents in transit into existing
5 emergency response systems, primarily the CCG’s Incident Integrated Response
6 Plans.

7 **Conclusion**

8 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
9 impacts on Ditidaht First Nation’s other cultural and traditional interests, although the EAO
10 acknowledges that there is uncertainty in the relationship between incremental increases in
11 shipping, the availability of cultural resources such as SRKW and impacts to cultural interests.
12 The EAO considers TMJ-related increases to vessel traffic in the established Traffic Separation
13 Scheme of the Salish Sea during operations would be incremental compared to existing
14 baseline conditions. However, in consideration of the available information, the EAO’s
15 consultation with Ditidaht First Nation, Ditidaht First Nation’s engagement with TJLP, TJLP’s
16 commitments, the EAO’s proposed EAC conditions if an EAC is issued, and the recommended
17 KMMs under CEAA 2012, TMJ-related marine shipping effects combined with cumulative
18 effects in the MSA area is expected to result in moderate-to-serious impacts on Ditidaht First
19 Nation’s other traditional and cultural interests. The EAO predicts that TMJ-related marine
20 shipping activities during operations would overlap with current baseline levels of cumulative
21 effects to underwater noise to culturally important SRKWs and access to and quality of
22 experience for cultural-use areas in, or adjacent to, the shipping lanes. These cumulative effects
23 in the MSA area combined with the importance of Swiftsure Bank as a key cultural area for
24 Ditidaht First Nation and the location of the shipping lanes overlapping this area increase the
25 seriousness of impact of TMJ on Ditidaht First Nation’s other cultural and traditional interests.

26 The EAO considered Ditidaht First Nation’s perspectives on cumulative effects and Ditidaht First
27 Nation’s ability to access and use Swiftsure Bank for other cultural and traditional activities,
28 including transmission of knowledge regarding harvesting techniques and use of travel routes
29 or traditional forms of transportation (i.e., dugout canoes). The EAO acknowledges that there is
30 already many vessels transiting the shipping lanes which can impact access and quality of
31 experience for other cultural and traditional purposes. While the EAO recognizes there is some
32 uncertainty when considering how cumulative effects impact Aboriginal Interests, the EAO
33 considers, that any increase in vessel traffic at Swiftsure Bank would potentially be more
34 serious to Ditidaht First Nation’s other cultural and traditional interests when combined with
35 past, present and reasonably foreseeable shipping activities.

1 The EAO notes several Federal regional initiatives and measures have been implemented to
2 better understand and manage cumulative effects on the recovery of SRKWs and (listed in
3 [Section 13.1.1](#)). The EAO also understands there are eligible opportunities for
4 Ditidaht First Nation's participation in the Whales Initiative's TSS Feasibility Study, CEMS, MSET,
5 CDCR or the Indigenous and Multi-Stakeholder Advisory Group and Technical Working Groups
6 for the Salish Sea Initiative. For some initiatives funding is available through the OPP's CFPF.
7 The EAO notes that these programs are broad in nature and are not intended to mitigate or
8 accommodate for the specific potential impacts to Indigenous mariners and fishers navigating
9 in proximity to TMJ vessels within the established TSS of the Salish Sea.

10 The key factors that were considered in support of the EAO's conclusion on the impacts to
11 other traditional and cultural interests are summarized as follows:

12 **Cultural and Heritage Resources:**

- 13 • The EAO's conclusions in Part B of this Report found no residual effects to Heritage
14 Resources (7.1) from erosion due to wake effects along the shorelines of the MSA area;
- 15 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
16 moderate magnitude residual effects on marine mammals and significant cumulative
17 effects to SRKWs due to underwater vessel noise; and
- 18 • The MSA area, including Swiftsure bank, is a heavily utilized marine environment with
19 occasionally high levels of marine traffic in the shipping lanes.

20 **Geospatial:**

- 21 • Swiftsure Bank is a key area for cultural activities including the transmission of
22 knowledge and the shipping lanes go through a portion of Swiftsure Bank;
- 23 • Ditidaht First Nation conduct journeys across the shipping lanes to maintain kinship ties,
24 trade, and other cultural practices at Neah Bay in the United States;
- 25 • The EAO's conclusions in the Current Use chapter of Part B that the incremental increase
26 (i.e., 0.2 - 1.1 percent% for segments A – D) due to TMJ-related vessel transits during
27 operations (minimum 30 years) would result in negligible to low magnitude effects due
28 to relatively infrequent and short-duration interruptions to access to fishing areas in the
29 Salish Sea compared to existing baseline conditions; and
- 30 • The predicted overlap of TMJ-related shipping activities with cumulative effects from
31 current and reasonably foreseeable shipping activities that would further constrain
32 Ditidaht First Nation's ability exercise other cultural and traditional practices, such that
33 impacts may be compounded at Swiftsure Bank

1 **Social, Cultural, Experiential:**

- 2 • Potential negligible to low impacts from the incremental increase due to TMJ-related
3 vessel traffic during operations affecting visual quality, noise, and vessel wake (with an
4 increasing magnitude of effect the closer one is to the vessels;
- 5 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
6 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
7 Part B; and
- 8 • SRKWs plays an important role in Ditidaht First Nation culture.

9 **Mitigations:**

- 10 • Proposed mitigations for potential impacts to traditional and cultural interests are the
11 recommended key mitigations under CEAA 2012 for Marine Communications and Vessel
12 Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
13 Program;
- 14 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
15 Plan that would require TJLP to incorporate contractual measures to support
16 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
17 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
18 participation in regional environmental management measures and cumulative effects
19 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
20 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
21 Banks, Haro Strait and Boundary Pass; and
- 22 • The EAO acknowledges that these mitigation measures would not reduce impacts for
23 baseline conditions and/ or impact of future projects, which are a source of issues for
24 many Indigenous Groups.

25 **16.4 PAUQUACHIN FIRST NATION**

26 **16.4.1 COMMUNITY PROFILE**

27 BOKÓCEN (Pauquachin) First Nation, meaning “Earth bluff”, is one of five members of the
28 W̱SÁNEĆ (Saanich) Nation, along with the Tsawout First Nation, Tsartlip First Nation, Tseycum
29 First Nation, and Malahat First Nation. W̱SÁNEĆ is part of the larger Coast Salish cultural group
30 which has occupied the Gulf of Georgia continuously for thousands of years. Pauquachin First
31 Nation is a small community located on the western side of the Saanich Peninsula on Vancouver

1 Island. As of November 2021, Pauquachin First Nation had a registered population of 415
2 people (230 living on own reserve, 150 living off reserve and 35 living on other reserves)²⁴⁰.

3 From time immemorial, Pauquachin First Nation villages faced the sea along Vancouver Island's
4 shores; the ocean was their front door, breadbasket, and foundation of their economies, laws,
5 customs, and myths. Before contact, the W̱SÁNEĆ Nations were a single group of extended
6 families sharing the SENĆOŦEN language and a cultural order revolving around their relations
7 with marine creatures, spirit beings, and one another. The relationship of the W̱SÁNEĆ with
8 their marine environment drives their society, health, economy, culture, and identity.

9 XWSANETS (Saanich Peninsula) is the "homebase" of the W̱SÁNEĆ. It derives its name from the
10 image presented to paddlers in a canoe as they approach from the water, meaning "raised up"
11 or "emerging people." The naming practice based on the perspective of the water reveals the
12 fundamental nature of marine territory to the W̱SÁNEĆ worldview which sees nature as a
13 source of supernatural powers and considers food a sacred gift from these powers. All living
14 things were relatives, transformed and given to the W̱SÁNEĆ as gifts; salmon were thus
15 addressed as "Elder brother." The W̱SÁNEĆ view themselves as equal to and inseparable from
16 the environment. This is the basis of the W̱SÁNEĆ stewardship system based on respect for and
17 spiritual connection to salmon and KELŁOLEMEĆEN (orcas), the earth, and each other, allowing
18 the W̱SÁNEĆ to thrive for millennia. One ritual the W̱SÁNEĆ practiced demonstrating respect
19 was to release some salmon to ensure they could return home and allow their lineages to
20 continue.

21 W̱SÁNEĆ families had permanent winter settlements on the Saanich Peninsula and temporary
22 settlements throughout the San Juan and southern Gulf Islands and across the Salish Sea to
23 Point Roberts and Boundary Bay. This territory is defined by the pursuit of the five salmon
24 species and steelhead and is where the W̱SÁNEĆ have continuous and exclusive use and
25 occupation since time immemorial. The 1987 Saanich Declaration describes W̱SÁNEĆ territory
26 as "[encompassing] all [their] Spiritual Places, medicine and fruit gathering places, fishing
27 stations, hunting and trapping areas, winter and summer homesites, burial sites, meditation
28 places and all our territories in between these places." W̱SÁNEĆ families exploited different
29 ecological niches, had tailored seasonal movements, and shared resources with each other in a
30 reciprocal system. The W̱SÁNEĆ had reef net fishing sites throughout their territory, with the

²⁴⁰ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Pauquachin First Nation, https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=652&lang=eng, accessed December 16, 2021.

1 Nation's largest immemorial reef net claim at Point Roberts and another on ŚNEWIL (the Fraser
2 River).

3 Pauquachin First Nation has Douglas Treaty Rights to hunt over unoccupied lands and carry on
4 their fisheries "as formerly". The WŚÁNEĆ signed the Douglas Treaty (1852) during a time of
5 escalating tension between the WŚÁNEĆ and white settlers. The WŚÁNEĆ viewed the treaty as
6 a peaceful agreement between two nations that would ensure the continuation of WŚÁNEĆ
7 fisheries, lifestyle, culture, resource management and governance systems as formerly. By the
8 mid-19th century, most WŚÁNEĆ families had relocated to Saanichton Bay due to disease spread
9 by European contact, raids from northern First Nations, and land pre-emptions by white
10 settlers. This is when the village site Pauquachin First Nation was founded or reoccupied on
11 Cole Bay.

12 The Pauquachin First Nation use the Salish Sea to hunt, fish, gather, travel, and harvest which
13 varies according to the season and traditional WŚÁNEĆ calendar. Marine foods are the
14 preferred Pauquachin First Nation diet (including clams, oysters, mussels, and chitons), for
15 subsistence, health, and spiritual reasons. Some WŚÁNEĆ continue to earn a living and feed
16 their communities through fishing. The WŚÁNEĆ continue to gather seaweed and hunt deer and
17 ducks on islands near the shipping lanes. Herring and herring roe were traditionally harvested in
18 the area but at lower levels now due to frequent ship traffic. Bivalves play a significant role in
19 feeding the community as well as sea urchin, but Pauquachin First Nation have noted that they
20 are now unfortunately unavailable in many locations.

21 The Coast Salish are sometimes called the "salmon people" due to heavy reliance on salmon for
22 seasonal rounds and cultural practices. FEKI (sockeye) is the most prized species of the Coast
23 Salish. Fish were caught using the unique reef net, as well as gaffs, harpoons, and dip and trawl
24 nets. Reef net fishing is a way of life and is part of the WŚÁNEĆ identity. It plays a central role in
25 WŚÁNEĆ cosmology, seasonal round, and societal organization, and demonstrates the continual
26 use of salmon by the WŚÁNEĆ since time immemorial. Reef nets were outlawed by the
27 Canadian government in 1916 but the WŚÁNEĆ are now working to revive this sacred fishery.

28 Throughout their traditional territory, the Pauquachin First Nation have travel routes and
29 burial, cultural, heritage, and spiritual sites, as well as traditional knowledge which bears
30 evidence of the long residency of the WŚÁNEĆ people. Pauquachin First Nation have reported
31 that these sites are vulnerable to disturbance. Pauquachin First Nation's view is that cumulative
32 effects such as declining runs, environmental degradation and pollution, fishing regulations,
33 and vessel wakes are barriers limiting harvest, violating Pauquachin First Nation's Douglas
34 Treaty and Aboriginal rights and threatening Pauquachin First Nation health. Pauquachin First
35 Nation have noted that in addition to the current polluted state of the Saanich Inlet, many
36 Pauquachin First Nation members report inappropriate treatment by non-Aboriginals when

1 harvesting at traditional sites due to the invisibility of harvesting rights to outsiders, regulations,
2 and licensing.

3 **16.4.2 PAUQUACHIN FIRST NATION INVOLVEMENT IN THE CONSULTATION** 4 **PROCESS**

5 Consultation with Indigenous Groups identified in Schedule D began in July of 2019 when EAO
6 sent a letter to these groups inviting comments on the draft Section 13 Order, including
7 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
8 EAO under the Section 13 Order amended the geographic scope for the assessment of the
9 marine shipping route and added the Indigenous groups identified in Schedule D which
10 included Pauquachin First Nation. For the review of the MSA, the EAO led Consultation
11 Activities with Indigenous Groups in Schedule D and, as part of this work, invited Pauquachin
12 First Nation to participate in the Marine Shipping Working Group. The EAO is of the view that it
13 has approached consultation with Pauquachin First Nation at the deeper end of the spectrum,
14 with the intent to identify potential impacts and consider ways to address any potential impacts
15 to Aboriginal Interests that were identified by Pauquachin First Nation within the MSA area.

16 As part of the Marine Shipping Working Group, the EAO invited Pauquachin First Nation to
17 review and provide comments on TJLP's MSA Supplemental Analysis, the EAO's draft
18 Assessment Report (including Part C of the Assessment Report), the draft CPD, draft Certificate
19 Conditions and recommended KMMs under CEAA 2012. As part of the Marine Shipping
20 Working Group, Pauquachin First Nation was invited to participate in Marine Shipping Working
21 Group meetings during the MSA Supplemental Analysis Review stages. Pauquachin First Nation
22 participated in Marine Shipping Working Group meetings.

23 During the MSA review, Pauquachin First Nation submitted feedback on TJLP's MSA
24 Supplemental Analysis, including concerns that the MSA should be scoped to 200 nm, about
25 inappropriate use of information from the RBT2 process, insufficient assessment of impacts due
26 to LNG carrier spill or accident, and that cumulative impacts of development on the health of
27 the ocean ecosystems should be included in the assessment. Pauquachin First Nation also
28 requested that the MSA should include new studies to understand impacts to Pauquachin First
29 Nation's rights and that TJLP should be required to invest into the long-term health of the
30 ocean. Further information related to concerns raised by Indigenous Group's with respect to
31 scoping of the MSA and reliance on information from RBT2 and TMX processes is provided in
32 [Section 13.2](#) of this Report.

33 During the MSA review, the EAO met directly with Pauquachin First Nation to discuss TMJ, EA
34 process, and any potential concerns with TMJ. Pauquachin First Nation met separately with
35 TJLP in relation to TMJ. The EAO considered Pauquachin First Nation's feedback provided on the

1 MSA and the EAO endeavoured to reflect Pauquachin Nation's concerns and perspectives
2 related to potential impacts to Pauquachin First Nation's Aboriginal Interests due to TMJ and
3 the consultation process in Part C of the Assessment Report.

4 **16.4.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

5 The following sections focus on potential impacts of TMJ to Pauquachin First Nation's Douglas
6 Treaty rights to hunt and fish and other interests. A discussion of the EAO's assessment
7 approach is provided in Impact Assessment Methods of Part C ([Section 12.2](#)).

8 The EAO considered information available, including from public sources as well as relevant
9 issues raised by Pauquachin First Nation and members during the EA process, in the following
10 assessments of the potential impacts of TMJ to Pauquachin First Nation's Douglas Treaty rights
11 and other interests, mitigations and accommodations to address potential impacts.

12 The following sections focus on potential impacts of TMJ to Pauquachin First Nation's Douglas
13 Treaty right to fish and hunt and other interests, mitigations, and accommodations to address
14 potential impacts.

15 **A. POTENTIAL IMPACTS ON FISHING**

16 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
17 summary in [Section 13.3.1](#) of this Report. In addition, the EAO considered relevant information
18 related to the potential shipping-related effects based on review of RBT2 and TMX processes.
19 The EAO is satisfied that the key impacts to biophysical components resulting in changes to fish
20 quantity and quality, changes in access to fishing resources, and changes to social, cultural, and
21 spiritual values associate with traditional fishing activities that apply to Pauquachin First Nation
22 are summarized in [Section 13.3.1](#).

23 The MSA, reporting from information in the traditional marine resource use study for TMX,
24 noted that Pauquachin First Nation still harvest seaweed at Saanich Inlet as well as on James
25 Island and Discovery Island, in Haro Strait, west of the shipping lanes. Pauquachin First Nation
26 harvests clam in Coles Bay (often daily), and on the Southern Gulf Islands (e.g., Pender Island).
27 Pauquachin harvest mussels and fish for salmon, halibut, and cod at a variety of locations near
28 the Gulf Islands and on islands in the USA.

29 Pauquachin First Nation raised the following concerns regarding potential impacts on the right
30 to fish due to TMJ:

- 31 • Concern regarding the potential cumulative impact of TMJ on steelhead, chinook and
32 SRKWs, in relation to land and resources for traditional purposes.
- 33 ○ As discussed in [Section 13.3.1](#), the EAO is recommending KMMs under CEAA

1 2012 for the Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset
2 Plan, and Vessel Traffic Management Plan to address these concerns. The EAO
3 did not predict any residual effects to fish and fish habitat in the MSA area.

4 The EAO understands that during the EAs of RBT2 and TMX, Pauquachin First Nation raised
5 issues and concerns with potential impacts related to fishing, including that shipping may
6 impact Pauquachin First Nation's ability to exercise Aboriginal and Treaty Harvesting rights,
7 efforts to revive a historical reef net fishery and result in potential damage to fishing vessels or
8 gear.

- 9 • As described in the section on Land and Marine Use Part B (Section 8.2), the EAO
10 predicts that infrequent and short duration TMJ-related traffic disruptions would have
11 potential to result in negligible to low magnitude effect to Indigenous access to fishing
12 areas; and
- 13 • TJLP has stated that TMJ's influence on TMJ-related vessel operations would be limited
14 beyond TMJ's marine terminal area (including the location and operation of
15 international shipping lanes), but TJLP has committed to a Marine Communication Plan
16 out to 12 nm that would be developed in consultation with Schedule B and D Indigenous
17 Groups and include a communication procedure to inform Indigenous Groups of vessel
18 schedules and provide a complaint submission process.

19 In consideration of the available information, the EAO's consultation with Pauquachin First
20 Nation, TJLP's commitments, and the EAO's proposed EAC conditions if an EAC is issued and the
21 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor impact
22 on Pauquachin First Nation's right to fish. The EAO considers TMJ-related increases to vessel
23 traffic during operations would be incremental compared to existing baseline conditions in the
24 Traffic Separation Scheme of the Salish Sea.

25 The key factors that were considered in support of EAO's conclusion on the impacts to the right
26 to fish are summarized as follows:

27 **Biophysical:**

- 28 • The EAO's conclusions in the Fish and Fish Habitat chapter in Part B do not predict any
29 residual effects to fish and fish habitat in the MSA area; and
- 30 • The MSA area is a heavily utilized marine environment.

31 **Geospatial:**

- 32 • Pauquachin First Nation harvests marine invertebrates and fishes throughout the MSA
33 area including in areas near to, or requiring crossing of, the shipping lanes;

- 1 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
2 segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
3 Separation Scheme of the Salish Sea; and
- 4 • The EAO’s conclusions in the Current Use of Part B that TMJ-related vessel transits
5 during operations (minimum 30 years) would result in negligible to low magnitude
6 effects due to relatively infrequent and short-duration interruptions to access to areas
7 in the Salish Sea.

8 **Social, Cultural and Experiential:**

- 9 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
10 traffic during operations affecting visual quality, noise, and vessel wake (with an
11 increasing magnitude of effect the closer one is to the vessels); and
- 12 • Potential concerns regarding safety of small vessels with large vessels and wake effects
13 Accidents and Malfunctions and Effects of the Environment, as assessed in the section in
14 Part B.

15 **Mitigations:**

- 16 • Proposed mitigations for impacts to Pauquachin First Nation’s right to fish include the
17 Marine Communications Plan recommended as a KMM under CEAA 2012.

18 **B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING**

19 The EAO evaluated the potential effects on hunting, trapping, and gathering activities
20 attributable to TMJ which apply broadly to Indigenous Groups. These potential effects are
21 summarized in [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical
22 components resulting in changes to wildlife and vegetation quantity and quality, changes in
23 access to hunting, trapping and gathering areas, and changes to social, cultural, and spiritual
24 values associated with traditional hunting, trapping and gathering activities that apply to
25 Pauquachin First Nation are summarized in [Section 13.3.2](#).

26 **Conclusion**

27 In consideration of the available information in [Section 13.3.2](#), which outlines the potential
28 effect to hunting, trapping and gathering; consultation with Pauquachin First Nation;
29 Pauquachin First Nation’s engagement with TJLP; TJLP’s commitments; and the EAO’s proposed
30 EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is
31 expected to result in negligible impact on Pauquachin First Nation’s hunting, trapping and
32 gathering. Based on the study used for TMX, the MSA reported that Pauquachin First Nation
33 hunts ducks at Coles Bay; surf scoter on the beach in East Saanich and within Saanich Inlet from

1 dugout canoe. Pauquachin First Nation gather seagull eggs from Mandarte Island (in Haro
2 Strait, near the shipping lanes). The MSA noted that Pauquachin First Nation reported impacts
3 to hunting from restrictions and regulations relating to licensing and other factors.

4 The key factors that were considered in support of EAO's conclusion on the impacts to the
5 hunting, trapping, and gathering included the EAO's conclusions on adverse residual effects to
6 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
7 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
8 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
9 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
10 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
11 Heads to the 12 nm territorial limit.

12 To mitigate potential impacts to Pauquachin First Nation's right to hunt, trap and gather, the
13 EAO is recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
14 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
15 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
16 considered that the small relative increase due to TMJ-related vessel traffic would have a
17 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
18 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
19 Regulations and Legislation regulating vessel noise and lighting.

20 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

21 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
22 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
23 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
24 pathways to impacts based on review of publicly available information from RBT2 and TMX
25 processes, and any information provided by Indigenous Groups during the MSA review. The
26 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
27 experience and SRKWs would be the pathways to impacts to Pauquachin First Nation's other
28 traditional and cultural interests.

29 The MSA noted, based on the study conducted during TMX, that orcas play an important
30 cultural role in W̱SÁNEĆ culture. The MSA explained that Pauquachin First Nation used a variety
31 of cultural travel routes in the MSA, including a route from Saanich Inlet to Stuart Island that
32 crosses the shipping lanes, in addition to routes in proximity to the shipping lanes. During the
33 RBT2 process Pauquachin First Nation members indicated that they travel all though the Gulf
34 Islands for cultural practices including using a sacred bathing/cleansing site on Tumbo Island.

1 The MSA also noted that Pauquachin First Nation use historical canoe routes from their
2 community through Active Pass (between Mayne Island and Galiano Island) to Point Roberts.
3 The MSA, again referencing the TMX study, noted place names for most of the Gulf Islands and
4 a variety of other islands in the MSA in proximity to the shipping lanes (e.g. D'arcy Island, James
5 Island, Stuart Island – USA, Sucia Island - USA). The MSA reported that Pauquachin First Nation
6 has cultural connections throughout the southern Gulf Islands and San Juan Islands, including
7 harvesting locations, and considers these islands sacred.

8 Pauquachin First Nation also identified that cumulative impacts of development on the health
9 of the ocean is a major concern, including the collapsing steelhead, chinook and SRKW
10 populations, which Pauquachin First Nation considers are signs of an imbalance in the marine
11 environment. Pauquachin First Nation requested that TJLP contribute to supporting the long-
12 term recovery and health of the ocean, such as enhanced tug escorts for LNG carriers or
13 additional investments in government spill response capacity.

- 14 • The EAO acknowledges Pauquachin First Nation's concerns regarding cumulative
15 impacts to the health of the ocean, including potential effects to fish and SRKWs and the
16 entire ecosystem;
- 17 • See [Section 2.2.3](#) for a detailed discussion of the analysis and resolution of concerns
18 related to the effects on whales. As discussed in [Section 2.2.3](#), the EAO concluded that
19 TMJ would not result in significant residual effects to Marine Mammals; however, the
20 EAO notes that the current baseline of cumulative effects to SRKWs are already high and
21 that TMJ would contribute additional residual effects from shipping noise and potential
22 avoidance behaviour by SRKWs to ships, such that cumulative effects to SRKWs are
23 considered significant;
- 24 • TJLP stated their commitment to adhering to the mitigation measures outlined in the
25 MSA and that TJLP adaptive management of mitigation measures would be an essential
26 part of the overall management strategy to promote ocean health. TJLP also stated they
27 have included a requirement that management measures related to SRKWs would be
28 reviewed on an annual basis to determine if changes need to be incorporated into TMJ
29 shipping practices. TJLP also anticipates that tug escorts would be required for LNG
30 vessels in Boundary Pass and Haro Strait; and
- 31 • The EAO is recommending as a KMM under CEAA 2012 a Vessel Traffic Management
32 Plan that would require TJLP to incorporate contractual measures to support
33 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
34 initiatives (or future equivalent), and annual reporting on TJLP's participation in regional
35 environmental management measures and cumulative effects monitoring to protect
36 SRKW, where feasible. The seasonal slowdown initiatives currently request vessels to

1 slow down in key SRKW foraging areas such as Swiftsure Banks, Haro Strait and
2 Boundary Pass. The EAO notes several regional initiatives and measures have been
3 implemented by the Government of Canada to better understand and manage
4 cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

5 During the MSA review, Pauquachin First Nation raised concerns about potential environmental
6 effects from an accident or malfunction, resulting in a spill in the waterways of Pauquachin First
7 Nation's traditional territory and that the Accidents and Malfunctions risk assessment in the
8 MSA failed to provide rationale for the bunker fuel estimate and was limited by assessing a spill
9 at only one location and at one time of year.

- 10
- 11 • In the Accidents and Malfunctions and Effects of the Environment section in Part B, with
12 consideration of the MSA, it was determined that the risk of an LNG or bunker fuel
13 release would have consequence severities ranging from moderate to very high with
14 the very high being on SRKWs and heritage resources and having potentially irreversible
15 effects. However, the likelihood was estimated to be extremely rare as the release
16 would need to occur in the vicinity of these susceptible sites or SRKWs;
 - 17 • TJLP clarified that the lower volume estimate for bunker fuel spill assessment did not
18 affect the MSA, which was conservatively based on the oil spill modelling results
19 performed for TMX, and the modelling results from RBT2 and TMX were qualitatively
20 expanded for the MSA area, which included seasonal variation; and
 - 21 • Marine shipping associated with TMJ would be required to meet the international
22 standards and Canadian regulations set out by Canada's compliance-based marine
23 safety and security system, which is designed to protect life, property, and the marine
24 environment. The EAO is recommending a KMM under CEAA 2012 for a Marine Shipping
25 Emergency Response Outreach Program to facilitate the integration of plans for
26 responding to incidents in transit into existing emergency response systems, primarily
the CCG's Incident Integrated Response Plans.

27 Additional issues and concerns with potential impacts related to traditional and cultural
28 interests were raised by Pauquachin First Nation during the EAs of RBT2 and TMX. These
29 concerns were not raised by Pauquachin First Nation during the TMJ EA but the EAO considers
30 them applicable to the MSA area:

- 31 • Concerned about the impact of accidents or malfunctions on the ability to engage in
32 traditional ceremonies due to impacted water quality or shorelines.
 - 33 ○ As described in the Accidents and Malfunctions Section of this Report the MSA
34 predicted that TMJ would have moderate residual risk of LNG or bunker fuel
35 release causing SRKWs mortality or irreversible damage to heritage resources,

1 which were considered to result in high severity of consequences. However, the
2 likelihood of such an event occurring was estimated to be extremely rare as the
3 release would need to occur in the vicinity of a SRKWs or heritage resources.

- 4 ○ Marine shipping associated with TMJ would be required to meet the
5 international standards and Canadian regulations set out by Canada's
6 compliance-based marine safety and security system, which is designed to
7 protect life, property, and the marine environment.
- 8 ○ The EAO is recommending a KMM under CEAA 2012 for a Marine Shipping
9 Emergency Response Outreach Program to facilitate the integration of plans for
10 responding to incidents in transit into existing emergency response systems,
11 primarily the CCG's Incident Integrated Response Plans.

12 **Conclusion**

13 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
14 impacts on Pauquachin First Nation's other cultural and traditional interests, although the EAO
15 acknowledges that there is uncertainty in the relationship between incremental increases in
16 shipping and the availability of cultural resources such as SRKW. However, in consideration of
17 the available information in [Section 13.2.3](#), consultation with Pauquachin First Nation,
18 Pauquachin First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
19 conditions if an EAC is issued, and the recommended KMMs under CEAA 2012, TMJ-related
20 marine shipping effects combined with cumulative effects in the MSA area is expected to result
21 in moderate-to-serious impact to Pauquachin First Nation's other traditional and cultural
22 interests. The EAO's conclusions of significant cumulative effects to SRKW was a major key
23 factor considered in the EAO's seriousness determination. The EAO notes several regional
24 initiatives and measures have been implemented by the Government of Canada to better
25 understand and manage cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

26 The key factors that were considered in support of EAO's conclusion on the impacts to other
27 traditional and cultural interests are summarized as follows:

28 **Cultural and Heritage Resources:**

- 29 ● The EAO's conclusions in Part B did not predict residual effects on Heritage Resources
30 (7.1) from erosion due to wake effects along the shorelines of the MSA area;
- 31 ● The EAO's conclusions in Part B section on Marine Mammals, which found low to
32 moderate magnitude residual on SRKWs and significant cumulative effects to SRKWs
33 due to underwater noise; and
- 34 ● The MSA area is a heavily utilized marine environment.

1 **Geospatial:**

- 2 • Pauquachin Nation travel all though the Gulf Islands and into the USA for cultural
3 practices including using a sacred bathing/cleansing site on Tumbo Island. Some sites
4 require crossing of the shipping lanes; and
- 5 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
6 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
7 Separation Scheme that would result in negligible to low magnitude effects due to
8 relatively infrequent and short-duration interruptions to access to areas in the Salish
9 Sea.

10 **Social, Cultural, Experiential:**

- 11 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
12 traffic during operations affecting visual quality, noise, and vessel wake (with an
13 increasing magnitude of effect the closer one is to the vessels);
- 14 • Potential concerns regarding safety of small vessels with large vessels and wake effects
15 Accidents and Malfunctions and Effects of the Environment, as assessed in the section in
16 Part B; and
- 17 • SRKWs plays an important role in Pauquachin First Nation culture.

18 **Mitigations:**

- 19 • Proposed mitigations for potential impacts to traditional and cultural interests are the
20 recommended key mitigations under CEAA 2012 for Marine Communications and Vessel
21 Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
22 Program; and
- 23 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
24 Plan that would require TJLP to incorporate contractual measures to support
25 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
26 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
27 participation in regional environmental management measures and cumulative effects
28 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
29 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
30 Banks, Haro Strait and Boundary Pass.

31

32

1 16.5 ESQUIMALT FIRST NATION

2 16.5.1 COMMUNITY PROFILE

3 The traditional territory of Esquimalt First Nation encompasses the lands and waters of Greater
4 Victoria and the western side of San Juan Island. Esquimalt is part of the larger Coast Salish
5 cultural group which has occupied the Gulf of Georgia continuously for thousands of years.
6 Ethnohistoric evidence indicates there is no distinction between the territory of the Esquimalt
7 and Songhees peoples.

8 As of November 2021, Esquimalt First Nation has a registered population of 330, with 165 living
9 on the Esquimalt reserve, 136 living off-reserve, and 29 living on other reserves²⁴¹. Esquimalt
10 First Nation originates from the Lək̓ʷəŋən (*Lekwungun*) Tribes who inhabited their same
11 traditional territory. Esquimalt First Nation speak *Lekwungun* which is considered part of the
12 Northern Straits Salish language family. The Esquimalt are “ocean people,” and rely on balanced
13 ocean ecosystems for their health and economy. Esquimalt First Nation has used and occupied
14 its traditional lands and waters since time immemorial for hunting, fishing, transport, trade,
15 ceremonies, and settlement; this territory and these practices continue to be integral to
16 Esquimalt’s distinctive culture and way of life.

17 Esquimalt First Nation has Douglas Treaty Rights to hunt over unoccupied lands and carry on
18 their fisheries “as formerly.”

19 Esquimalt Harbour is a hunting and fishing area for the community. Species are harvested for
20 sustenance, ceremonial, and commercial purposes. Esquimalt First Nation traditionally
21 harvested aquatic plants but no longer does so due to contamination concerns. Bivalves were
22 harvested along the southern and eastern shoreline of Vancouver Island and in the Saanich
23 Inlet. Clams, especially littleneck and butter clams, are one of the most important food sources
24 for Esquimalt First Nation. Crab, mussels, rock stickers (chitons), octopus, sea urchin, abalone,
25 and geoduck are other species harvested by the Esquimalt. Sea lions were traditionally
26 harvested for food from fishing canoes; the whole animal was used for various purposes.
27 Humpback whales and orcas were hunted in the past; the Esquimalt relationship with SRKWs
28 remains important to their culture and identity. Ducks, especially the surf scoter or “black

²⁴¹ Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Esquimalt First Nation, https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=644&lang=eng, accessed December 16, 2021.

1 duck,” were once very common in Esquimalt First Nation’s diet. Currently, Esquimalt First
2 Nation engages in game hunting for deer and elk in the winter.

3 Fish are critical for Esquimalt First Nation culture and well-being and remain a primary food
4 source for the Esquimalt Nation. Salmon, halibut, lingcod and lingcod roe, and herring were
5 harvested at many locations, including at Esquimalt Harbour and Race Rocks. Macaulay Point in
6 Esquimalt Harbour is the only reported *Lekwungen sxwalu* (reef net) location on the Canadian
7 side of the Strait of Juan de Fuca, with the rest located around San Juan Island. Reef netting was
8 key to the Northern Straits Salish economy, and used by *Lekwungen* for fishing sockeye and
9 pink (humpback) salmon specifically. Gaffing for chum, chinook, and coho continues at
10 Goldstream in the fall. Esquimalt First Nation smoke their fish, a skill learned from family and
11 neighbouring communities.

12 Esquimalt First Nation reported that diminishing availability, access restrictions, and avoidance
13 due to contamination limit Esquimalt harvest, and that according to Esquimalt First Nation this
14 violates their harvesting rights. For example, clams must be cleaned prior to consumption, and
15 Esquimalt First Nation are forced to travel further from their home to harvest. While present
16 use levels do not reflect past use, Esquimalt First Nation Aboriginal and treaty rights are not
17 dependent on current use and marine resources and rights to these resource areas remain
18 equally important to the Esquimalt First Nation. Esquimalt First Nation desires to restore
19 marine resource use to past levels and locations. Historically Esquimalt First Nation citizens
20 fished throughout their territory and wish to restore fishing by their members, including around
21 the Shipping lanes.

22 Coastal practices and areas such as ritual bathing, religious and burial sites, longhouses, and
23 cave and rock art sites are culturally important for Esquimalt First Nation.

24 Canoes were the traditional mode of transport for the Esquimalt First Nation, which required
25 knowledge of currents and tides. Boats are still the community’s main mode of transport.

26 Esquimalt First Nation has on- and off-reserve economic interests; those tied to their marine
27 territory include potential property development, an RV park, marina, and float home village,
28 bridge installation, and a dredging and pile driving business.

29 **16.5.2 ESQUIMALT FIRST NATION INVOLVEMENT IN THE CONSULTATION** 30 **PROCESS**

31 Consultation with Indigenous Groups identified in Schedule D began in July of 2019 when EAO
32 sent a letter to these groups inviting comments on the draft Section 13 Order, including
33 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
34 EAO under the Section 13 Order amended the geographic scope for the assessment of the

1 marine shipping route and added the Indigenous Groups identified in Schedule D which
2 included Esquimalt First Nation. For the review of the MSA, the EAO led consultation activities
3 with the Indigenous groups identified in Schedule D and, as part of this work, invited Esquimalt
4 First Nation to participate in the Marine Shipping Working Group.

5 During the MSA review, the EAO invited Esquimalt First Nation to review and provide
6 comments on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including
7 Part C of the Assessment Report), the draft CPD draft Certificate Conditions, and recommended
8 KMMs under CEAA 2012. As part of the Marine Shipping Working Group, Esquimalt First Nation
9 was invited to participate in Marine Shipping Working Group meetings during the MSA
10 Supplemental Analysis review stages.

11 During the MSA review, Esquimalt First Nation submitted feedback on TJLP's MSA
12 Supplemental Analysis, including concerns that the MSA should be scoped to 200 nm, about
13 inappropriate use of information from the RBT2 process, insufficient assessment of impacts due
14 to LNG carrier spill or accident, and that cumulative impacts of development on the health of
15 the ocean ecosystems should be included in the assessment. Esquimalt First Nation also
16 requested that the MSA should include new studies to understand impacts to Esquimalt First
17 Nation's rights and that TJLP should be required to invest into the long-term health of the
18 ocean. Further information related to concerns raised by Indigenous Group's with respect to
19 scoping of the MSA and reliance on information from RBT2 and TMX processes is provided in
20 [Section 13.2.2](#) of this Report.

21 The EAO also understands that Esquimalt First Nation considered that upstream GHG emissions
22 should have been included in the EAO's conclusions on GHG management and that the no
23 baseline case for upstream GHG emissions was unfounded given the uncertain economic
24 viability of shipping that volume of LNG via truck and ISO container. The EAO appreciates that
25 Esquimalt First Nation is concerned about the cumulative effects of GHG emissions from marine
26 shipping and is of the view that any increase in GHG emissions from a major project such as
27 TMJ is significant, given the current GHG emission levels and their resulting impact on climate
28 change. The EAO understands that Esquimalt First Nation disagrees with the EAO's conclusions
29 on the significance for cumulative effects of GHG management for TMJ.

30 The issue of direct GHG emissions from TMJ, and upstream GHG emissions – in addition to
31 mitigations for direct emissions from TMJ – are addressed in the GHG management chapter in
32 [Section 5.2](#) of Part B of this Report. The EAO is proposing a Condition 20: GHG Reduction Plan,
33 which would require measures for TJLP to reduce GHGs, including development of triggers that
34 would cause TJLP to take corrective action to reduce GHGs, and describe how TMJ would
35 achieve any municipal, provincial, national or international government GHG regulations or

1 objectives that are made mandatory for TMJ. The EAO has reflected Esquimalt First Nation's
2 perspectives on the EAO's assessment of GHG management for TMJ in Section 13.2.3 of Part C.

3 The EAO met directly with Esquimalt First Nation in January 2020 to discuss TMJ, EA process,
4 and any potential concerns with TMJ. Teleconference meetings with Esquimalt First Nation's
5 legal representative were conducted at their discretion and when requested. Esquimalt First
6 Nation met separately with TJLP in relation to TMJ. Esquimalt First Nation told the EAO that a
7 finding of residual effects should trigger a consent seeking process with Esquimalt regarding
8 proposed mitigation and accommodation measures to ensure culture continuity and a role for
9 Esquimalt First Nation in the future economy of the West Coast.

10 During review of TJLP's BVSA Report, Esquimalt First Nation participated in four Working Group
11 meetings and raised concerns related to the increased bunker vessel traffic, including potential
12 effects to the distribution of vessels in the MSA Area, and marine species that utilize the Fraser
13 River watershed, which are important to its culture or to which it has harvesting rights,
14 including SRKWs and salmon, respectivelyThe EAO considered and responded to Esquimalt First
15 Nation's feedback provided on the MSA and the EAO endeavoured to reflect Esquimalt Nation's
16 concerns and perspectives related to the potential for impacts to Esquimalt First Nation's
17 Aboriginal Interests due to TMJ and the consultation process in Part C of the Assessment
18 Report.

19 The EAO is of the view that it has approached consultation with Esquimalt First Nation at the
20 deeper end of the spectrum, with the intent to identify potential impacts and consider ways to
21 address any potential impacts to Aboriginal Interests that were identified by Esquimalt First
22 Nation within the MSA area. As outlined in the Section 13 Order for TMJ, the EAO provided an
23 opportunity to Esquimalt First Nation to provide a separate submission in the referral package
24 to be considered by decision makers, should Esquimalt First Nation disagree with the EAO's
25 conclusions or the way that the EAO has captured Esquimalt First Nation's perspectives and
26 views in the referral materials.

27 **16.5.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

28 The following sections focus on potential impacts of TMJ to Esquimalt First Nation Douglas
29 Treaty rights to hunt and fish and other interests. A discussion of the EAO's assessment
30 approach is provided in Impact Assessment Methods of Part C ([Section 12.2](#)).

31 The EAO considered information available, including from public sources as well as relevant
32 issues raised by Esquimalt First Nation and members during the EA process (in meetings,
33 letters, and correspondence), in the following assessments of the potential impacts of TMJ on

1 Esquimalt First Nation Douglas Treaty rights and other interests, mitigations accommodations
2 to address potential impacts.

3 The following sections focus on potential impacts of TMJ to Esquimalt First Nation Douglas
4 Treaty right to fish and hunt and other interests, mitigations, and accommodations to address
5 potential impacts.

6 *A. POTENTIAL IMPACTS ON FISHING*

7 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
8 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to the
9 potential shipping-related effects based on review of the RBT2 and TMX processes. The EAO is
10 satisfied that the key impacts to biophysical components resulting in changes to fish quantity
11 and quality, changes in access to fishing resources, and changes to social, cultural, and spiritual
12 values associate with traditional fishing activities that apply to Esquimalt First Nation are
13 summarized in [Section 13.3.1](#).

14 Esquimalt First Nation raised the following concerns regarding potential impacts on the right to
15 fish due to TMJ:

- 16 • Concern regarding the potential cumulative impact of TMJ on steelhead, chinook and
17 SRKWs, in relation to land and resources for traditional purposes.
- 18 • Concern about the cumulative effects of marine shipping on fish and fish habitat,
19 including effects to fish habitat due to piles, dredging, vibrodensification and scour
20 protection at marine terminal area and changes in fish behaviour due to underwater
21 noise during construction or mortality to sturgeon due to vessel strikes. The EAO
22 understands that Esquimalt First Nation disagreed with the EAO's conclusions on the
23 significance for cumulative effects to fish and fish habitat for TMJ.
- 24 • Concerns about the cumulative effects of the marine shipping on Esquimalt First
25 Nation's rights, interests, culture and wellbeing. Esquimalt First Nation view any impact
26 to their rights, interests and culture due to a marine shipping as significant, given the
27 volume of existing and proposed future vessel traffic through their territorial waters.
 - 28 ○ As discussed in [Section 13.3.1](#), the EAO is recommending KMMs under CEAA
29 2012 for the Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset
30 Plan, and Marine Communication Plan to address these concerns. The EAO did
31 not predict any residual effects to fish and fish habitat in the MSA area. As
32 described in [Section 13.1.1](#), there are current regional Government of Canada
33 programs and initiatives relevant to cumulative impacts to the ability of
34 Indigenous Groups to safely access fishing areas.
35

1 Additional issues and concerns with potential impacts related to fishing were raised by
2 Esquimalt First Nation during the EAs of RBT2 and TMX. These concerns were not raised by
3 Esquimalt First Nation during the TMJ EA but the EAO considers them applicable to the MSA
4 area.

5 • Concern about the localized impact of construction and marine shipping on Fraser River
6 salmon and other fish stocks. These are critically important for the entire marine
7 ecosystem and to the Esquimalt people's culture, health, and wellbeing.

8 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
9 concerns related to the effects of TMJ on fishing rights. As discussed in that
10 section, the proposed mitigation measures to addresses this concern are
11 included in the fish and fish habitat monitoring and mitigation plans.

12 • Concerns regarding impact of potential spill restricting times and locations, reducing
13 quality/quantity of marine resources, harvesting gear. All of these concerns were in
14 relation to the exercising of fishing rights.

15 ○ In the Accidents and Malfunctions and Effects of the Environment section in Part
16 B, it was determined that with the mitigation measures in place, including
17 navigational requirements, vessel operational procedures, emergency response
18 measures and emergency spill response that would be supported by TC these
19 concerns would be addressed.

20 • Concern regarding shipping lane overlap with areas where Esquimalt First Nation holds
21 Aboriginal and Treaty Harvesting Rights and that TMJ-related ships may impact these
22 Rights by restricting time and locations and disrupting travel ways.

23 ○ In the Current Use section of Part B of this Report it was determined that with
24 the marine transportation regulatory regime, as well as low frequency and short
25 duration of TMJ-related traffic there would be negligible to low magnitude of
26 effect of Indigenous access to fishing areas in Esquimalt First Nations traditional
27 territories.

28 The EAO considers that the safety of small vessels with large vessels and wake effects were
29 assessed in the Accidents and Malfunctions Section of Part B and that the regular and relatively
30 short-duration passage of TMJ-related vessels through the Salish Sea would include monitoring
31 of compliance with maritime regulations and legislation such as the *Canada Shipping Act* and
32 the Collision Regulations. TJLP has stated that TMJ's influence on TMJ-related vessel operations
33 would be limited beyond TMJ's marine terminal area, but TJLP has committed to a Marine
34 Communication Plan out to 12 nm that would be developed in consultation with Schedule B
35 and D Indigenous Groups and include a communication procedure to inform Indigenous Groups

1 of vessel schedules and provide a complaint submission process. TJLP has also committed to
2 developing a Marine Shipping Emergency Response Outreach Program that would facilitate the
3 integration of plans for responding to incidents in transit into existing emergency response
4 systems, primarily the CCG's Incident Integrated Response Plans.

5 **Conclusion**

6 In consideration of the available information; the EAO's consultation with Esquimalt First
7 Nation; Esquimalt First Nation's engagement with TJLP; TJLP's commitments; and the EAO's
8 proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012,
9 TMJ is expected to result in negligible-to-minor impact on Esquimalt First Nation's right to fish.
10 The EAO considers TMJ-related increases to vessel traffic during operations would be
11 incremental compared to existing baseline conditions in the Traffic Separation Scheme of the
12 Salish Sea. The EAO considers that TMJ-related marine shipping effects combined with
13 cumulative effects in the MSA area could potentially result in more serious impacts to
14 Esquimalt First Nation's right to fish, should Esquimalt First Nation begin to fish regularly in and
15 around the shipping lanes because TMJ-related shipping during operations would interact with
16 current baseline levels of cumulative effects to access to fishing areas and the experience of
17 fishing in, or adjacent to, the shipping lanes.

18 The EAO considered Esquimalt First Nation's perspectives on cumulative effects and Esquimalt
19 First Nation's ability to meaningfully practice their fishing rights in the MSA area. The EAO
20 acknowledges that there are already vessels transiting the shipping lanes which can impact
21 Indigenous fishers' access to and quality of experience of fishing. While the EAO recognizes
22 there is some uncertainty when considering how cumulative effects impact Aboriginal Interests,
23 the EAO agrees with Esquimalt First Nation, that any increase in vessel traffic in the shipping
24 lanes would potentially be more serious when combined with past, present, and reasonably
25 foreseeable shipping activities. The EAO understands that Esquimalt First Nation disagrees with
26 the EAO's significance determination on the fishing component of Current Use of Lands and
27 Resources for Traditional Purposes in Part B of this report, and that Esquimalt First Nation told
28 the EAO that their Aboriginal Interests are not dependent on current use.

29 The key factors that were considered in support of the EAO's conclusion on the impacts to the
30 right to fish are summarized as follows:

31 **Biophysical:**

- 32 • The EAO's conclusions in the Fish and Fish Habitat chapter in Part B which do not predict
33 any residual effects to fish and fish habitat in the MSA area;
- 34 • Esquimalt First Nation view any impact to their rights, interests and culture due to a
35 marine shipping as significant, given the volume of existing and proposed future vessel

- 1 traffic through their territorial waters; and
- 2 • The MSA area is a heavily utilized marine environment.

3 **Geospatial:**

- 4 • Esquimalt Harbour and Race Rocks are important fishing areas for Esquimalt First Nation
5 but historically Esquimalt First Nation fished throughout their territory and wish to
6 restore fishing by their members, including around the shipping lanes;
- 7 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
8 segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
9 Separation Scheme of the Salish Sea; and
- 10 • The EAO's conclusions in the Current Use of Part B that TMJ-related vessel transits
11 during operations (minimum 30 years) would result in negligible to low magnitude
12 effects of relatively infrequent and shortduration interruptions to access to areas in the
13 Salish Sea.

14 **Social, Cultural and Experiential:**

- 15 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
16 traffic during operations affecting visual quality, noise, and vessel wake (with an
17 increasing magnitude of effect the closer one is to the vessels); and
- 18 • Potential concerns regarding safety of small vessels with large vessels and wake effects
19 Accidents and Malfunctions and Effects of the Environment, as assessed in the section in
20 Part B.

21 **Mitigations:**

- 22 • Proposed mitigations for impacts to Esquimalt First Nation's right to fish include the
23 Marine Communications Plan recommended as KMMs under CEAA 2012.

24 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

25 The EAO evaluated the potential effects on hunting, trapping, and gathering activities
26 attributable to TMJ in [Section 13.3.2](#) which apply broadly to Indigenous Groups. The EAO is
27 satisfied that the key impacts to biophysical components resulting in changes to wildlife and
28 vegetation quantity and quality, changes in access to hunting, trapping and gathering areas, and
29 changes to social, cultural, and spiritual values associated with traditional hunting, trapping and
30 gathering activities that apply to Esquimalt First Nation are summarized in [Section 13.3.2](#).

31 **Conclusion**

1 In consideration of the available information in [Section 13.3.2](#), which outlines the potential
2 effect to hunting, trapping and gathering; consultation with Esquimalt First Nation; Esquimalt
3 First Nation's engagement with TJLP; TJLP's commitments; and the EAO's proposed EAC
4 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
5 to result in negligible impact on Esquimalt First Nation's right to hunt, trap and gather.

6 The key factors that were considered in support of the EAO's conclusion on the impacts to
7 hunting, trapping, and gathering included the EAO's conclusions on adverse residual effects to
8 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
9 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
10 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
11 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
12 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
13 Heads to the 12 nm territorial limit. The EAO understands that Esquimalt First Nation agrees
14 with the EAO's residual effects assessment for marine birds but are uncertain about the EAO's
15 non-significance determination for the potential effects to migratory and marine birds from
16 TMJ.

17 To mitigate potential impacts to Esquimalt First Nation's right to hunt, trap and gather, the EAO
18 is recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
19 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
20 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
21 considered that the small relative increase due to TMJ-related vessel traffic would have a
22 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
23 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
24 Regulations and Legislation regulating vessel noise and lighting. The EAO also considered that
25 the small relative increase due to TMJ-related vessel traffic would have a negligible effect to
26 experiential aspects of hunting, trapping, and gathering from changes to visual quality and
27 noise in the MSA and that all TMJ related vessels would adhere to the Marine Regulations and
28 Legislation regulating vessel noise and lighting.

29 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

30 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
31 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
32 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
33 pathways to impacts based on review of publicly available information from RBT2 and TMX
34 processes, and any information provided by Indigenous Groups during the MSA review. The
35 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of

1 experience and SRKWs would be the pathways to impacts to Esquimalt First Nation's other
2 traditional and cultural interests.

3 Esquimalt First Nation raised the following concerns regarding potential impacts related to
4 traditional and cultural interests due to TMJ:

5 Esquimalt First Nation identified that cumulative impacts of development on the health of the
6 ocean is a major concern, including the collapsing steelhead, chinook and SRKW populations,
7 which Esquimalt First Nation considers are signs of an imbalance in the marine environment.
8 Esquimalt First Nation expressed concerned about the cumulative effects of the marine
9 shipping industry on SRKWs, including that vessel strikes and harm to prey should also be
10 identified as a pathway for residual effects. Esquimalt First Nation requested that TJLP
11 contribute to supporting the long-term recovery and health of the ocean, such as enhanced tug
12 escorts for LNG carriers or additional investments in government spill response capacity.

- 13 • The EAO acknowledges Esquimalt First Nation's concerns regarding cumulative impacts
14 to the health of the ocean, including potential effects to fish and SRKWs and the entire
15 ecosystem. The EAO understands that Esquimalt First Nations disagrees with the EAO's
16 significance determination for residual effects to SRKWs for TMJ.;
- 17 • See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of concerns
18 related to the effects on whales. As discussed in [Section 13.3.3](#), the EAO concluded that
19 TMJ would not result in significant residual effects to Marine Mammals; however, the
20 EAO notes that the current baseline of cumulative effects to SRKWs are already high and
21 that TMJ would contribute additional residual effects from shipping noise and potential
22 avoidance behaviour by SRKWs to ships, such that cumulative effects to SRKWs are
23 considered significant;
- 24 • TJLP stated their commitment to adhering to the mitigation measures outlined in the
25 MSA and that TJLP adaptive management of mitigation measures would be an essential
26 part of the overall management strategy to promote ocean health. TJLP also stated they
27 have included a requirement that management measures related to SRKWs would be
28 reviewed on an annual basis to determine if changes need to be incorporated into TMJ
29 shipping practices. TJLP also anticipates that tug escorts would be required for LNG
30 vessels in Boundary Pass and Haro Strait; and
- 31 • The EAO is recommending as a KMM under CEAA 2012 a Vessel Traffic Management
32 Plan that would require TJLP to incorporate contractual measures to support
33 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
34 initiatives (or future equivalent), and annual reporting on TJLP's participation in regional
35 environmental management measures and cumulative effects monitoring to protect
36 SRKW, where feasible. The seasonal slowdown initiatives currently request vessels to

1 slow down in key SRKW foraging areas such as Swiftsure Banks, Haro Strait and
2 Boundary Pass. The EAO notes several regional initiatives and measures have been
3 implemented by the Government of Canada to better understand and manage
4 cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

- 5 • During the MSA review, Esquimalt First Nation raised concerns about potential
6 environmental effects from an accident or malfunction, resulting in a spill in the
7 waterways of Esquimalt First Nation's traditional territory and that the Accidents and
8 Malfunctions risk assessment in the MSA failed to provide rationale for the bunker fuel
9 estimate and was limited by assessing a spill at only one location and at one time of
10 year. In the Accidents and Malfunctions and Effects of the Environment section in Part
11 B, with consideration of the MSA, it was determined that the risk of an LNG or bunker
12 fuel release would have consequence severities ranging from moderate to very high
13 with the very high being on SRKWs and heritage resources and having potentially
14 irreversible effects. However, the likelihood was estimated to be extremely rare as the
15 release would need to occur in the vicinity of these susceptible sites or SRKWs;
- 16 • TJLP clarified that the lower volume estimate for bunker fuel spill assessment did not
17 affect the MSA, which was conservatively based on the oil spill modelling results
18 performed for TMX, and the modelling results from RBT2 and TMX were qualitatively
19 expanded for the MSA area, which included seasonal variation; and
- 20 • Marine shipping associated with TMJ would be required to meet the international
21 standards and Canadian regulations set out by Canada's compliance-based marine
22 safety and security system, which is designed to protect life, property, and the marine
23 environment. The EAO is recommending a KMM under CEAA 2012 for a Marine Shipping
24 Emergency Response Outreach Program to facilitate the integration of plans for
25 responding to incidents in transit into existing emergency response systems, primarily
26 the CCG's Incident Integrated Response Plans.

27 Regarding Indigenous socio-economic conditions and Indigenous health and wellbeing, the EAO
28 understands that Esquimalt First Nation agrees with the EAO's residual effects assessment but
29 disagrees with the EAO's significance determination of not significant for TMJ. The EAO
30 understands that Esquimalt First Nation are concerned about the cumulative effects of the
31 marine shipping industry on their well-being. According to Esquimalt First Nation, there are
32 signs of an already declining marine ecosystem, a shifting economy on the West Coast are a
33 concern, and that further consensus seeking for appropriate mitigation and accommodation
34 measures would be necessary to ensure Esquimalt First Nation's cultural continuity and role for
35 in the future economy of the West Coast.

1 • In Part B, Land and Marine Resource Use (Section 8.2) and Current Use of Lands and
2 Resources for Traditional Purposes (Section 11.4), the EAO concludes that TMJ-related
3 vessel movements would result in negligible to low impacts to commercial fishing,
4 including commercial harvesting areas in the MSA RSA. The EAO also predicted that
5 residual effects to the experience of commercial and non-commercial marine users
6 conducting their activities are expected to diminish with increased distance from TMJ
7 vessels in transit and are predicted to be negligible in magnitude. The EAO is
8 recommending a KMM under CEAA 2012 for a Marine Communication Plan out to 12
9 nm that would be developed in consultation with Indigenous Groups, including
10 Esquimalt First Nation, and include a communication procedure and complaint
11 submission process. As described in the Fish and Fish Habitat chapter in Part B, the EAO
12 did not conclude any residual or cumulative effects to fish and fish habitat for the MSA.
13

14 Additional issues and concerns with potential impacts related to traditional and cultural
15 interests were raised by Esquimalt First Nation during the EAs of RBT2 and TMX. These
16 concerns were not raised by Esquimalt First Nation during the TMJ EA but the EAO considers
17 them applicable to the MSA area.

- 18 • Concern that members' lack of access to traditional harvesting areas is removing
19 opportunities to teach children how to fish and harvest (transmission of traditional
20 knowledge). Concern about impacts of ships, transiting through territorial waters,
21 including close proximity to D'Arcy Island which has cultural meaning to Esquimalt First
22 Nation
- 23 ○ In the Current Use section of Part B of this Report the EAO predicted that the
24 increased vessel traffic due to TMJ-related vessel transits during operations
25 (minimum 30 years) would result in negligible to low magnitude effects due to
26 relatively infrequent and short-duration interruptions to access to areas for
27 resource harvesting for cultural purposes and visual quality, noise, and vessel
28 wake (with an increasing magnitude of effect the closer one is to the vessels).
 - 29 ○ The EAO acknowledges that wakes generated by TMJ vessels would be larger the
30 closer one is to the vessel and that the presence of LNG carriers may be
31 considered disturbing for safety or other reasons by Indigenous people, which
32 could lead to reduced opportunities to practice Aboriginal rights in and around
33 the shipping lanes.
 - 34 ○ The EAO is recommending a KMM under CEAA 201 for a Marine Communication
35 Plan out to 12 nm that would be developed in consultation with Schedule B and

1 D Indigenous Groups and include a communication procedure and complaint
2 submission process.

3 • Concerns regarding impact of potential spill impacting burial sites, archaeological
4 remains and cultural/spiritual sites and restricting ability to engage in traditional
5 ceremonies.

6 ○ In the Accidents and Malfunctions and Effects of the Environment section of Part
7 B, with consideration of the MSA, it was determined that the risk of an LNG or
8 bunker fuel release would have consequence severities ranging from moderate
9 to very high with the very high having potentially irreversible effects to heritage
10 resources. However, the likelihood was estimated to be extremely rare as the
11 release need to occur in the vicinity of areas for used for cultural purposes.

12 ○ The EAO is recommending a Marine Shipping Emergency Response Outreach
13 Program that would facilitate the integration of plans for responding to incidents
14 in transit into existing emergency response systems, primarily the CCG's Incident
15 Integrated Response Plans and marine shipping associated with TMJ would be
16 required to meet the international standards and Canadian regulations set out
17 by Canada's compliance-based marine safety and security system, which is
18 designed to protect life, property, and the marine environment

19 Conclusion

20 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
21 impacts on Esquimalt First Nation's other cultural and traditional interests, although the EAO
22 acknowledges that there is uncertainty in the relationship between incremental increases in
23 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
24 the available information, the EAO's consultation with Esquimalt First Nation, Esquimalt First
25 Nation's engagement with TJLP, TJLP's commitments and the EAO's proposed EAC conditions if
26 an EAC is issued, and the recommended KMMs under CEAA 2012, the impacts from TMJ
27 combined with cumulative effects in the MSA area is expected to result in moderate-to-serious
28 impacts on Esquimalt First Nation's other traditional and cultural interests. The EAO's
29 conclusions of significant cumulative effects to SRKW was a major key factor considered in the
30 EAO's seriousness determination. The EAO notes several regional initiatives and measures have
31 been implemented by the Government of Canada to better understand and manage cumulative
32 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

33 The key factors that were considered in support of EAO's conclusion on the impacts to other
34 traditional and cultural interests are summarized as follows:

1 **Cultural and Heritage Resources:**

- 2 • The EAO's conclusions in the Heritage Resources section of Part B did not predict
3 residual effects on Heritage Resources ([Section 7.1](#)) from erosion due to wake effects
4 along the shorelines of the MSA area;
- 5 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
6 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
7 cumulative effects to SRKWs due to underwater noise; and
- 8 • The MSA area is a heavily utilized marine environment.

9 **Geospatial:**

- 10 • Esquimalt First Nation's access and travel through territorial waters, such as D'Arcy
11 Island which has cultural meaning, for example; and
- 12 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
13 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
14 Separation Scheme of the Salish Sea would result in negligible to low magnitude effects
15 due to relatively infrequent and short-duration interruptions to access to areas in the
16 Salish Sea.

17 **Social, Cultural, Experiential:**

- 18 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
19 traffic during operations affecting visual quality, noise and vessel wake (with an
20 increasing magnitude of effect the closer one is to the vessels);
- 21 • Potential concerns regarding safety of small vessels with large vessels and wake effects
22 Accidents and Malfunctions and Effects of the Environment, as assessed in the section in
23 Part B;
- 24 • Access and use of traditional harvesting areas important for opportunities to teach
25 children how to fish and harvest (transmission of traditional knowledge); and
- 26 • SRKWs are important to Esquimalt First Nation culture and identity.

27 **Mitigations:**

- 28 • Proposed mitigations for potential impacts to traditional and cultural interests are the
29 recommended key mitigations under CEAA 2012 for a Marine Communications, and
30 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
31 Program; and
- 32 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management

1 Plan that would require TJLP to incorporate contractual measures to support
2 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
3 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
4 participation in regional environmental management measures and cumulative effects
5 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
6 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
7 Banks, Haro Strait and Boundary Pass.

8 **16.6 TSAWOUT FIRST NATION**

9 **16.6.1 COMMUNITY PROFILE**

10 *ᑭᑭᑭᑭᑭ* (Tsayout) First Nation is one of five members of the *ᑭᑭᑭᑭᑭ* (Saanich) Nation, along
11 with the Pauquachin First Nation, Tsartlip First Nation, Tseycum First Nation, and Malahat First
12 Nation. *ᑭᑭᑭᑭᑭ* is part of the larger Coast Salish cultural group which has occupied the Gulf of
13 Georgia continuously for thousands of years. Tsawout First Nation is located on the Saanich
14 Peninsula on Vancouver Island and has six reserves; East Saanich 2 is the main reserve. As of
15 November 2021, Tsawout First Nation has a registered population of 973 people with 553 living
16 on Tsawout First Nation reserves, 312 living off-reserve, and 108 living on other reserves²⁴².

17 *ᑭᑭᑭᑭᑭ* (Tsayout) means “houses on the hill,” describing the settlement as seen from canoes
18 approaching in Saanichton Bay. The Tsawout have lived here for many centuries, and Tsawout
19 creation stories recount islands and fisheries as their ancestors. Before contact, the *ᑭᑭᑭᑭᑭ*
20 Nations were a single group of extended families sharing the *ᑭᑭᑭᑭᑭ* language and a cultural
21 order revolving around their relations with marine creatures, spirit beings, and one another.
22 The relationship of the *ᑭᑭᑭᑭᑭ* with their marine environment drives their society, economy,
23 culture, and identity.

24 Before contact, the *ᑭᑭᑭᑭᑭ* Nations were a single group of extended families sharing the
25 *ᑭᑭᑭᑭᑭ* language and a cultural order revolving around their relations with marine
26 creatures, spirit beings, and one another. The relationship of the *ᑭᑭᑭᑭᑭ* with their marine
27 environment drives their society, economy, culture, and identity. *ᑭᑭᑭᑭᑭ* (Saanich Peninsula)
28 is the “homebase” of the *ᑭᑭᑭᑭᑭ*. It derives its name from the image presented to paddlers in

²⁴² Indigenous and Northern Affairs Canada. 2021. First Nation Profiles – Tsawout First Nation, https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=654&lang=eng, accessed December 16, 2021.

1 a canoe as they approach from the water, meaning “raised up” or “emerging people.” The
2 naming practice based on the perspective of the water reveals the fundamental nature of
3 marine territory to the W̱SÁNEĆ worldview.

4 W̱SÁNEĆ families had permanent winter settlements on the Saanich Peninsula and temporary
5 settlements throughout the San Juan and southern Gulf Islands and across the Salish Sea to
6 Point Roberts and Boundary Bay. This territory is defined by the pursuit of the five salmon
7 species and steelhead and is where the W̱SÁNEĆ have continuous and exclusive use and
8 occupation since time immemorial. The 1987 Saanich Declaration describes W̱SÁNEĆ territory
9 as “[encompassing] all [their] Spiritual Places, medicine and fruit gathering places, fishing
10 stations, hunting and trapping areas, winter and summer homesites, burial sites, meditation
11 places and all our territories in between these places.” W̱SÁNEĆ families exploited different
12 ecological niches, had tailored seasonal movements, and shared resources with each other. The
13 W̱SÁNEĆ reciprocal system of sharing marine resources and associated knowledge is key to self-
14 actualization and creating an autonomous future. The W̱SÁNEĆ had reef net fishing sites
15 throughout their territory, with the Nation’s largest reef net claim at Point Roberts and another
16 on ŚNEWİŁ (the Fraser River).

17 The W̱SÁNEĆ view themselves as equal to and inseparable from the natural environment,
18 entailing deep respect for and spiritual connection to salmon, the earth, and each other. One
19 ritual the W̱SÁNEĆ practiced demonstrating respect was to release some salmon to ensure they
20 could return home and allow their lineages to continue. Salmon were also relatives as all living
21 things were once people and should be respected as such.

22 The W̱SÁNEĆ signed the Douglas Treaty (1852) during an apparent time of escalating tension
23 between the W̱SÁNEĆ and white settlers due to logging disputes and the shooting of a First
24 Nation boy by a white farmer. The W̱SÁNEĆ therefore viewed the treaty as a peaceful
25 agreement between two nations that would ensure the continuation of the W̱SÁNEĆ fisheries,
26 lifestyle, culture, resource management, and governance systems as formerly. By the mid-19th
27 century, most W̱SÁNEĆ families had relocated to Saanichton Bay due to disease spread by
28 European contact, raids from northern First Nations, and land pre-emptions by white settlers;
29 former sites were continually occupied during seasonal rounds.

30 Tsawout First Nation has Douglas Treaty Rights to hunt over unoccupied lands and carry on
31 their fisheries “as formerly.” Tsawout First Nation also asserts that it holds Aboriginal rights and
32 title within its territory. Shipping traffic transits through Tsawout First Nation territorial waters
33 and in close proximity to Tsawout First Nation reserves. Tsawout First Nation uses the Salish
34 Sea to hunt, fish, gather, travel, and harvest; harvest varies based on the season and traditional
35 W̱SÁNEĆ calendar. Marine foods are preferred for the Tsawout First Nation diet and health,

1 consumed weekly to daily; as the W̱SÁNEĆ say, “when the tide is out, the table is set.” Some
2 W̱SÁNEĆ earn a living and feed their communities through fishing. Active Tsawout First Nation
3 “superharvesters” gather marine resources to share in networks and at regular community
4 events, religious and spiritual gatherings, funerals, longhouse events, naming ceremonies, and
5 potlatches. This is how Tsawout First Nation maintains its subsistence economy and cultural
6 identity. Resources are even shared with neighbouring Salish communities.

7 The Coast Salish are sometimes called the “salmon people” due to heavy reliance on salmon for
8 seasonal rounds and cultural practices. Unlike other Coast Salish peoples, the W̱SÁNEĆ did not
9 have major rivers within their territory, so fished for salmon in the sea through their unique
10 reef net method and were thus called the “saltwater people.” ƐEKI (sockeye) is the most prized
11 species of the Coast Salish, including for the W̱SÁNEĆ. Reef net fishing is a way of life as well as
12 part of the W̱SÁNEĆ identity. According to W̱SÁNEĆ teachings, the reef net technique was
13 gifted from the Salmon People to the W̱SÁNEĆ in exchange for a beautiful W̱SÁNEĆ princess,
14 allowing the W̱SÁNEĆ to live in harmony with salmon forever. Reef netting plays a central role
15 in W̱SÁNEĆ cosmology, seasonal round, and societal organization, and demonstrates the
16 continual use of salmon by the W̱SÁNEĆ since time immemorial. Reef net fisheries are sacred
17 and Tsawout First Nation are working to revive them. Tsawout First Nation reported harvesting
18 all five salmon species at hundreds of locations that line the shipping lanes of the MSA including
19 the waters around Tumbo Island, Saturna Island, Pender Island, Sidney Island, James Island,
20 D’Arcy islands, Coal Island and Saanichton Bay to Port Renfrew. Tsawout First Nation report
21 using their travel routes seasonally to access fishing, gathering, and hunting locations. Herring
22 and herring roe were traditionally harvested in the area but at lower levels now due to frequent
23 ship traffic.

24 In addition to salmon, currently marine invertebrate harvesting plays a significant role in
25 feeding the community. Crab and sea urchin have been used since time immemorial, and
26 Tsawout First Nation also manages a communal prawn license and red sea urchin license.
27 Cumulative effects such as declining runs, environmental degradation, fishing regulations, and
28 vessel wakes are described as barriers limiting Tsawout First Nation harvest, who view it as
29 violating their Douglas Treaty and Aboriginal rights. Tsawout reported travelling outward
30 towards the shipping lanes to find clean beaches to harvest bivalves such as clams and mussels.

31 W̱SÁNEĆ continue to gather seaweed and hunt deer and ducks on islands near the shipping
32 lanes. The surf scoter is prized by the W̱SÁNEĆ for sacred ceremonial use. Other ducks are
33 served at funerals, longhouse ceremonies, and community events. Preferred seaweed, crab,
34 octopus and marine invertebrate gathering locations have been identified along the shoreline
35 adjacent to or within the shipping lanes among the Gulf Islands (some Islands in Washington
36 State), the shoreline at Saanichton Bay and the northern tip of the Saanich Peninsula.

1 Tsawout First Nation identified Point Roberts within the MSA as the location of the Saanich
2 people's most important village site and associate reef-net sites. Tsawout First Nation would
3 like to continue the use of this area, but they have been forced out over time. Other sites of
4 cultural importance within the MSA include a village site in Tod Inlet, burial sites on Pender
5 Island, Scull Island, Saturna Island and Cabbage Island.

6 **16.6.2 TSAWOUT FIRST NATION INVOLVEMENT IN THE CONSULTATION** 7 **PROCESS**

8 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
9 sent a letter to these groups inviting comments on the draft Section 13 Order, including
10 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
11 EAO under the Section 13 Order amended the geographic scope for the assessment of the
12 marine shipping route and added the Indigenous groups identified in Schedule D which
13 included the Tsawout First Nation. For the review of the MSA, the EAO led consultation
14 activities with the Indigenous groups identified in Schedule D and, as part of this work, invited
15 Tsawout First Nation to participate in the Marine Shipping Working Group. The EAO is of the
16 view that it has approached consultation with Tsawout First Nation at the deeper end of the
17 spectrum, with the intent to identify potential impacts and consider ways to address any
18 potential impacts to Aboriginal Interests that were identified by Tsawout First Nation within in
19 the MSA area.

20 During the MSA review, the EAO invited Tsawout First Nation to review and provide comments
21 on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including Part C of
22 the Assessment Report), the draft CPD and draft Certificate Conditions. As part of the Marine
23 Shipping Working Group, Tsawout First Nation was invited to participate in Marine Shipping
24 Working Group meetings during the MSA Supplemental Analysis, and BVSA Report Review
25 stages. During review of TJLP's BVSA Report, Tsawout First Nation attended four Working Group
26 meetings. The EAO offered to meet directly with Tsawout First Nation to discuss TMJ, the EA
27 process, and any potential concerns with TMJ.

28 **16.6.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND ABORIGINAL INTERESTS**

29 The following sections focus on potential impacts of the Project to Tsawout First Nation's
30 Douglas Treaty rights to hunt and fish and other interests. A discussion of the EAO's assessment
31 approach is provided in Impact Assessment Methods of Part C ([Section 12.2](#)).

32 The EAO considered information available, including from public sources as well as relevant
33 issues raised by Tsawout First Nation and members during the EA process, in the following

1 assessments of the potential impacts of TMJ to Tsawout First Nation's Douglas Treaty rights and
2 other interests, mitigations and accommodations to address potential impacts.

3 *A. POTENTIAL IMPACTS ON FISHING*

4 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
5 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to
6 potential shipping-related effects based on review of RBT2 and TMX processes. The EAO is
7 satisfied that the key impacts to biophysical components resulting in changes to fish quantity
8 and quality, changes in access to fishing resources, and changes to social, cultural, and spiritual
9 values associated with traditional fishing activities that apply to Tsawout First Nation are
10 summarized in [Section 13.3.1](#)

11 The MSA included information on a variety of marine invertebrate harvesting and fishing
12 locations throughout the Gulf Islands and on some Islands in Washington State – many of which
13 are in proximity to the shipping lanes and some requiring crossing the lanes to access the sites.
14 Fishing was also reported at many locations along the marine shipping lanes in segments A and
15 B of the MSA area.

16 Additional issues and concerns with potential impacts related to fishing were raised by Tsawout
17 First Nation during the RBT2 Panel and TMX EA processes. These concerns were not raised by
18 Tsawout First Nation during the TMJ EA but the EAO considers them applicable to the MSA
19 area.

- 20 • Concerned about impacts to fishing and fishing rights. Tsawout First Nation exercise FSC
21 fishing rights as well as having a commercial fishery interest
 - 22 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
23 concerns related to the effects of TMJ on fishing. As discussed in [Section 13.3.1](#),
24 the proposed mitigation measures to addresses this concern are included in the
25 fish and fish habitat monitoring and mitigation, marine communications and
26 vessel traffic management plans.
- 27 • Concerned with the increase in vessel traffic and the impacts on the salmon migration
28 route
 - 29 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
30 concerns related to the effects of increase in vessel traffic on fish. As discussed in
31 [Section 13.3.1](#), the proposed mitigation measures to addresses this concern are
32 included in the fish and fish habitat monitoring and mitigation, marine
33 communications and vessel traffic management plans.
- 34 • Concern regarding the impact of invasive species, illegal dumping and anchorage

- 1 contributing to environmental impacts to fish and crab habitat
- 2 ○ The EAO notes that the potential introduction of invasive species from ballast
3 water discharge would be sufficiently managed through adherence to federal
4 regulations (*Canada Shipping Act, 2001*) and international conventions (for
5 example, MARPOL Convention) that prohibit these activities in the Fraser River
6 and MSA area.
- 7 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
8 concerns related to these effects on environmental impacts to habitats. As
9 discussed in [Section 13.3.1](#), the proposed mitigation measures to address this
10 concern are included in the fish and fish habitat monitoring and mitigation plan.
- 11 ○ As described in the Accidents and Malfunctions and Effects of the Environment
12 section (Section 9) of Part B, vessels would be required to meet internationally
13 recognized safety standards that include pollution prevention of ships.
- 14 ● Concerns regarding impact of increasing shipping traffic on reef net fishing, as fishing
15 areas the near shipping lanes. Tsawout First Nation is working to revive the reef net
16 fishery.
- 17 ○ As outlined in the Current Use assessment in Part B, potential negligible to low
18 magnitude impacts to the experiential aspect of fishing in the MSA due to TMJ-
19 related vessel traffic and potential concerns regarding safety regularly occurring
20 vessels transits during the operations for Indigenous Groups who harvest fish in,
21 or in proximity to, the navigational channel or shipping lanes, or those who need
22 to cross these areas to access fishing resources.
- 23 ○ TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
24 limited beyond TMJ's marine terminal area, but TJLP has committed a Marine
25 Communication Plan out to 12 nm that would be developed in consultation with
26 Schedule B and D Indigenous Groups and include procedures to inform
27 Indigenous Groups of traffic schedules, for Indigenous Groups to provide
28 feedback on adverse effects related to navigation as a result of TMJ, and for TJLP
29 to document and respond to feedback in a timely manner.
- 30 ○ The EAO also acknowledges that the TMJ-specific mitigation measures would not
31 reduce impacts to quality of experience because some Indigenous people may
32 find the presence and sounds of LNG carriers disturbing for safety and/or
33 aesthetic reasons, or for other reasons.
- 34 ● Impact to small fishing boats, increasing the risk to fishers and diminishing the ability to
35 gather marine food.

- 1 ○ With respect to likelihood of collision between large and smaller ships, TJLP
2 responded to a similar concern raised during TMJ and respect to mitigation
3 measures, including loudhailers (such as, megaphone) and vessel operators
4 being required by TMJ to follow their own emergency response plans that meet
5 or exceed TMJ's safety standard, that the environmental consequence
6 severity of a small vessel collision would be moderate with rare likelihood. The
7 residual risk level was estimated to be moderate.
- 8 ○ In section the Current Use section of Part B, it was determined that with the
9 marine transportation regulatory regime, as well as low frequency and short
10 duration of TMJ-related traffic there would be negligible to low magnitude of
11 effect of Indigenous access to fishing areas.
- 12 ○ The EAO is recommending a KMM under CEAA 2012 for a Marine
13 Communication Plan out to 12 nm with procedures to inform Indigenous Groups
14 of traffic schedules, for Indigenous Groups to provide feedback on adverse
15 effects related to navigation as a result of TMJ, and for TJLP to document and
16 respond to feedback in a timely manner.
- 17 ● Concerns regarding the cumulative effects of increased shipping traffic on traditional
18 crabbing as the vessel wake can be dangerous to those harvesting crab on the shore and
19 vessel wake limiting ability to bring children out to experience reef net fishing
- 20 ○ It was determined that the TMJ-related vessel wake would be within natural
21 variation of the wave heights in this area (see the EAO's section on Vessel Wake
22 in Part B) and the EAO is of the opinion that TMJ-related vessel wakes from Sand
23 Heads to the 12 nm territorial limit would have a negligible effect on the ability
24 of Indigenous fishers to access and undertake fishing activities (see the Current
25 Use section (Section 11.4) in Part B).
- 26 ○ The EAO acknowledges that Indigenous people may find the presence and
27 sounds of LNG carriers disturbing for safety and/or aesthetic reasons, or for
28 other reasons and that shipping-related access interruptions and concerns about
29 safety could then lead to reduced opportunities for cultural transmission,
30 including Indigenous language acquisition by younger generations while
31 undertaking traditional harvesting activities on land or on the water, and in
32 particular, while fishing.
- 33 ○ In the Current Use of Land and Resources for Traditional Purposes section
34 ([Section 11.4](#)) of Part B the EAO predicted that TMJ-related traffic would have
35 negligible to low magnitude of effects to Indigenous access to fishing areas due
36 to relatively infrequent and short-duration interruptions to access.

1 Conclusion

2 In consideration of the available information, the EAO's consultation with Tsawout First Nation,
3 TJLP's commitments, the EAO's proposed EAC conditions if an EAC is issued and the
4 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor impact
5 on Tsawout First Nation's right to fish. The EAO considers TMJ-related increases to vessel traffic
6 during operations would be incremental compared to existing baseline conditions in the Traffic
7 Separation Scheme of the Salish Sea.

8 The key factors that were considered in support of EAO's conclusion on the impacts to the right
9 to fish are summarized as follows:

10 **Biophysical:**

- 11 • The EAO's conclusions in the Fish and Fish Habitat section in Part B which do not predict
12 any residual effects to fish and fish habitat in the MSA area; and
- 13 • The MSA area is a heavily utilized marine environment.

14 **Geospatial:**

- 15 • Tsawout First Nation harvests marine invertebrates and fishes throughout the MSA area
16 including in areas near to, or requiring crossing of, the shipping lanes;
- 17 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 percent
18 for segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
19 Separation Scheme of the Salish Sea; and
- 20 • The EAO's conclusions in the Current Use of Part B that TMJ-related vessel transits
21 during operations (minimum 30 years) would result in negligible to low magnitude
22 effects due to relatively infrequent and short-duration interruptions to access to areas in
23 the Salish Sea.

24 **Social, Cultural and Experiential:**

- 25 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
26 traffic during operations affecting visual quality, noise, and vessel wake (with an
27 increasing magnitude of effect the closer one is to the vessels);
- 28 • Safety and wake related concerns about marine shipping are limiting Tsawout First
29 Nation's ability to bring children out to experience reef net fishing, which could impact
30 intergenerational knowledge transfer; and
- 31 • Reef net fisheries are sacred, and Tsawout First Nation are working to revive them.

32 **Mitigations:**

- 1 • Proposed mitigations for impacts to Tsawout First Nation’s right to fish include the
2 Marine Communications Plan recommended as KMMs under CEAA 2012.

3 *B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING*

4 The EAO evaluated the potential effects on hunting, trapping and gathering rights attributable
5 to TMJ in [Section 13.3.2](#) above that apply broadly to Indigenous Groups. The EAO is satisfied
6 that the key impacts to biophysical components resulting in changes to wildlife and vegetation
7 quantity and quality, changes in access to hunting, trapping and gathering areas, and changes
8 to social, cultural, and spiritual values associated with traditional hunting, trapping and
9 gathering activities that apply to Tsawout First Nation are summarized in [Section 13.3.2](#).

10 The MSA reported that Tsawout First Nation’s preferred marine birds harvested for traditional
11 purposes were ducks and geese. Duck hunting currently occurs in the area around Sidney and
12 James Islands, from Saanichton Bay south to Cordova Bay and sites next to the shipping lanes
13 on the south side of Saturna Island and south and west of South Pender Island.

14 **Conclusion**

15 In consideration of the available information in [Section 13.3.2](#), the EAO’s consultation with
16 Tsawout First Nation, TJLP’s commitments, the EAO’s proposed EAC conditions if an EAC is
17 issued and the recommended KMMs under CEAA 2012, TMJ is expected to result in negligible
18 impact on Tsawout First Nation’s right to hunt, trap and gather.

19 The key factors that were considered in support of the EAO’s conclusion on the impacts to the
20 right to hunt, trap and gather included the EAO’s conclusions on adverse residual effects to
21 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
22 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
23 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
24 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
25 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
26 Heads to the 12 nm territorial limit.

27 To mitigate potential impacts to Tsawout First Nation’s right to hunt, trap and gather, the EAO
28 is recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
29 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
30 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
31 considered that the small relative increase due to TMJ-related vessel traffic would have a
32 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
33 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
34 Regulations and Legislation regulating vessel noise and lighting.

1 C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS

2 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
3 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
4 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
5 pathways to impacts based on review of publicly available information from RBT2 and TMX
6 processes, and any information provided by Indigenous Groups during the MSA review. The
7 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
8 experience and SRKWs would be the pathways to impacts to Tsawout First Nation's other
9 cultural and traditional interests.

10 The MSA reported that orcas are a key species in oral history, providing a sense of place and
11 well-being. It also explained that traditional travel routes are used seasonally to access fishing,
12 gathering, and hunting locations. These routes can intersect with the shipping lanes. The MSA
13 noted that Point Roberts was the most important village site and reef-net site, but Tsawout
14 First Nation no longer use it. Additional important sites in the MSA area are a first village site in
15 Tod inlet, burial sites on Pender, Scull, Saturna and Cabbage Islands and summer camps
16 throughout the Gulf Islands and Henry Island (U.S.A.).

17 Additional issues and concerns with potential impacts related to traditional and cultural
18 interests were raised by Tsawout First Nation during the EAs of RBT2 and TMX. These concerns
19 were not raised by Tsawout First Nation during the TMJ EA but the EAO considers them
20 applicable to the MSA area:

- 21 • Concerned with the potential for vessel strikes to whales, and the impacts of increased
22 underwater noise.
 - 23 ○ See in [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of
24 concerns related to the effects on whales. As discussed in that section, the EAO
25 concluded that TMJ would not result in significant residual effects to Marine
26 Mammals; however, the EAO notes that the current baseline of cumulative
27 effects to SRKWs are already high and that TMJ would contribute additional
28 residual effects from shipping noise and potential avoidance behaviour by
29 SRKWs to ships, such that cumulative effects to SRKWs are considered
30 significant.
 - 31 ○ The EAO is recommending a KMM under CEAA 2012 for a Vessel Traffic
32 Management Plan that would require TJLP to incorporate contractual measures
33 to support participation of TMJ-related vessels in the VFPA-led ECHO Program
34 seasonal slowdown initiatives (as amended) or a future equivalent, and annual
35 reporting on TJLP's participation in regional environmental management
36 measures and cumulative effects monitoring to protect SRKW, where feasible.

1 The seasonal slowdown initiatives currently request vessels to slow down in key
2 SRKW foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass.
3 The EAO notes several regional initiatives and measures have been implemented
4 by the Government of Canada to better understand and manage cumulative
5 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

- 6 • Concerns regarding impact of wake erosion on currently unknown burial sites
 - 7 ○ It was determined that the TMJ-related vessel wake would be within natural
8 variation of the wave heights in this area, as discussed in the Vessel Wake
9 section in Part B.

10 Conclusion

11 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
12 impacts on Tsawout First Nation's other cultural and traditional interests, although the EAO
13 acknowledges that there is uncertainty in the relationship between incremental increases in
14 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
15 the available information in [Section 13.3.3](#), the EAO's consultation with Tsawout First Nation,
16 TJLP's commitments, the EAO's proposed EAC conditions if an EAC is issued and the
17 recommended KMMs under CEAA 2012, TMJ-related marine shipping effects combined with
18 cumulative effect in the MSA area is expected to result in moderate-to-serious impact on
19 Tsawout First Nation's other traditional and cultural interests. The EAO's conclusions of
20 significant cumulative effects to SRKW was a major key factor considered in the EAO's
21 seriousness determination. The EAO notes several regional initiatives and measures have been
22 implemented by the Government of Canada to better understand and manage cumulative
23 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

24 The key factors that were considered in support of the EAO's conclusion on the impacts to
25 other traditional and cultural interests are summarized as follows:

26 Cultural and Heritage Resources:

- 27 • The EAO's conclusions in the Heritage Resources section of Part B did not predict
28 residual effects on Heritage Resources ([Section 7.1](#)) from erosion due to wake effects
29 along the shorelines of the MSA area;
- 30 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
31 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
32 cumulative effects to SRKWs due to underwater noise; and
- 33 • The MSA area is a heavily utilized marine environment.

34 Geospatial:

- 1 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
2 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
3 Separation Scheme of the Salish Sea would result in negligible to low magnitude effects
4 due to relatively infrequent and short-duration interruptions to access to areas in the
5 Salish Sea.

6 **Social, Cultural, Experiential:**

- 7 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
8 traffic during operations affecting visual quality, noise, and vessel wake (with an
9 increasing magnitude of effect the closer one is to the vessels);
- 10 • Potential concerns regarding safety of small vessels with large vessels and wake effects
11 as assessed in the Accidents and Malfunctions and Effects of the Environment section of
12 Part B; and
- 13 • Tsawout First Nation’s special cultural and spiritual relationship to SRKWs.

14 **Mitigations:**

- 15 • Proposed mitigations for potential impacts to traditional and cultural interests are the
16 recommended key mitigations under CEAA 2012 for a Marine Communications, and
17 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
18 Program; and
- 19 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
20 Plan that would require TJLP to incorporate contractual measures to support
21 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
22 initiatives (as amended) or a future equivalent, and annual reporting on TJLP’s
23 participation in regional environmental management measures and cumulative effects
24 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
25 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
26 Banks, Haro Strait and Boundary Pass.

27 **16.7 T'SOU-KE (SOOKE) FIRST NATION**

28 **16.7.1 COMMUNITY PROFILE**

29 T’Sou-ke First Nation describes themselves as a First Nation located on the southwest coast of
30 Vancouver Island that has resided within its traditional territory since time immemorial. That
31 territory extends beyond its reserve lands from approximately Beechey Head to the east and
32 Port Renfrew to the west, north to the Koksilah River, and south towards the United States,

1 including the Northern Straits (otherwise known as the Strait of Juan de Fuca) and Secretary
2 Island (“Territory”).

3 T’Sou-ke First Nation is part of the Te’mexw Treaty Association. Te’mexw traditional territory is
4 located in two main areas, southern Vancouver Island in the Greater Victoria area and on the
5 east coast of Vancouver Island around Nanoose Bay. There are 1,675 Te’mexw members from
6 five nations: Malahat, Nanoose, Songhees, Scia’new, and T’Sou-ke. T’sou-ke is also part of the
7 Naut’sa mawt Tribal Council, along with Halalt, Klahoose, Malahat, Tla’amin, Nanoose,
8 Snuneymuxw, Stz’iminus, Tsawwassen, Tseil-Waututh, and Homalco First Nations. T’sou-ke First
9 Nation has two reserves and, as of February 2022, has a registered population of 315 people
10 with 125 living on own reserve, 188 living off-reserve and 2 living on other reserves²⁴³.

11 The T’Sou-ke language is a distinct dialect of Northern Straits Salish, closely related to Saanich,
12 Songhees, Samish, Lummi, and Semiahmoo. The name T’Sou-ke is derived from a Straits Salish
13 word for a small stickleback fish that is commonly found at the mouth of the Sooke River.

14 T’Sou-ke First Nation note that the name “T’Sou-ke” emphasizes the connection that T’Sou-ke
15 First Nation has to its Territory and the resources therein. It is derived from a Straits Coast
16 Salish word for the rare and endangered stickleback fish that is found at the mouth of the
17 Sooke River, near one of T’Sou-ke First Nation’s ancestral village sites. T’sou-ke First Nation’s
18 Territory is of critical importance to its knowledge, use and occupancy, and the continued
19 ability of its members to meaningfully exercise its rights. That Territory includes the marine
20 environment, which has sustained T’Sou-ke First Nation members for generations, extending
21 beyond providing nourishment to an intimate connection with T’Sou-ke First Nation’s cultural
22 identity. For instance, salmon is used not only for food but also for sacred seasonal ceremonies.
23 The act of fishing has many communal aspects, bringing families together, supporting
24 community ties, and providing the transfer of T’Sou-ke First Nation’s knowledge and culture
25 through the generations. SRKWs are also an integral part of T’Sou-ke First Nation’s customs,
26 practices, traditions, and spirituality. To T’Sou-ke First Nation, SRKWs are supernatural beings
27 that often act as important messengers, communicating vital information that informs T’Sou-ke
28 First Nation’s stewardship of the marine environment in its Territory.

29 T’Sou-ke First Nation describe their Aboriginal rights as including rights to:

²⁴³ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – T’Sou-ke First Nation, https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=657&lang=eng, accessed March 22, 2022.

- 1 • harvest (fishing, hunting, trapping, and gathering) for subsistence, cultural, and
2 economic purposes, including all manner of marine and freshwater species. For
3 example, the five species of Pacific salmon have always been a major food source for
4 T'Sou-ke First Nation, and play a central role in T'Sou-ke First Nation's exercises of its
5 fishing and cultural rights;
- 6 • marine navigation and travel;
- 7 • traditional knowledge, culture, and way of life, such as maintaining areas of cultural
8 importance like seafood and game processing areas, and burial sites. A particular sacred
9 site of importance is the Northern Straits, which have been both a spiritual site and an
10 important trade and travel route since time immemorial; and
- 11 • self-governance.

12 T'Sou-ke First Nation also note their rights under the Douglas Treaty to carry on its fisheries "as
13 formerly" (including the rights to travel to and from that fishery), to hunt over unoccupied
14 lands, and to have its village sites remain free from disturbance. In addition, T'Sou-ke First
15 Nation noted their Aboriginal title to its entire Territory, including to the waters and marine
16 foreshore areas within it.

17 Historically, the T'Sou-ke First Nation predominantly utilized reef nets, known as SXOLE, to
18 catch running salmon in open water, deploying nets outside Sooke Harbour southeast from
19 Otter Point to Becher Bay. Reef nets could catch thousands of fish a day during the peak of the
20 summer Sockeye run and through drying and smoking, stocks of salmon could be kept for the
21 winter period. Halibut, lingcod, herring, and rockfish were other reliable sources of food
22 throughout the year. Marine invertebrates including crabs, mussels, sea urchins, cockles, and
23 numerous species of clams were gathered along the shorelines at low tide. Marine hunters
24 used nets or harpoons to catch seals and porpoises, which were caught for their meat and oil.
25 Harvesting of resources from the sea by fishing, gathering, and hunting is of primary
26 importance, with each particular resource occupying a distinct time period during the yearly
27 cycle. T'Sou-ke First Nation members see the marine and inland ecosystems as intimately
28 connected.

29 The five species of migratory Pacific salmon (sockeye, Coho, chinook or spring, pink, and chum)
30 have always been a major food source for the T'Sou-ke First Nation people and continue to play
31 a central role in T'Sou-ke First Nation fishing practices. Sockeye are the most important species.
32 Salmon are harvested in the Strait of Juan de Fuca and in the Sooke River. The use of reef nets
33 has been revitalized in recent years as the technique has been shown to be an effective means
34 of both harvesting and monitoring salmon. Salmon fishing is a notably important activity not

1 only to get enough fish to see families through the winter, but also as a communal event where
2 they spent time learning and interacting with their entire family.

3 T'Sou-ke First Nation members reported harvesting, fishing, and cultural activities in the Strait
4 of Juan de Fuca including trapping crab, fishing for lingcod, halibut, rock cod, dogfish, herring,
5 and five Pacific salmon species, and using fish traps. Many members report travelling to Port
6 Renfrew annually to harvest smelt. T'Sou-ke First Nation members also report gaffing for
7 salmon in some small rivers along the Strait. Use is especially intensive between Race Rocks and
8 China Beach.

9 Along the coastal areas in the Strait of Juan de Fuca T'Sou-ke First Nation reports: place names;
10 a birth place; seafood processing areas; smokehouses; gathering places (for elders' gatherings,
11 youth gatherings, picnics, seafood collecting, camping, and smelting); ceremonial places (for
12 dances, feasts, and greeting protocols associated with Tribal Journeys); medicinal plant
13 gathering areas; teaching places (where members learn to gather seafood, berries, and
14 medicinal plants and traditional craft making); and spiritual places. T'sou-ke First Nation
15 members reported that water routes in the Strait of Juan de Fuca are used for tribal journeys,
16 fishing trips, marine invertebrate harvesting trips and travel across the Strait of Juan de Fuca
17 has important transportation, cultural, and teaching value. Many of the Tribal Journey canoe
18 routes reproduce traditional travel routes used by Coast Salish ancestors for trading and
19 attending potlatches.

20 Sooke Harbour and Sooke Basin comprise a very heavily used area in which many T'Sou-ke First
21 Nation participants reported fishing for anchovies and herring in the 1980s and 1990s, ongoing
22 fishing for salmon (chum and coho), perch, flounder, steelhead, and cutthroat trout, and setting
23 shrimp and crab traps. The foreshore and coastal areas of Sooke harbour and Sooke Basin
24 comprise of areas for clam harvesting (including butter clams, manila clams, littleneck clams,
25 and cockles), collecting oysters and mussels and raking crabs; an oyster farm that the
26 T'Sou-ke First Nation is establishing in the basin; hunting ducks and geese; picking berries
27 (including blackberries, blueberries, Oregon grapes, salmon berries, salal berries,
28 thimbleberries, strawberries, and black caps), picking sweet grass; and collecting firewood.

29 **16.7.2 T'SOU-KE FIRST NATION INVOLVEMENT IN THE CONSULTATION** 30 **PROCESS**

31 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
32 sent a letter to these groups inviting comments on the draft Section 13 Order, including
33 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
34 EAO under the Section 13 Order amended the geographic scope for the assessment of the

1 marine shipping route and added the Indigenous groups identified in Schedule D which
2 included the T'Sou-ke First Nation. For the review of the MSA, the EAO led consultation
3 activities with the Indigenous groups identified in Schedule D and, as part of this work, invited
4 T'Sou-ke First Nations to participate in the Marine Shipping Working Group. The EAO is of the
5 view that it has approached consultation with T'Sou-ke First Nation at the deeper end of the
6 spectrum, with the intent to identify potential impacts and consider ways to address any
7 potential impacts to Aboriginal Interests that were identified by T'Sou-ke First Nation within the
8 MSA area.

9 During the MSA review, EAO invited T'Sou-ke First Nation to review and provide comments on
10 TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including Part C of the
11 Assessment Report), the draft CPD, draft Certificate Conditions and recommended KMMs under
12 CEAA 2012. As part of the Marine Shipping Working Group, T'Sou-ke First Nation was invited to
13 participate in Marine Shipping Working Group meetings during the MSA Supplemental Analysis
14 Review stages. The EAO offered to meet directly with T'Sou-ke First Nation to discuss TMJ, EA
15 process, and any potential concerns with TMJ.

16 During the MSA review, T'Sou-ke First Nation sent two letters to the EAO that outlining T'Sou-
17 ke First Nation's key concerns related to TMJ and the EA process. T'Sou-ke First Nation's main
18 concerns included that the MSA should be scoped out beyond 12 nm within Canada's territorial
19 sea as a legal requirement of CEAA 2012, proposed measures in the MSA to reduce effects from
20 underwater noise and vessel strikes to SRKW should not be considered as mitigations since
21 these are either voluntary, not pro-active (i.e., reporting out on strikes after they happen), or
22 not specific to TMJ, and a new Indigenous land and resource use study would be needed to
23 understand the potential impacts to T'Sou-ke First Nation's current use in the MSA area. The
24 letters identified that T'Sou-ke First Nation did not give consent for the EAO to apply land and
25 resource use information provided through RBT2 and TMX to the MSA for TMJ, and considers
26 this information may be incomplete (i.e., RBT2 process is still ongoing), out of date, and not
27 applicable to impacts specific to TMJ.

28 During the MSA review, the EAO met directly with T'Sou-ke First Nation to discuss TMJ, EA
29 process, and any potential concerns with TMJ. T'Sou-ke First Nation met separately with TJLP in
30 relation to TMJ. The EAO responded to the letters and also had follow up dialogue to better
31 understand the concerns raised in the letters sent by T'Sou-ke First Nation. The EAO considered
32 T'Sou-ke First Nation's feedback provided on the MSA and the EAO endeavoured to reflect
33 T'Sou-ke First Nation's concerns and perspectives related to potential impacts to
34 T'Sou-ke First Nation's Aboriginal Interests due to TMJ and the consultation process in Part C of
35 the Assessment Report.

1 Based on these discussions the EAO understands that T'Sou-ke First Nation wants to ensure
2 that the Assessment Report included T'Sou-ke First Nation's perspective that, in addition to the
3 EAO's conclusions that underwater noise from TMJ-related marine shipping would have
4 potential for significant cumulative effects on SRKW, Decision Makers should also consider that
5 there could also be potential for TMJ-related marine shipping effects in critical habitat for
6 SRKW located in Canada's EEZ beyond 12 nm. Further information related to concerns raised by
7 Indigenous Group's with respect to scoping of the MSA and reliance on information from RBT2
8 and TMX processes is provided in [Section 13](#) of this Report.

9 Also, through dialogue the EAO was able to explain that the Part B conclusions were not based
10 on an assumption that the proposed mitigations for SRKW, including TJLP's participation in
11 regional programs, would completely mitigate potential impacts from TMJ-related vessels for
12 the same reasons that T'Sou-ke provided. The EAO understands that Indigenous Groups have a
13 strong spiritual and cultural connection to SRKWs and that the Government of Canada will
14 continue working with Indigenous Peoples, members of the ECHO Program, the marine
15 industry, and other governments to adaptively manage the recovery of SRKWs. For more
16 information about the EAO's considerations of existing regional Government of Canada
17 initiatives please see [Section 13.1.2](#) of this Report.

18 The EAO acknowledges there is some uncertainty associated with the EAO's conclusions on the
19 overall potential seriousness of impact from TMJ (i.e., TMJ effects combined with cumulative
20 effects) on Aboriginal Interests and Treaty Rights. The level of uncertainty in the EAO's
21 conclusions is affected by multiple factors, including the extent of the EAO's understanding of
22 the locations where Indigenous Groups practice their Aboriginal Interests in the MSA area, or
23 the complex relationship between incremental increases in shipping from TMJ-related vessels
24 and cumulative effects to Aboriginal Interests, for example. As described in the Current Use of
25 Lands and Resources for Traditional Purposes section of Part B, the EAO found it is reasonable
26 to expect that past effects would combine with effects from TMJ-related marine shipping to
27 result in significant cumulative effects to current use for fishing and other cultural use of marine
28 areas for Indigenous Groups that preferentially use or rely on sites located at TMJ or within and
29 adjacent to shipping lanes. Please see [Section 13.2.1](#) for additional information related to the
30 concerns raised by Indigenous Groups related to the EAO's reliance on publicly available
31 information from RBT2 and TMX processes for the MSA of TMJ.

1 16.7.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND ASSERTED ABORIGINAL 2 INTERESTS

3 The following sections focus on potential impacts of TMJ to T'Sou-ke First Nation's Douglas
4 Treaty rights and asserted Aboriginal Interests. A discussion of the EAO's assessment approach
5 is provided in [Section 12.2](#) Impact Assessment Methods of this Report.

6 The EAO considered information available, including from public sources. The EAO reached out
7 to T'Sou-ke First Nation regarding potential effects on its Douglas Treaty rights and Aboriginal
8 Interests and received a letter outlining the T'Sou-ke First Nations perspectives on TMJ which
9 the EAO considered in our assessment below.

10 The following sections focus on potential impacts of TMJ to T'Sou-ke First Nation's Douglas
11 Treaty right and asserted Aboriginal Interests, mitigations, and accommodations to address
12 potential impacts.

13 A. POTENTIAL IMPACTS ON FISHING

14 The EAO evaluated the potential effects on fishing rights attributable to TMJ which are
15 summarized in [Section 13.3.1](#). In addition, the EAO considered the potential effects based on
16 review of the RBT2 and TMX processes. The EAO is satisfied that the key impacts to biophysical
17 components resulting in changes to fish quantity and quality, changes in access to fishing
18 resources, and changes to social, cultural, and spiritual values associate with traditional fishing
19 activities that apply to T'Sou-ke First Nation are summarized in [Section 13.3.1](#).

20 Additional issues and concerns with potential impacts related to fishing were raised by T'Sou-ke
21 First Nation during the EAs of RBT2 and TMX. These concerns were not raised by T'Sou-ke First
22 Nation during the TMJ EA but the EAO considers them applicable to the MSA area:

23 Cumulative effects such as declining runs, environmental degradation, fishing regulations, and
24 vessel wakes are described as barriers limiting T'Sou-ke First Nation harvest, who view it as
25 violating their Douglas Treaty and Aboriginal Interests. The RBT2 Panel report noted that T'Sou-
26 ke First Nation also noted that their community was already facing curtailment of their
27 traditional activities due to the existing shipping taking place through their territory. They
28 stated that additional ships would hinder their members in travelling by boat in their territorial
29 waters to reach preferred harvesting areas and culturally significant sites.

- 30 • Concern that the increase in vessel traffic associated would adversely impact salmon,
31 halibut and other marine species by further congesting migration paths and reducing
32 available habitat.
- 33 ○ See [Section 13.3.1](#) for detailed discussion to address this concern. As discussed

1 in [Section 13.3.1](#), the proposed mitigation measures to address concerns
2 regarding impacts to these species are included in the fish and fish habitat
3 monitoring and mitigation plan. The EAO did not predict residual impacts to fish
4 and fish habitat in the MSA area from TMJ-related vessels.

- 5 • Concern about impacts on ability to exercise Aboriginal subsistence and commercial
6 harvesting of clams
 - 7 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
8 concerns related to these effects on environmental impacts to fish habitats. The
9 EAO considered that TMJ-related marine shipping in the MSA area may cause
10 infrequent, short-term, temporary disruptions predicted to result in negligible
11 effects on Indigenous access to terrestrially based gathering sites that are
12 accessed by boat from the pilot station at Sand Heads to the 12 nm territorial
13 limit. The EAO did not predict residual impacts to fish and fish habitat, including
14 shellfish, in the MSA area from TMJ-related vessels.
 - 15 ○ Marine shipping associated with TMJ would be required to meet the
16 international standards and Canadian regulations set out by Canada's
17 compliance-based marine safety and security system, which is designed to
18 protect life, property, and the marine environment.

19 Conclusion

20 In consideration of the available information; the EAO's consultation with T'Sou-ke First Nation;
21 T'Sou-ke First Nation's engagement with TJLP; TJLP's commitments; the EAO's proposed EAC
22 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
23 to result in negligible-to-minor impact on T'Sou-ke First Nation's right to fish. The EAO considers
24 TMJ-related increases to vessel traffic during operations would be incremental compared to
25 existing baseline conditions in the shipping lanes of the Salish Sea.

26 The key factors that were considered in support of the EAO's conclusion on the impacts to the
27 right to fish are summarized as follows:

28 Biophysical:

- 29 • EAO's conclusions in the Fish and Fish Habitat chapter in Part B which do not predict any
30 residual effects to fish and fish habitat in the MSA area; and
- 31 • The MSA area is a heavily utilized marine environment.

32 Geospatial:

- 33 • Key fishing areas for T'Sou-ke First Nation include the water routes in the Strait of Juan

- 1 de Fuca, Sooke Harbour, and Sooke Basin;
- 2 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
3 segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
4 Separation Scheme of the Salish Sea; and
- 5 • The EAO’s conclusions in the Current Use of Part B that TMJ-related vessel transits
6 during operations (minimum 30 years) would result in negligible to low magnitude
7 effects due to relatively infrequent and short-duration interruptions to access to areas
8 in the Salish Sea.

9 **Social, Cultural and Experiential:**

- 10 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
11 traffic during operations affecting visual quality, noise, and vessel wake (with an
12 increasing magnitude of effect the closer one is to the vessels);
- 13 • Due to small number of TMJ-related vessels relative to current and projected vessel
14 traffic these are predicted to have a negligible residual effect to experiential aspects of
15 fishing; and
- 16 • Potential concerns regarding safety of small vessels with large vessels and wake effects
17 Accidents and Malfunctions and Effects of the Environment, as assessed in the section in
18 Part B.

19 **Mitigations:**

- 20 • Proposed mitigations for impacts to T’Sou-ke First Nation’s right to fish include the
21 Marine Communications Plan recommended as a KMMs under CEAA 2012.

22 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

23 The EAO evaluated the potential effects on hunting, trapping and gathering activities
24 attributable to TMJ in [Section 13.3.2](#) above that apply broadly to Indigenous Groups. The EAO is
25 satisfied that the key impacts to biophysical components resulting in changes to wildlife and
26 vegetation quantity and quality, changes in access to hunting, trapping and gathering areas, and
27 changes to social, cultural, and spiritual values associated with traditional hunting, trapping and
28 gathering activities that apply to T’Sou-ke First Nation are summarized in [Section 13.3.2](#).

29 Additional issues and concerns with potential impacts related to hunting, trapping, and
30 gathering were raised by T’Sou-ke First Nation during the EAs of RBT2 and TMX. These concerns
31 were not raised by T’Sou-ke First Nation during the TMJ EA but the EAO considers them
32 applicable to the MSA area.

- 33 • Concern that wakes occurring in increased frequency as a result of TMJ-related vessels

1 would increase erosion and the ability of T'Sou-ke members to continue exercise their
2 rights in foreshore areas.

3 ○ It was determined that the TMJ-related vessel wake would be within natural
4 variation of the wave heights in this area, see the Vessel Wake section of Part B
5 of this Report.

6 ○ The EAO acknowledges that wakes generated by TMJ vessels would be larger the
7 closer one is to the vessel and that the presence of LNG carriers may be
8 considered disturbing for safety and/or aesthetic reasons, or for other reasons.

9 **Conclusion**

10 In consideration of the available information, the EAO's consultation with T'Sou-ke First Nation,
11 T'Sou-ke First Nation's engagement with TJLP, TJLP's commitments, the EAO's proposed EAC
12 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
13 to result in negligible impact on T'Sou-ke First Nation's hunting, trapping, and gathering
14 activities.

15 The key factors that were considered in support of the EAO's conclusion on the impacts to the
16 hunting, trapping, and gathering included the EAO's conclusions on adverse residual effects to
17 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
18 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
19 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
20 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
21 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
22 Heads to the 12 nm territorial limit.

23 To mitigate potential impacts to T'Sou-ke First Nation's right to hunt, trap and gather, the EAO
24 is recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
25 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
26 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
27 considered that the small relative increase due to TMJ-related vessel traffic would have a
28 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
29 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
30 Regulations and Legislation regulating vessel noise and lighting.

31 ***C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS***

32 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
33 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
34 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
35 pathways to impacts based on review of publicly available information from RBT2 and TMX

1 processes, and any information provided by Indigenous Groups during the MSA review. The
2 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
3 experience and SRKWs would be the pathways to impacts to T'Sou-ke First Nation other
4 traditional and cultural interests.

5 T'Sou-ke First Nation raised the following concerns regarding potential impacts on the
6 traditional and cultural interests from TMJ:

- 7 • Concerned about adverse and cumulative impacts to SRKWs, including impacts to
8 SRKWs related to critical habitat beyond the 12 nm scoping of the MSA and limitations
9 of proposed mitigation measures noted in the MSA like the Whale Alert App or
10 participation in regional initiatives such as the VFPA-led ECHO Program seasonal
11 slowdown initiatives.
 - 12 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of
13 concerns related to the effects on whales. As discussed in [Section 13.3.3](#), the
14 EAO concluded that TMJ would not result in significant residual effects to Marine
15 Mammals; however, the EAO notes that the current baseline of cumulative
16 effects to SRKWs are already high and that TMJ would contribute additional
17 residual effects from shipping noise and potential avoidance behaviour by
18 SRKWs to ships, such that cumulative effects to SRKWs are considered
19 significant. The EAO recommends the Vessel Traffic Management Plan as KMMs
20 under CEAA 2012 that would require TJLP to incorporate contractual measures
21 to support participation of TMJ-related vessels in the VFPA-led ECHO Program
22 seasonal slowdown initiatives (as amended) or a future equivalent, and annual
23 reporting on TJLP's participation in regional environmental management
24 measures and cumulative effects monitoring to protect SRKW, where feasible.
25 The seasonal slowdown initiatives currently request vessels to slow down in key
26 SRKW foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass.
27 The EAO also notes several regional initiatives and measures have been
28 implemented by the Government of Canada to better understand and manage
29 cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).
 - 30 • Concerns about potential impacts from a spill of any kind.
 - 31 ○ In the Accidents and Malfunctions and Effects of the Environment section of Part
32 B of this Report, with consideration of the MSA, it was determined that the risk
33 of an LNG or bunker fuel release would have consequence severities ranging
34 from moderate to very high with the very high having potentially irreversible
35 effects. However, the likelihood of these spills was estimated to range from rare
36 to extremely rare, with extremely rare being those causing SRKWs fatality or
37 irreversible damage to heritage resources.

1
2 Additional issues and concerns with potential impacts related to traditional and cultural
3 interests were raised by T'Sou-ke First Nation during the EAs of RBT2 and TMX. These concerns
4 were not raised by T'Sou-ke First Nation during the TMJ EA but the EAO considers them
5 applicable to the MSA area:

- 6 • Concern about the introduction of invasive species into waters by way of transport in
7 ballast water, disrupting the marine and coastal ecosystem and the ability both to
8 harvest preferred species, and to harvest preferred species in preferred locations,
9 including in areas of cultural and spiritual significance to T'Sou-ke First Nation
 - 10 ○ In the Fish and Fish Habitat section and Water section of this report, the EAO
11 notes that the potential introduction of invasive species from ballast water
12 discharge would be sufficiently managed through adherence to federal
13 regulations (*Canada Shipping Act, 2001*) and international conventions (for
14 example, MARPOL Convention) that prohibit these activities in the Fraser River
15 and MSA area.
 - 16 ○ See [Section 13.2.1](#) for a detailed discussion of the analysis and resolution of
17 concerns related to these effects on environmental impacts to habitats. As
18 discussed in [Section 13.2.1](#), the proposed mitigation measures to address this
19 concern are included in the OEMP, and fish and fish habitat monitoring and
20 mitigation plan.
- 21 • Concern that the increase in ship traffic has the potential to adversely affect and infringe
22 on T'Sou-ke First Nations rights by hindering boat travel and disrupting access to
23 harvesting areas and culturally significant sites. T'Sou-ke also voiced concern with
24 proper assessment of boats and boat movements (i.e. speed).
 - 25 ○ The EAO notes that the RBT2 process included information about T'Sou-ke First
26 Nation's connection to other communities on Vancouver Island and the USA
27 through canoe journeys and how travel by canoe in the Salish Sea is integral to
28 T'Sou-ke First Nation culture.
 - 29 ○ In the Current Use section of Part B of this Report it was determined that with
30 the marine transportation regulatory regime, as well as low frequency and short
31 duration of TMJ-related traffic there would be negligible to low magnitude of
32 effect on Indigenous access in the MSA area. TJLP has stated that TMJ's influence
33 on TMJ-related vessel operations would be limited beyond TMJ's marine
34 terminal area, TJLP has committed to a Marine Communication Plan out to 12
35 nm that would be developed in consultation with Schedule B and D Indigenous
36 Groups and include a communication procedure to inform Indigenous Groups of

- 1 vessel schedules and provide a complaint submission process.
- 2 ○ The EAO is recommending as a KMM under CEAA 2012 a Vessel Traffic
3 Management Plan that would require TJLP to incorporate contractual measures
4 to support participation of TMJ-related vessels in the VFPA-led ECHO Program
5 seasonal slowdown initiatives (as amended) or a future equivalent, and annual
6 reporting on TJLP's participation in regional environmental management
7 measures and cumulative effects monitoring to protect SRKW, where feasible.
8 The seasonal slowdown initiatives currently request vessels to slow down in key
9 SRKW foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass..
- 10 ● Concern that wakes occurring in increased frequency as a result of TMJ-related vessels
11 would increase erosion and the ability of T'Sou-ke members to continue exercise their
12 Rights traditional activities in foreshore areas.
- 13 ○ The EAO agrees with TJLP's assessment that TMJ-related vessel wakes wave
14 energy would be within natural variation of the wave heights in this area (see the
15 Vessel Wake section (Section 5.4) of Part B)) and concludes that TMJ would have
16 no residual effects on heritage resources from erosion due to wake
17 effects/propeller wash in the MSA area.
- 18 ○ The EAO considered that TMJ-related marine shipping may cause infrequent,
19 short-term, temporary disruptions predicted to result in negligible effects on
20 Indigenous access to terrestrially based sites that are accessed by boat from the
21 pilot station at Sand Heads to the 12 nm territorial limit.

22 Conclusion

23 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
24 impacts on T'Sou-ke First Nation's other cultural and traditional interests, although the EAO
25 acknowledges that there is uncertainty in the relationship between incremental increases in
26 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
27 the available information, the EAO's consultation with T'Sou-ke First Nation, T'Sou-ke First
28 Nation's engagement with TJLP, TJLP's commitments and the EAO's proposed EAC conditions if
29 an EAC is issued and the recommended KMMs under CEAA 2012, the EAO concludes that TMJ-
30 related marine shipping effects combined with cumulative effects in the MSA area is expected
31 to result in moderate-to-serious impact on T'Sou-ke First Nation's other traditional and cultural
32 interests. The EAO's conclusions of significant cumulative effects to SRKW was a major key
33 factor considered in the EAO's seriousness determination. The EAO notes several regional
34 initiatives and measures have been implemented by the Government of Canada to better
35 understand and manage cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

1 The key factors that were considered in support of EAO's conclusion on the impacts to other
2 traditional and cultural interests are summarized as follows:

3 **Cultural and Heritage Resources:**

- 4 • The EAO's conclusions in the Heritage Resources section of Part B did not predict
5 residual effects to Heritage Resources ([Section 7.1](#)) from erosion due to wake effects
6 along the shorelines of the MSA area;
- 7 • The EAO's conclusions in Part B section on Marine Mammals, which found low to
8 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
9 cumulative effects to SRKWs due to underwater noise; and
- 10 • The MSA area is a heavily utilized marine environment.

11 **Geospatial:**

- 12 • T'Sou-ke First Nation reports many culturally important areas along the coast areas of
13 the Strait of Juan de Fuca including place names; a birth place; gathering places (for
14 elders' gatherings, youth gatherings, ceremonial, teaching and spiritual places);
- 15 • T'Sou-ke First Nation's connection to other communities on Vancouver Island and the
16 USA through canoe journeys (including crossing shipping lanes); and
- 17 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
18 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
19 Separation Scheme of the Salish Sea would result in negligible to low magnitude effects
20 due to relatively infrequent and short-duration interruptions to access to areas in the
21 Salish Sea.

22 **Social, Cultural, Experiential:**

- 23 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
24 traffic during operations affecting visual quality, noise, and vessel wake (with an
25 increasing magnitude of effect the closer one is to the vessels);
- 26 • T'Sou-ke First Nation's connections to cultural use areas, other communities through
27 traditional travel ways, and traditional practices such as canoe journeys in the MSA area
28 are important to T'Sou-ke First Nation culture;
- 29 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
30 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
31 Part B; and
- 32 • T'sou-ke First Nation's cultural and spiritual interest in SRKWs

1 Mitigations:

- 2 • Proposed mitigations for potential impacts to traditional and cultural interests are the
3 recommended key mitigations under CEAA 2012 for a Marine Communications, and
4 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
5 Program; and
- 6 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
7 Plan that would require TJLP to incorporate contractual measures to support
8 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
9 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
10 participation in regional environmental management measures and cumulative effects
11 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
12 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
13 Banks, Haro Strait and Boundary Pass.

14 16.8 MALAHAT NATION

15 16.8.1 COMMUNITY PROFILE

16 Malahat Nation (Malahat) is one of five members of the W̱SÁNEĆ (Saanich) Nation, along with
17 the Tsawout First Nation, Tsartlip First Nation, Tseycum First Nation, and Pauquachin First
18 Nation. W̱SÁNEĆ is part of the larger Coast Salish cultural group which has occupied the Gulf of
19 Georgia continuously for thousands of years. Malahat is also part of the Naut'sa mawt Tribal
20 Council along with Halalt, Klahoose, T'Sou-ke, Tla'amin, Snaw-naw-as (Nanoose), Snuneymuxw,
21 Stz'iminus, Tsawwassen, Tseil-Waututh, and Homalco First Nations. Malahat Nation is located
22 on the east coast of Vancouver Island and has two reserves. As of February 2022, Malahat
23 Nation has a registered population of 361 people with 141 living on Malahat Nation reserves,
24 163 living off-reserve, and 57 living on other reserves²⁴⁴. Malahat First Nation is part of the
25 Northern Straits Salish language group and speaks SENĆOŦEN along with other W̱SÁNEĆ.

26 Malahat First Nation traditional marine use was heavily influenced by the seasons. Malahat
27 First Nation engaged in seasonal round-based on hunting, fishing, harvesting, and preserving
28 seafood and making houses, canoes, weapons, and tools. Community members had permanent
29 winter villages on Vancouver Island where they had potlatches and dance ceremonies and

²⁴⁴ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Malahat Nation. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=647&lang=eng, Accessed March 22, 2022.

1 prepared items for inter-community trade. Malahat families travelled to coastal regions and
2 islands (e.g. Saanich Inlet and Gulf Islands) in the summer, following salmon movements as fish
3 were their most important resource. The W̱SÁNEĆ would net sockeye and humpback (pink)
4 salmon all the way out to Point Roberts beginning in late spring, returning to the Saanich Inlet
5 in the fall when the seasonal round cycle ended with chum salmon harvested at Goldstream.
6 During the summer the Malahat visited other communities via trails and travelways throughout
7 the West Coast and into the Rocky Mountains to compete in contests, attend ceremonies, and
8 trade.

9 W̱SÁNEĆ families maintained reef net fishing sites throughout their traditional marine territory
10 along the salmon migration route to the Fraser River. The Malahat First Nation see places of
11 traditional use as holistic and transcending space and time. Traditional use cannot be
12 delineated into past and present; instead, traditional use is seen in the context of time
13 immemorial, and equal value is placed upon past, present, and future use sites and practices.

14 Malahat First Nation continues to harvest marine and terrestrial wildlife species, from a few
15 primary locations: Saanich Inlet, Cowichan River and Shawnigan Lake area, Fraser River coastal
16 region, and Gulf and San Juan Islands region. Salmon is still the most important subsistence
17 species harvested by the Malahat; additional species such as cod, steelhead, halibut, herring
18 and herring roe, lingcod, crab, oyster, clam, sea urchin, and others are also harvested. The
19 Malahat First Nation report hunting sea lion, seal, harbour porpoise, duck, bear, deer, duck, and
20 pheasant. SRKWs are not currently harvested but still used as an indicator species to monitor
21 ecosystem health and for the cultural activity of whale viewing.

22 The Malahat First Nation use blueberries, salmon berries, thimble berries, strawberries,
23 raspberries, cucumber, hops, cauliflower, kelp, and seaweed gathered throughout their
24 traditional territory for food, fuel, and material.

25 Malahat Nation's sacred sites are located throughout their traditional territory and include
26 ceremonial, spiritual, and burial sites. Community gatherings are also sacred events where
27 Salish culture is transmitted to maintain cultural continuity. Trails and travelways are still
28 important to the Malahat for continuing their relationships with other Salish communities.

29 **16.8.2 MALAHAT FIRST NATION INVOLVEMENT IN THE CONSULTATION** 30 **PROCESS**

31 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
32 sent a letter to Indigenous groups identified in Schedule D inviting comments on the draft
33 Section 13 Order, including consultation processes and opportunities. On August 6, 2019, at the
34 request of Canada, the EAO under the Section 13 Order amended the geographic scope for the

1 assessment of the marine shipping route and added the Indigenous groups identified in
2 Schedule D which included the Malahat First Nation. For the review of the MSA, the EAO led
3 consultation activities with the Indigenous groups identified in Schedule D and, as part of this
4 work, invited Malahat First Nation to participate in the Marine Shipping Working Group. The
5 EAO is of the view that it has approached consultation with Malahat First Nation at the deeper
6 end of the spectrum, with the intent to identify potential impacts and consider ways to address
7 potential impacts to Aboriginal Interests that were identified by Malahat First Nation within the
8 MSA area.

9 During the MSA review, the EAO invited Malahat First Nation to review and provide comments
10 on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including Part C of
11 the Assessment Report), the draft CPD, draft Certificate Conditions and recommended KMMs
12 under CEAA 2012. As part of the Marine Shipping Working Group, Malahat First Nation was
13 invited to participate in Marine Shipping Working Group meetings during the MSA
14 Supplemental Analysis Review stages. During the MSA review, the EAO met directly with
15 Malahat First Nation to discuss TMJ, EA process, and any potential concerns with TMJ.

16 **16.8.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

17 The following sections focus on potential impacts of TMJ to Malahat First Nation's Douglas
18 Treaty rights to hunt and fish and other interests. A discussion of the EAO's assessment
19 approach is provided in Impact Assessment Methods of Part C ([Section 12.2](#)).

20 Canada recognizes the Douglas Treaties and understands Malahat First Nation has members
21 who are descendants of one or more signatories to one or more Douglas Treaties. Canada
22 remains committed to working toward a common understanding of the content and scope of
23 the Douglas Treaties with Malahat First Nation, to implement the treaty through agreements
24 with the Crown, and to explore opportunities to honour and recognize the Douglas Treaties.

25 British Columbia recognizes that Malahat First Nation asserts Aboriginal Interests and Douglas
26 Treaty rights in the MSA and seeks information to inform this understanding through
27 consultation with Malahat First Nation. During the MSA review, the EAO invited Malahat Nation
28 to review and provide comments on TJLP's MSA Supplemental Analysis, the EAO's draft
29 Assessment Report (including Part C of the Assessment Report), the draft CPD and draft
30 Certificate Conditions. As part of the Marine Shipping Working Group, Malahat Nation was
31 invited to participate in Marine Shipping Working Group meetings during the MSA
32 Supplemental Analysis, and BVSA Report Review stages. During review of TJLP's BVSA Report,
33 Malahat Nation attended two Working Group meetings. The EAO offered to meet directly with
34 Malahat Nation to discuss TMJ, the EA process, and any potential concerns with TMJ.

1 The EAO considered information available, including from public sources as well as relevant
2 issues raised by Malahat First Nation and members during the EA process (e.g., in meetings), in
3 the following assessments of the potential impacts of TMJ on Malahat First Nation's Douglas
4 Treaty rights to hunt and fish and other interests.

5 The following sections focus on potential impacts of TMJ to Malahat First Nation's Douglas
6 Treaty right to hunt and fish and other interests, mitigations, and accommodations to address
7 potential impacts.

8 *A. POTENTIAL IMPACTS ON FISHING*

9 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
10 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to the
11 potential shipping-related effects based on review of the RBT2 and TMX processes. The EAO is
12 satisfied that the key impacts to biophysical components resulting in changes to fish quantity
13 and quality, changes in access to fishing resources, and changes to social, cultural, and spiritual
14 values associate with traditional fishing activities that apply to Malahat First Nation are
15 summarized in [Section 13.3.1](#).

16 During the EA, Malahat First Nation expressed concern that TJLP's assessment underestimated
17 the magnitude of residual effects to fish and fish habitat from TMJ-related construction and
18 marine shipping, including disturbances to brackish water habitats for juvenile salmon,
19 potential for environmental contamination due to spills and contribution to further salmon
20 declines and ongoing impacts in the Fraser River and MSA.

- 21 • See [Section 13.3.1](#) for a detailed discussion of issues and concerns raised by Indigenous
22 Groups related to the effects on fish, fish habitat and fishing rights. The EAO is
23 proposing federal KMMs under CEAA 2012, including the Fish Mitigations to Reduce
24 Harm and Mortality, Fish Habitat Offset Plan, and Study and Vessel Traffic Management
25 Plan and concludes that effects to fish and fish habitat from TMJ would not be
26 significant within the LAA/RAA and no residual effects were predicted within the MSA.

27 During the EA, Malahat First Nation expressed concern that TMJ-related shipping activities
28 would negatively impact Malahat harvesters' safety and experience during harvesting and that
29 predicted vessel wake were likely underestimated in the EA because only the calmest days
30 during the summer months are selected for traditional activities such as harvesting and canoe
31 journeys and there are accounts of canoes sinking due to wakes from freighters. Malahat First
32 Nation asked whether the TJLP could enforce a mandatory vessel slowdown in these areas to
33 mitigate effects.

- 34 • As outlined in the Current Use assessment in Part B, potential negligible to low
35 magnitude impacts to the experiential aspect of fishing in the MSA due to TMJ-related

1 vessel traffic and potential concerns regarding safety regularly occurring vessels transits
2 during the operations for Indigenous Groups who harvest fish in, or in proximity to, the
3 navigational channel or shipping lanes, or those who need to cross these areas to access
4 fishing resources;

- 5 • TJLP has stated that TMJ's influence on TMJ-related vessel operations would be limited
6 beyond TMJ's marine terminal area, but TJLP has committed to a Marine
7 Communication Plan out to 12 nm that would be developed in consultation with
8 Schedule B and D Indigenous Groups and include procedures to inform Indigenous
9 Groups of traffic schedules, for Indigenous Groups to provide feedback on adverse
10 effects related to navigation as a result of TMJ, and for TJLP to document and respond
11 to feedback in a timely manner; and
- 12 • The EAO also acknowledges that the TMJ-specific mitigation measures would not reduce
13 impacts to quality of experience because some Indigenous people may find the
14 presence and sounds of LNG carriers disturbing for safety and/or aesthetic reasons, or
15 for other reasons.

16 **Conclusion**

17 In consideration of the available information, the EAO's consultation with Malahat First Nation,
18 TJLP's commitments, and the EAO's proposed EAC conditions if an EAC is issued and the
19 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor impact
20 on Malahat First Nation's right to fish. The EAO considers TMJ-related increases to vessel traffic
21 during operations would be incremental compared to existing baseline conditions in the Traffic
22 Separation Scheme of the Salish Sea

23 The key factors that were considered in support of the EAO's conclusion on the impacts to the
24 right to fish are summarized as follows:

25 **Biophysical:**

- 26 • The EAO's conclusions on in the Fish and Fish Habitat chapter in Part B which do not
27 predict any residual effects to fish and fish habitat in the MSA area; and
- 28 • The MSA area is a heavily utilized marine environment.

29 **Geospatial:**

- 30 • Malahat First Nation continues to harvest marine species, from a few primary locations:
31 Saanich Inlet, Cowichan River and Shawnigan Lake area, Fraser River coastal region, and
32 Gulf and San Juan Islands region;
- 33 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for

1 segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
2 Separation Scheme of the Salish Sea; and

- 3 • The EAO’s conclusions in the Current Use of Part B that TMJ-related vessel transits
4 during operations (minimum 30 years) would result in negligible to low magnitude
5 effects due to relatively infrequent and short-duration interruptions to access to areas
6 in the Salish Sea.

7 **Social, Cultural and Experiential:**

- 8 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
9 traffic during operations affecting visual quality, noise, and vessel wake (with an
10 increasing magnitude of effect the closer one is to the vessels); and
11 • Malahat First Nation have informed the EAO that traditional harvesting by Malahat First
12 Nation is reserved for the calmest days in the summer.

13 **Mitigations:**

- 14 • Proposed mitigations for impacts to Malahat First Nation’s right to fish include the
15 Marine Communications Plan recommended as KMMs under CEAA 2012.

16 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

17 The EAO evaluated the potential effects on hunting, trapping and gathering rights attributable
18 to TMJ which apply broadly to Indigenous Groups. These potential effects are summarized in
19 [Section 13.2.2](#). In addition, the EAO considered the potential effects based on review of the
20 RBT2 Panel process and TMX. The EAO is satisfied that the key impacts to biophysical
21 components resulting in changes to wildlife and vegetation quantity and quality, changes in
22 access to hunting, trapping and gathering areas, and changes to social, cultural, and spiritual
23 values associated with traditional hunting, trapping and gathering activities that apply to
24 Malahat First Nation are summarized in [Section 13.2.1](#).

25 Additional issues and concerns with potential impacts related to hunting, trapping, and
26 gathering were raised by Malahat First Nation during the EAs of RBT2 and TMX. These concerns
27 were not raised by Malahat First Nation during the TMJ EA but the EAO considers them
28 applicable to the MSA area.

- 29 • Concerns regarding noise generated by vessels nearby terrestrial-based harvesting
30 activities, such as hunting, may interrupt or disrupt these activities.
31 ○ The EAO’s conclusions in the Current Use section of Part B of this Report
32 determined that noise resulting from TMJ-related shipping activities would not
33 result in a measurable effect on hunting, trapping, or gathering in the MSA area.

1 Conclusion

2 In consideration of the available information in [Section 13.3.2](#), which outlines the potential
3 effect to hunting, trapping and gathering, consultation with Malahat First Nation, TJLP's
4 commitments, and the EAO's proposed EAC conditions if an EAC is issued and the
5 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible impact on
6 Malahat First Nation's right to hunt, trap and gather.

7 The key factors that were considered in support of EAO's conclusion on the impacts to the right
8 to hunt, trap and gather included the EAO's conclusions on adverse residual effects to wildlife
9 in the MSA area predict negligible to low magnitude mortality of select marine bird species. The
10 EAO also considered that in the MSA area, operations (30 years in duration) may cause
11 infrequent, short-term, temporary disruptions to marine-based hunting along the proposed
12 LNG vessel route and negligible effects on Indigenous access to terrestrially based hunting,
13 trapping, and gathering sites that are accessed by boat from the pilot station at Sand Heads to
14 the 12 nm territorial limit.

15 To mitigate potential impacts to Malahat First Nation's right to hunt, trap and gather, the EAO
16 is recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
17 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
18 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
19 considered that the small relative increase due to TMJ-related vessel traffic would have a
20 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
21 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
22 Regulations and Legislation regulating vessel noise and lighting.

23 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

24 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
25 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
26 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
27 pathways to impacts based on review of publicly available information from RBT2 and TMX
28 processes, and any information provided by Indigenous Groups during the MSA review. The
29 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
30 experience and SRKWs would be the pathways to impacts to Malahat First Nation's other
31 cultural and traditional interests.

32 Malahat First Nation raised the following concerns regarding potential impacts on other
33 traditional and cultural interests due to TMJ:

- 34 • Interest in reducing effects to travel required for food harvest, ecotourism, tribal
35 journeys (canoe voyage)

- 1 ○ The EAO predicted in the Current Use of Lands and Resources for Traditional
2 Purposes section of this Report that relatively infrequent and short duration
3 interruptions to access to marine areas in the Salish Sea due to TMJ-related
4 vessel traffic would be negligible to low magnitude. The EAO is recommending a
5 KMM under CEAA 2012 for a Marine Communication Plan to 12 nm including a
6 communication procedure for TJLP to share traffic schedules with Indigenous
7 Groups, however the EAO acknowledges that Indigenous people may find the
8 presence and sound of LNG carriers disturbing for safety and/or aesthetic
9 reasons, or for other reasons.
- 10 ● Concerns about potential risks related to marine shipping including pilotage areas,
11 impacts to human health and the environment from spills and spill liability
12 compensation.
- 13 ○ Marine shipping associated with TMJ would be required to meet the
14 international standards and Canadian regulations set out by Canada's
15 compliance-based marine safety and security system, which is designed to
16 protect life, property, and the marine environment. Refer to the Accidents and
17 Malfunctions chapter ([Section 9.3](#)) for more details.
- 18 ○ The EAO is recommending a KMM under CEAA 2012 for a Marine Shipping
19 Emergency Response Outreach Program that would facilitate the integration of
20 plans for responding to incidents in transit into existing emergency response
21 systems, primarily the CCG's Incident Integrated Response Plans
- 22 ● Concern about the effects of increased marine shipping on SRKW. The EAO also
23 understands that SRKW are of importance to Malahat First Nation culture because
24 Malahat First Nation identified this during the EAs of RBT2 and TMX and therefore EAO
25 considered this applicable to the MSA area During the MSA review, Malahat First Nation
26 expressed concern that underwater noise and vessel strikes from TMJ-relative vessel
27 increases would have impacts on SRKWs and indicated that Indigenous groups should be
28 involved in auditing the whale strike self-reporting program and suggested that TMJ-
29 vessels travel at reduced speeds of 10 knots to mitigate risk of whale strikes.
- 30 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of
31 concerns related to the effects on whales. As discussed in [Section 13.3.3](#), the
32 EAO concluded that TMJ would not result in significant residual effects to Marine
33 Mammals; however, the EAO notes that the current baseline of cumulative
34 effects to SRKWs are already high and that TMJ would contribute additional
35 residual effects from shipping noise and potential avoidance behaviour by
36 SRKWs to ships, such that cumulative effects to SRKWs are considered

- 1 significant.
- 2 ○ The EAO has recommended KMMs under CEAA 2012 for Vessel Traffic
- 3 Management Plans that would require TJLP to incorporate contractual measures
- 4 to support participation of TMJ-related vessels in the VFPA-led ECHO Program
- 5 seasonal slowdown initiatives (as amended) or a future equivalent, and annual
- 6 reporting on TJLP's participation in regional environmental management
- 7 measures and cumulative effects monitoring to protect SRKW, where feasible.
- 8 The seasonal slowdown initiatives currently request vessels to slow down in key
- 9 SRKW foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass. In
- 10 response to the concerns raised by Malahat First Nation, the EAO updated the
- 11 recommended KMM under CEAA 2012 requiring TJLP to report vessel marine
- 12 mammal collisions to Indigenous Groups, in addition to DFO.
- 13 ● Concerns regarding increased erosion of shoreline and effect on archaeological
- 14 resources.
- 15 ○ Malahat First Nation expressed concern that TJLP's estimation that vessel-
- 16 related waves from the shipping lane would be indiscernible from the natural
- 17 wave environment for areas that vessels pass closer to the shoreline (e.g., Areas
- 18 in zones 1, 2 and 3, around the southern gulf islands and Victoria) as erosion
- 19 impacts are higher. Malahat First Nation asked whether TJLP could enforce a
- 20 mandatory vessel slowdown in these areas or incentivize vessels to be retrofitted
- 21 with engine and propeller noise reductions technologies to mitigate effects.
- 22 Malahat First Nation suggested further estimations for wake effects consider
- 23 location and times with low natural wave energy and not only consider average
- 24 values.
- 25 ○ The EAO agrees with TJLP's assessment that TMJ-related vessel wakes wave
- 26 energy would be negligible in comparison to the natural wave environment and
- 27 concludes that TMJ would have no residual effects on heritage resources from
- 28 erosion due to wake effects/propeller wash in the MSA area, including shorelines
- 29 located closer to the shipping lanes.
- 30 ● Concerns regarding marine safety and navigation associated with vessels and wake.
- 31 During the EA, Malahat First Nation expressed concern that TMJ-related shipping
- 32 activities would negatively impact members safety and experience during canoe
- 33 journeys and vessel wake-effects were likely underestimated as only the calmest days
- 34 during the summer months are selected for traditional activities including harvesting
- 35 and canoe journeys. The Malahat First Nation reported accounts of canoes sinking due
- 36 to wakes from freighters. During the MSA review, Malahat First Nation asked whether

- 1 TJLP could enforce a mandatory vessel slowdown in these areas to mitigate effects.
- 2 ○ The EAO considers that the safety of small vessels with large vessels and wake
3 effects were assessed in the Accidents and Malfunctions and Section of Part B
4 and that TMJ associated marine shipping would include monitoring of
5 compliance with maritime regulations and legislation such as the *Canada*
6 *Shipping Act* and the Collision Regulations.
- 7 ○ The EAO is recommending a KMM under CEAA 2012 for a Marine
8 Communication Plan out to 12 nm with procedures to inform Indigenous Groups
9 of traffic schedules, for Indigenous Groups to provide feedback on adverse
10 effects related to navigation as a result of TMJ, and for TJLP to document and
11 respond to feedback in a timely manner.
- 12 ● Malahat First Nation suggested a potential mitigation to implement a cap a trade system on
13 commercial vessels to reduce cumulative effects from marine shipping in the region.
- 14 ○ In response to this recommendation, TC communicated to Malahat First Nation that
15 under the Ocean's Protection Plan, through the Cumulative Effects of Marine
16 Shipping (CEMS) Initiative and Indigenous and Local Communities Engagement
17 Partnership Program (ILCEPP), the Commitment to Action and Results (C2AR) Accord
18 was signed in 2019 with the First Nations Fisheries Council under ILCEPP, and CEMS
19 has been identified as a priority initiative to proceed under the Indigenous Ship
20 Movement and Vessel Management Coordination Committee (SVCC), as part of this
21 approach.
- 22 ○ The EAO understands that that next steps under this initiative include the co-
23 development of a Terms of Reference and workplan for conducting the South Coast
24 wide regional cumulative effects assessment of marine shipping, with the SVCC, but
25 TC was also interested in working with South Coast Nations in sub-regional
26 assessments that would address more localized marine shipping issues and
27 assessment priorities, and would also inform the larger South Coast wide
28 assessment, in a multi-layered assessment approach and that discussions are
29 ongoing between the TC CEMS team and Malahat First Nation in this regard. Further
30 information related to the EAO's consideration of existing regional Government of
31 Canada initiatives, is included in [Section 13.1.1](#).
- 32 Additional issues and concerns with potential impacts related to traditional and cultural
33 interests were raised by Malahat First Nation during the EAs of RBT2 and TMX. These concerns
34 were not raised by Malahat First Nation during the TMJ EA but the EAO considers them
35 applicable to the MSA area:
- 36 ● Concerns regarding impact of vessel traffic on cultural revival activities and livelihood.

- 1 ○ In the Current Use section in Part B of this Report it was determined that with the
2 marine transportation regulatory regime, as well as low frequency and short
3 duration of TMJ-related traffic there would be negligible to low magnitude effects
4 on Indigenous access to areas in the MSA area.

5 **Conclusion**

6 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
7 impacts on Malahat First Nation's other cultural and traditional interests, although the EAO
8 acknowledges that there is uncertainty in the relationship between incremental increases in
9 shipping, the availability of cultural resources such as SRKW. In consideration of the available,
10 the EAO's consultation with Malahat First Nation, TJLP's commitments and the EAO's proposed
11 EAC conditions if an EAC is issued and the recommended KMMs under CEAA 2012, the impacts
12 from TMJ combined with cumulative effects is expected to result in moderate-to-serious impact
13 on Malahat First Nation's other traditional and cultural interests. The EAO's conclusions of
14 significant cumulative effects to SRKW was a major key factor considered in the EAO's
15 seriousness determination. The EAO notes several regional initiatives and measures have been
16 implemented by the Government of Canada to better understand and manage cumulative
17 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

18 The key factors that were considered in support of EAO's conclusion on the impacts to other
19 traditional and cultural interests are summarized as follows:

20 **Cultural and Heritage Resources:**

- 21 • The EAO's conclusions in the Heritage Resources section of Part B did not predict
22 residual effects on Heritage Resources ([Section 7.1](#)) from erosion due to wake effects
23 along the shorelines of the MSA area;
- 24 • The EAO's conclusions in the Marine Mammals section of Part B, which found residual
25 effects from TMJ-related vessels on SRKWs and significant cumulative effects to SRKWs
26 due to underwater noise; and
- 27 • The MSA area is a heavily utilized marine environment.

28 **Geospatial:**

- 29 • The EAO's conclusions in the Current Use section in Part B found that TMJ-related vessel
30 transits would be regular and of relatively short duration passing through areas in the
31 Salish Sea; and
- 32 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
33 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
34 Separation Scheme of the Salish Sea would result in negligible to low magnitude effects

1 due to relatively infrequent and short-duration interruptions to access to areas in the
2 Salish Sea.

3 **Social, Cultural, Experiential:**

- 4 • Potential negligible to low impacts from TMJ-related vessel traffic during operations
5 affecting visual quality, noise and vessel wake (with an increasing magnitude of effect
6 the closer one is to the vessels);
- 7 • Traditional activities such as harvesting, and canoe journeys are preferentially carried
8 out during the calmest days in the summer;
- 9 • Concerns regarding safety of small vessels with large vessels and wake effects, as
10 assessed in the Accidents and Malfunctions and Effects of the Environment section in
11 Part B; and
- 12 • Malahat First Nation's cultural and spiritual interest in SRKWs.

13 **Mitigations:**

- 14 • Proposed mitigations for potential impacts to traditional and cultural interests are the
15 recommended key mitigations under CEAA 2012 for Marine Communications and Vessel
16 Traffic Management Plans and Marine Shipping Emergency Response Outreach
17 Program;
- 18 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
19 Plan that would require TJLP to incorporate contractual measures to support
20 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
21 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
22 participation in regional environmental management measures and cumulative effects
23 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
24 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
25 Banks, Haro Strait and Boundary Pass; and
- 26 • The EAO acknowledges that these mitigation measures would not reduce impacts for
27 baseline conditions and/ or impact of future projects, which are a source of issues for
28 many Indigenous Groups.

29

1 16.9 TSARTLIP FIRST NATION

2 16.9.1 COMMUNITY PROFILE

3 WJOLĒLP (Tsartlip) First Nation is one of five members of the WŚÁNEĆ (Saanich) Nation, along
4 with the Tsawout First Nation, Pauquachin First Nation, Tseycum First Nation, and Malahat First
5 Nation; Tsartlip First Nation is the largest. WŚÁNEĆ is part of the larger Coast Salish cultural
6 group which has occupied the Gulf of Georgia continuously for thousands of years. Tsartlip First
7 Nation is located on the Saanich Peninsula on Vancouver Island and has four reserves. As of
8 February 2022, Tsartlip First Nation has a registered population of 1,031 with 536 living on
9 Tsartlip First Nation reserves, 368 living off-reserve, and 127 living on other reserves²⁴⁵. Tsartlip
10 First Nation territory includes the lands and waters of the WŚÁNEĆ.

11 WJOLĒLP (Tsartlip) means “Place of the maple leaves,” named after the Broad-leaf maples in
12 Saanich. The Tsartlip origin story describes a woman and her young son, KWELOXWNTHET,
13 fleeing East Saanich to escape violence and wandering throughout XWSANETS (Saanich
14 Peninsula) until coming to a beautiful place the woman names WXTS’HELH (Tsartlip). The
15 woman stays there to raise her son, and the Tsartlip people become known as TS’ESINGSET,
16 meaning “growing up,” referring to people who raise themselves up to never be defeated
17 again. In WŚÁNEĆ creation stories the Creator X’ALS turns their ancestors into islands and tells
18 the remaining people to look after their “relatives of the deep.” As many components of nature
19 were people transformed and gifted to the WŚÁNEĆ, they see themselves as equal actors in
20 their environment and maintain these relationships through rituals and laws.

21 The WŚÁNEĆ have the traditional role of ocean stewards and a cultural commitment to
22 maintain ecosystem balance. This sacred, timeless responsibility guides the practices of the
23 contemporary Tsartlip First Nation in managing their marine territory to benefit all inhabitants.
24 XWSANETS is the “home base” of the WŚÁNEĆ. This name means “raised up” or “emerging
25 people” and derives from the image of the landscape presented to canoes approaching in the
26 water. The naming practice based on the perspective of the water reveals the fundamental
27 nature of marine territory to the WŚÁNEĆ worldview. Before contact, the WŚÁNEĆ Nations
28 were a single group of extended families sharing the SENĆOŦEN language, stewardship
29 responsibilities, and a cultural order revolving around their relations with marine creatures,

²⁴⁵ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Tsartlip. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=653&lang=eng, Accessed March 23, 2022.

1 spirit beings, and one another. The relationship of the W̱SÁNEĆ with their marine environment
2 drives their society, economy, culture, and identity.

3 W̱SÁNEĆ families had permanent winter settlements on the Saanich Peninsula and temporary
4 settlements throughout the San Juan and southern Gulf Islands and across the Salish Sea to
5 Point Roberts and Boundary Bay. This territory is defined by the pursuit of the five salmon
6 species and steelhead and is where the W̱SÁNEĆ assert continuous and exclusive use and
7 occupation since time immemorial. The 1987 Saanich Declaration describes W̱SÁNEĆ territory
8 as “[encompassing] all [their] Spiritual Places, medicine and fruit gathering places, fishing
9 stations, hunting and trapping areas, winter and summer homesites, burial sites, meditation
10 places and all our territories in between these places.”

11 Tsartlip First Nation has Douglas Treaty Rights to hunt on unoccupied lands and carry on their
12 fisheries “as formerly.” Tsartlip First Nation asserts that it holds Aboriginal rights and title
13 within its territory. Shipping traffic transits through Tsartlip First Nation territorial waters.
14 Cumulative effects such as declining runs, environmental degradation, fishing regulations, and
15 vessel wakes are barriers limiting Tsartlip First Nation harvest, violating their Douglas Treaty
16 and Aboriginal rights.

17 Tsartlip First Nation use the Salish Sea to hunt, fish, gather, travel, and harvest; harvest varies
18 according to the tides, season, and traditional W̱SÁNEĆ calendar. Marine foods are the
19 preferred Tsartlip First Nation diet. Tsartlip First Nation conduct both subsistence and
20 commercial fishing and harvesting via small boats to feed their families and communities and
21 for inter-community trade.

22 W̱SÁNEĆ continue to gather seaweed and hunt deer and ducks on islands near the shipping
23 lanes. The surf scoter is prized by the W̱SÁNEĆ for sacred ceremonial use. Herring and herring
24 roe were traditionally harvested in the area but, according to Tsartlip First Nation, no longer
25 persist due to frequent ship traffic. Marine invertebrate harvesting plays a significant role in
26 feeding the community. Chiton and sea urchin are preferred by the Tsartlip First Nation and are
27 highly culturally valuable but currently difficult to find.

28 The Coast Salish are sometimes called the “salmon people” due to heavy reliance on salmon for
29 seasonal rounds and cultural practices. Unlike other Coast Salish peoples, the W̱SÁNEĆ did not
30 have major rivers within their territory, so fished for salmon in the sea through their unique
31 reef net method and were thus called the “saltwater people.” FEKI (sockeye) is the most prized
32 species of the Coast Salish, including for the W̱SÁNEĆ. The Tsartlip First Nation have continued
33 reliance on salmon for sustenance. Next to salmon, halibut were a preference of the Coast
34 Salish and were referred to as E’lis, meaning “sister.”

35 Fish were caught using the unique SXOLE (reef net), as well as gaffs, harpoons, and dip and
36 trawl nets. The W̱SÁNEĆ had reef net fishing sites throughout their traditional territory; reef net

1 fishing is a way of life and is part of the W̱SÁNEĆ identity. The largest immemorial reef net claim
2 was at Point Roberts and another on ŚNEWIŁ (the Fraser River), but this fishery is not currently
3 practiced as it was outlawed by the government in 1916; the W̱SÁNEĆ are working to revive this
4 sacred fishery. Tsartlip Indian Band identified Active Pass, Swanson Channel and Boundary Pass,
5 Pender Island and Race Rocks as locations of historic reef-net sites within the MSA. Harvesters
6 report salmon fishing locations at Stuart Island and southwest of San Juan Island and indicate
7 that the preferred travel route for accessing these locations is boating directly east from the
8 Saanich Peninsula across the international border.

9 Tsartlip First Nation reported burial sites, midden sites and villages within the MSA including
10 sites throughout the Gulf Islands and specifically Saturna Island, Coates Cove, Grace Islet and
11 multiple site in and around the Saanich Peninsula.

12 The Tsartlip First Nation have a spiritual connection with KELLOLEMEĆEN (orcas), which guide
13 Tsartlip First Nation harvesters in their marine voyages and are used to track salmon. The
14 Tsartlip First Nation and orcas have a mutual responsibility to protect each other. Harm to orcas
15 constitutes a great loss to the Tsartlip First Nation, as when ocean health is jeopardized so is
16 that of the W̱SÁNEĆ.

17 The Tsartlip First Nation have preferred traditional marine use sites for fishing, gathering,
18 travelling, and hunting, as well as burial, heritage, and sacred sites that are vulnerable to
19 disturbance.

20 **16.9.2 TSARTLIP FIRST NATION INVOLVEMENT IN THE CONSULTATION** 21 **PROCESS**

22 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
23 sent a letter to these groups inviting comments on the draft Section 13 Order, including
24 consultation processes and opportunities.

25 On August 6, 2019, at the request of Canada, the EAO under the Section 13 Order amended the
26 geographic scope for the assessment of the marine shipping route and added the Indigenous
27 groups identified in Schedule D which included the Tsartlip First Nation. For the review of the
28 MSA, the EAO led consultation activities with the Indigenous groups identified in Schedule D
29 and, as part of this work, invited Tsartlip First Nation to participate in the Marine Shipping
30 Working Group. The EAO is of the view that it has approached consultation with Tsartlip First
31 Nation at the deeper end of the spectrum, with the intent to identify potential impacts and
32 consider ways to address potential impacts to Aboriginal Interests that were identified by
33 Tsartlip First Nation within the MSA area.

1 During the MSA review, the EAO invited Tsartlip First Nation to review and provide comments
2 on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including Part C of
3 the Assessment Report), the draft CPD, draft Certificate Conditions and recommended KMMs
4 under CEAA 2012. As part of the Marine Shipping Working Group, Tsartlip First Nation was
5 invited to participate in Marine Shipping Working Group meetings during review of TJLP's MSA
6 Supplemental Analysis and BVSA Report. To support Tsartlip First Nation's participation in the
7 MSA for TMJ, the EAO and IAAC provided capacity funding in the form of grants. In a letter to
8 the EAO dated April 26, 2022, Tsartlip First Nation confirmed interest in participating in the
9 duration of the EA for TMJ. Also in its letter, Tsartlip First Nation identified concerns that TMJ
10 will have cumulative and negative impacts (both direct and indirect) to Tsartlip's Aboriginal and
11 Douglas Treaty rights and interests and that Tsartlip First Nation is concerned that these
12 impacts, would further impair the ability of Tsartlip members to practice their constitutionally
13 protected Aboriginal and Douglas Treaty rights in and around the Project area and throughout
14 Tsartlip's marine territories.

15 The EAO is of the view that it has approached consultation with Tsartlip First Nation at the
16 deeper end of the spectrum, with the intent to identify potential impacts and consider ways to
17 address any potential impacts to Aboriginal Interests that were identified by Tsartlip First
18 nation within the MSA area. The EAO offered to meet directly with Tsartlip First Nation to
19 discuss TMJ, EA process, and any potential concerns with TMJ. The EAO considered Tsartlip First
20 nation's concerns and perspective related to potential impacts to Tstartlip First Nation's
21 Aboriginal Interests due to TMJ in Part C of the Assessment Report.

22 **16.9.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

23 The following sections focus on potential impacts of TMJ to Tsartlip First Nation's Douglas
24 Treaty rights to hunt and fish and other interests. A discussion of the EAO's assessment
25 approach is provided in [Section 12.2](#) Impact Assessment Methods of Part C.

26 The EAO considered information available, including from public sources. The EAO reached out
27 to Tsartlip First Nation regarding potential effects on Douglas Treaty rights and other interests,
28 mitigations, and accommodations to address potential impacts but did not receive a response.
29 The following sections focus on potential impacts of TMJ to Tsartlip First Nation's Douglas
30 Treaty rights to hunt and fish, and other interests, mitigations, and accommodations to address
31 potential impacts.

32 **A. POTENTIAL IMPACTS ON FISHING**

33 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
34 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to the

1 potential shipping-related effects based on review of the RBT2 and TMX processes. The EAO is
2 satisfied that the key impacts to biophysical components resulting in changes to fish quantity
3 and quality, changes in access to fishing resources, and changes to social, cultural, and spiritual
4 values associate with traditional fishing activities that apply to Tsartlip First Nation are
5 summarized in [Section 13.3.1](#).

6 The MSA reported on a variety of marine invertebrate harvesting and fishing locations in the
7 MSA area, including near the Gulf Islands and islands in the U.S.A. The MSA also noted locations
8 of historic Tsartlip First Nation reef-net sites within the MSA area, which are considered sacred,
9 including Active Pass, Swanson Channel, Boundary Pass, the southern tip of South Pender Island
10 and at Race Rocks, in addition to a variety of locations in the USA.

11 The EAO is aware that Tsartlip First Nation consider that the most significant impacts related to
12 marine shipping would be from the various effects of significantly increased vessel traffic in
13 Tsartlip's marine waters; and the cumulative environmental effects of the already extensive
14 development, shipping, and marine activities within Tsartlip's traditional territory. The EAO
15 heard from Tsartlip First Nation concern that TMJ will have cumulative and negative impacts
16 (both direct and indirect) to Tsartlip's Aboriginal Interests and that these impacts, particularly
17 those affecting fish and fish habitat, the SRKWs, and human health, would further impair the
18 ability of Tsartlip members to practice their constitutionally protected Aboriginal and Douglas
19 Treaty rights in and around the Project area and throughout Tsartlip's marine territories.

20 Additional issues and concerns with potential impacts related to fishing were raised by Tsartlip
21 First Nation during the EAs of RBT2 and TMX. These concerns were not raised by Tsartlip First
22 Nation during the TMJ EA but the EAO considers them applicable to the MSA area.

23 • Concerns regarding increased shipping related effects on fish (including salmon and
24 shellfish), their habitat, and the ability of Tsartlip First Nation to harvest them. Concern
25 that the increase in shipping traffic would hinder boat travel and disrupt access to
26 traditional harvesting areas as well as make traditional practices of marine harvesting
27 unsafe. Concerns that additional shipping would displace recreational fishers and
28 increase competition in adjacent high value areas where resources are already limited.
29 Adequate fishing resources are of high cultural importance both for food security,
30 cultural identity, and ceremonial purposes.

31 ○ See [Section 13.3.1](#) for a detailed discussion of the analysis and resolution of
32 impacts to fish and fishing rights. As discussed in [Section 13.3.1](#), the EAO is
33 recommending KMMs under CEAA 2012 for the Fish Mitigations to Reduce Harm
34 and Mortality, Fish Habitat Offset Plan, and Vessel Traffic Management Plan to
35 address these concerns. The EAO did not predict any residual effects to fish and
36 fish habitat in the MSA area.

- 1 ○ The EAO concluded that TMJ-related vessel wake would be within natural
2 variation of the wave heights in this area (see the Vessel Wake section in Part B
3 of this Report). The EAO acknowledges that wakes generated by TMJ vessels
4 would be larger the closer one is to the vessel and that the presence of LNG
5 carriers may be considered disturbing by Indigenous people for safety and/or
6 aesthetic reasons, or for other reasons.
- 7 ○ In the Current Use section of this Report, the EAO predicted regularly occurring
8 and short-duration vessel movements through fishing areas would have
9 negligible to low magnitude effects to access to harvesting sites in the MSA area.
10 TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
11 limited beyond TMJ's marine terminal area, TJLP has committed a Marine
12 Communication Plan out to 12 nm that would be developed in consultation with
13 Schedule B and D Indigenous Groups and include procedures to inform
14 Indigenous Groups of traffic schedules, for Indigenous Groups to provide
15 feedback on adverse effects related to navigation as a result of TMJ, and for TJLP
16 to document and respond to feedback in a timely manner.

17 **Conclusion**

18 In consideration of the available information, the EAO's consultation with Tsartlip First Nation,
19 TJLP's commitments, the EAO's proposed EAC conditions if an EAC is issued, and the
20 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor impact
21 on Tsartlip First Nation's right to fish. The EAO considers TMJ-related increases to vessel traffic
22 during operations would be incremental compared to existing baseline conditions in the Traffic
23 Separation Scheme of the Salish Sea.

- 24 • The EAO considered Tsartlip First Nation's perspectives on cumulative effects and
25 Tsartlip First Nation's ability to meaningfully practice their fishing rights in the MSA area.
26 The EAO acknowledges that there are already vessels transiting the shipping lanes which
27 can impact Indigenous fishers' access to and quality of experience of fishing. While the
28 EAO recognizes there is some uncertainty when considering how cumulative effects
29 impact Aboriginal Interests and practice of Treaty Rights, the EAO agrees with Tsartlip
30 First Nation, that any increase in vessel traffic at fishing areas within or adjacent with
31 marine shipping routes would potentially be more serious when combined with past,
32 present, and reasonably foreseeable shipping activities. For more information on the
33 EAO's consideration of current context and cumulative effects please see Section 13.1 of
34 Part C.

1 The key factors that were considered in support of the EAO's conclusion on the impacts to the
2 right to fish are summarized as follows:

3 **Biophysical:**

- 4 • The EAO's conclusions on adverse residual effects in the Fish and Fish Habitat chapter in
5 Part B which does not predict any residual effects to fish and fish habitat in the MSA
6 area;
- 7 • Tsartlip First Nation consider that TMJ will have cumulative and negative impacts (both
8 direct and indirect) to fish and fish habitat, which would further impair the ability of
9 Tsartlip members to practice their Aboriginal and Douglas Treaty rights in and around
10 the Project area and throughout Tsartlip's marine territories.

11 **Geospatial:**

- 12 • Tsartlip First Nation harvests marine invertebrates and fishes throughout the MSA area
13 including in areas near to, or requiring crossing of, the shipping lanes;
- 14 • Tsartlip First Nation consider the most significant impacts related to marine shipping
15 would be due to significantly increased vessel traffic and cumulative environmental
16 effects that would combine with extensive development, shipping, and marine activities
17 within Tsartlip First Nation's traditional territory.
- 18 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 percent
19 for segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
20 Separation Scheme of the Salish Sea; and
- 21 • The EAO's conclusions in the Current Use of Part B that TMJ-related vessel transits
22 during operations (minimum 30 years) would result in negligible to low magnitude
23 effects due to relatively infrequent and short-duration interruptions to access to areas
24 in the Salish Sea

25 **Social, Cultural and Experiential:**

- 26 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
27 traffic during operations affecting visual quality, noise, and vessel wake (with an
28 increasing magnitude of effect the closer one is to the vessels);
- 29 • Adequate fishing resources are of high cultural importance both for food security,
30 cultural identity, and ceremonial purposes for Tsartlip First Nation; and
- 31 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
32 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
33 Part B.

1 Mitigations:

- 2 • Proposed mitigations for impacts to Tsartlip First Nation's right to fish include the
3 Marine Communications, Plan recommended as KMMs under CEAA 2012.

4 *B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING*

5 The EAO evaluated the potential effects on hunting, trapping, and gathering rights attributable
6 to TMJ in [Section 13.3.2](#). In addition, the EAO considered the potential effects based on review
7 of the RBT2 Panel process and TMX. The EAO is satisfied that the key impacts to biophysical
8 components resulting in changes to wildlife and vegetation quantity and quality, changes in
9 access to hunting, trapping and gathering areas, and changes to social, cultural, and spiritual
10 values associated with traditional hunting, trapping and gathering activities that apply to
11 Tsartlip First Nation are summarized in [Section 13.3.2](#).

12 The MSA reported a variety of contemporary duck hunting locations including on the eastern
13 waters of Sidney Island, Sidney Spit, Sidney Channel, waters surrounding James Island, the spit
14 at Tsawout and Saanichton Bay. The MSA noted that the surf scooter is the preferred species
15 and is used for ceremonial purposes.

16 Additional issues and concerns with potential impacts related to hunting, trapping, and
17 gathering were raised by Tsartlip First Nation during the EAs of RBT2 and TMX. These concerns
18 were not raised by Tsartlip First Nation during the TMJ EA but the EAO considers them
19 applicable to the MSA area.

- 20 • Concerns regarding impacts to coastal birds, their habitat, and the ability to harvest
21 them.
 - 22 ○ In the Current Use section in Part B of this Report it was determined that TMJ-
23 related shipping activities including noise, visual presence, and vessel wake
24 would have no measurable effect on the experience of hunting, trapping, and
25 gathering activities.

26 Conclusion

27 In consideration of the available information in [Section 13.3.2](#), the EAO's consultation with
28 Tsartlip First Nation, TJLP's commitments, the EAO's proposed EAC conditions if an EAC is issued
29 and the recommended KMMs under CEAA 2012, TMJ is expected to result in negligible impact
30 on Tsartlip First Nation's right to hunt, trap and gather.

31 The key factors that were considered in support of the EAO's conclusion on the impacts to the
32 right to hunt, trap and gather included the EAO's conclusions on adverse residual effects to
33 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
34 species. The EAO also considered that in the MSA area, operations (30 years in duration) may

1 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
2 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
3 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
4 Heads to the 12 nm territorial limit.

5 To mitigate potential impacts to Tsartlip First Nation's right to hunt, trap and gather, the EAO is
6 recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
7 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
8 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
9 considered that the small relative increase due to TMJ-related vessel traffic would have a
10 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
11 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
12 Regulations and Legislation regulating vessel noise and lighting.

13 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

14 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
15 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
16 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
17 pathways to impacts based on review of publicly available information from RBT2 and TMX
18 processes, and any information provided by Indigenous Groups during the MSA review. The
19 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
20 experience and SRKWs would be the pathways to impacts to Tsartlip First Nation's other
21 cultural and traditional interests.

22 The EAO notes that the RBT2 process included information that Tsartlip First Nation reported
23 traditional knowledge of travel routes by canoe across the shipping lanes from the Saanich
24 Peninsula to the Tsartlip First Nation settlements and traditional use sites throughout the
25 southern Gulf and San Juan Islands. The MSA reported on preferred travel routes to access
26 salmon fishing locations at Stuart island and southwest of San Juan Island by travelling directly
27 east from the Saanich Peninsula across the international border. The MSA noted that Tsartlip
28 First Nation has raised concerns about the impacts from shipping lanes and the exclusion
29 effects of larger vessels on smaller ones, in addition to impacts for noise, odours and wake
30 effects. Tsartlip First Nation has reported the presence of important sites (e.g. burial sites,
31 midden sites and village sites) throughout the Gulf Islands and some locations in the U.S.A.
32 including San Juan Island and a shore camp at Point Roberts.

33 Additional issues and concerns with potential impacts related to traditional and cultural
34 interest were raised by Tsartlip First Nation during the EAs of RBT2 and TMX. These
35 concerns were not raised by Tsartlip First Nation during the TMJ EA but the EAO considers
36 them applicable to the MSA area.

- 1 • Expressed concern that any impacts to SRKWs would adversely affect the entire valued
2 ecosystem of Tsartlip. SRKWs are an integral part of Tsartlip First Nation’s customs,
3 practices, traditions, and spirituality. Concerns that the potential mitigation measure to
4 reduce impacts on SRKWs (slowing down vessels) may lead to vessels spending
5 additional time in the shipping lanes and increasing the time that fishing and harvesting
6 rights are impacted.
- 7 ○ See [Section 13.2.3](#) for a detailed discussion of the analysis and resolution of
8 concerns related to the effects on whales. As discussed in [Section 13.2.3](#), the
9 EAO concluded that TMJ would not result in significant residual effects to Marine
10 Mammals; however, the EAO notes that the current baseline of cumulative
11 effects to SRKWs are already high and that TMJ would contribute additional
12 residual effects from shipping noise and potential avoidance behaviour by
13 SRKWs to ships, such that cumulative effects to SRKWs are considered
14 significant. The is EAO recommending a KMM under CEAA 2012 the Vessel Traffic
15 Management Plan that would require TJLP to incorporate contractual measures
16 to support participation of TMJ-related vessels in the VFPA-led ECHO Program
17 seasonal slowdown initiatives (as amended) or a future equivalent, and annual
18 reporting on TJLP’s participation in regional environmental management
19 measures and cumulative effects monitoring to protect SRKW, where feasible.
20 The seasonal slowdown initiatives currently request vessels to slow down in key
21 SRKW foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass.
22 The EAO also notes several regional initiatives and measures have been
23 implemented by the Government of Canada to better understand and manage
24 cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).
- 25 • Concerned about cumulative effects of increased shipping traffic and vessel size due to
26 multiple projects in the area. Ability to practice rights is already restricted due to traffic
27 and pollution.
- 28 ○ As outlined in the Current Use assessment in Part B, potential negligible to low
29 magnitude impacts to the experiential aspect of fishing in the MSA due to TMJ-
30 related vessel traffic and potential concerns regarding safety regularly occurring
31 vessels transits during the operations for Indigenous Groups who harvest fish in,
32 or in proximity to, the navigational channel or shipping lanes, or those who need
33 to cross these areas to access fishing resources.
- 34 ○ The EAO acknowledges Tsartlip First Nation’s worldview and perspective that
35 there are currently existing cumulative effects which have already affected
36 Tsartlip First Nation’s ability to exercise their fishing rights as preferred within

- 1 Tsartlip First Nation's asserted traditional territory.
- 2 ○ The EAO is recommending as a KMM under CEAA 2012 a Marine Communication
3 Plan out to 12 nm that would be developed in consultation with Schedule B and
4 D Indigenous Groups and include procedures to inform Indigenous Groups of
5 traffic schedules, for Indigenous Groups to submit any feedback on potential
6 adverse effects of TMJ-related vessels and for TJLP to respond in a timely
7 manner.
- 8 ● Concern about the potential impact of wake on archaeological sites located on exposed
9 shorelines. Establishing effective shore-based monitoring would require years of
10 planning effort, baseline data, and training to prepare for meaningful monitoring and
11 mitigation of adverse effects.
- 12 ○ The EAO concluded that TMJ-related vessel wake would be within natural
13 variation of the wave heights in this area (see the Vessel Wake section of this
14 Report). The EAO did not find any adverse residual effects to heritage resources
15 in the MSA area.
- 16 ● Concerned that light pollution, sound, odours, and the appearance of increasing large
17 vessels would adversely affect the psycho-social and cultural well-being of Tsartlip First
18 Nation members
- 19 ○ The EAO acknowledges that TMJ vessels would be larger the closer one is to the
20 vessel and that the presence of LNG carriers may be considered disturbing by
21 Indigenous people for safety and/or aesthetic reasons, or for other reasons.

22 The EAO heard from Tsartlip First Nation concern that TMJ will have cumulative and negative
23 impacts (both direct and indirect) to Tsartlip's Aboriginal Interests and that these impacts,
24 particularly those affecting fish and fish habitat, the SRKWs, and human health, would further
25 impair the ability of Tsartlip members to practice their constitutionally protected Aboriginal and
26 Douglas Treaty rights in and around the Project area and throughout Tsartlip's marine
27 territories.

28 **Conclusion**

29 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
30 impacts on Tsartlip First Nation's other cultural and traditional interests, although the EAO
31 acknowledges that there is uncertainty in the relationship between incremental increases in
32 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
33 the available information, the EAO's consultation with Tsartlip First Nation, TJLP's
34 commitments, the EAO's proposed EAC conditions if an EAC is issued and the recommended
35 KMMs under CEAA 2012, the EAO concludes that TMJ-related marine shipping effects

1 combined with cumulative effects in the MSA area is expected to result in moderate-to-serious
2 impact on Tsartlip First Nation's other traditional and cultural interests. The EAO's conclusions
3 of significant cumulative effects to SRKW was a major key factor considered in the EAO's
4 seriousness determination. The EAO notes several regional initiatives and measures have been
5 implemented by the Government of Canada to better understand and manage cumulative
6 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

7 The key factors that were considered in support of EAO's conclusion on the impacts to other
8 traditional and cultural interests are summarized as follows:

9 **Cultural and Heritage Resources:**

- 10 • The EAO's conclusions in Part B did not predict residual effects to Heritage Resources
11 ([Section 7.1](#)) from erosion due to wake effects along the shorelines of the MSA area;
- 12 • The EAO's conclusions in the Marine Mammals section in Part B, which found low to
13 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
14 cumulative effects to SRKWs due to underwater noise;
- 15 • Tsartlip First Nation consider that TMJ will have cumulative and negative impacts (both
16 direct and indirect) to SRKW and human health would further impair the ability of
17 Tsartlip members to practice their Aboriginal and Douglas Treaty rights in and around
18 the Project area and throughout Tsartlip's marine territories; and
- 19 • The MSA area is a heavily utilized marine environment.

20 **Geospatial:**

- 21 • Tsartlip use travel routes across the shipping lanes from the Saanich Peninsula to the
22 Tsartlip First Nation settlements and traditional use sites throughout the southern Gulf
23 and San Juan Islands; and
- 24 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
25 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
26 Separation Scheme and would result in negligible to low magnitude effects due to
27 relatively infrequent and short-duration interruptions to access to areas in the Salish
28 Sea.

29 **Social, Cultural, Experiential:**

- 30 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
31 traffic during operations affecting visual quality, noise, and vessel wake (with an
32 increasing magnitude of effect the closer one is to the vessels);
- 33 • Potential concerns regarding safety of small vessels with large vessels and wake effects,

1 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
2 Part B;

- 3 • Psycho-social and cultural well-being of Tsartlip First Nation members vulnerable to
4 marine shipping related safety concerns and effects on quality of experience; and
- 5 • Tsartlip Indian Band's cultural and spiritual interest in SRKWs.

6 **Mitigations:**

- 7 • Proposed mitigations for potential impacts to traditional and cultural interests are the
8 recommended key mitigations under CEAA 2012 for a Marine Communications, and
9 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
10 Program;
- 11 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
12 Plan that would require TJLP to incorporate contractual measures to support
13 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
14 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
15 participation in regional environmental management measures and cumulative effects
16 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
17 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
18 Banks, Haro Strait and Boundary Pass; and
- 19 • The EAO acknowledges that these mitigation measures would not reduce impacts for
20 baseline conditions and/ or impact of future projects, which are a source of issues for
21 many Indigenous Groups.

22 **16.10 TSEYCUM FIRST NATION**

23 **16.10.1 COMMUNITY PROFILE**

24 W̱ SI KEM (Tseycum) First Nation is one of five members of the W̱SÁNEĆ (Saanich) Nation, along
25 with the Tsawout, Tsartlip, Pauquachin, and Malahat First Nations. W̱SÁNEĆ is part of the larger
26 Coast Salish cultural group which has occupied the Gulf of Georgia continuously for thousands
27 of years. Tseycum is located on the northwest side of the Saanich Peninsula on Vancouver
28 Island, adjacent to the Saanich Inlet and has five reserves. As of February 2022, Tseycum has a

1 registered population of 204 with 81 living on Tseycum reserves, 76 living off-reserve, and 47
2 living on other reserves²⁴⁶.

3 Before contact, the W̱SÁNEĆ Nations were a single group of extended families sharing the
4 SENĆOŦEN language and a cultural order revolving around their relations with marine
5 creatures, spirit beings, and one another. The relationship of the W̱SÁNEĆ with their marine
6 environment drives their society, economy, culture, and identity.

7 XWSANETS (Saanich Peninsula) is the “homebase” of the W̱SÁNEĆ. It derives its name from the
8 image presented to paddlers in a canoe as they approach from the water, meaning “raised up”
9 or “emerging people.” The naming practice based on the perspective of the water reveals the
10 fundamental nature of marine territory to the W̱SÁNEĆ worldview.

11 W̱SÁNEĆ families had permanent winter settlements on the Saanich Peninsula and temporary
12 settlements throughout the San Juan and southern Gulf Islands and across the Salish Sea to
13 Point Roberts and Boundary Bay. This territory is defined by the pursuit of the five salmon
14 species and steelhead and is where the W̱SÁNEĆ assert continuous and exclusive use and
15 occupation since time immemorial. The 1987 Saanich Declaration describes W̱SÁNEĆ territory
16 as “[encompassing] all [their] Spiritual Places, medicine and fruit gathering places, fishing
17 stations, hunting and trapping areas, winter and summer homesites, burial sites, meditation
18 places and all our territories in between these places.” W̱SÁNEĆ families exploited different
19 ecological niches, had tailored seasonal movements, and shared resources with each other. The
20 W̱SÁNEĆ reciprocal system of sharing marine resources and associated knowledge is key to self-
21 actualization and creating an autonomous future. The W̱SÁNEĆ had reef net fishing sites
22 throughout their territory, with the Nation’s largest reef net claim at Point Roberts and another
23 on ŚNEWİŁ (the Fraser River).

24 The W̱SÁNEĆ signed the Douglas Treaty (1852) during an apparent time of escalating tension
25 between the W̱SÁNEĆ. The W̱SÁNEĆ therefore viewed the treaty as a peaceful agreement
26 between two nations that would ensure the continuation of the W̱SÁNEĆ fisheries, lifestyle,
27 culture, resource management, and governance systems as formerly.

²⁴⁶ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Tseycum. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=655&lang=eng, Accessed March 23, 2022.

1 **16.10.2 TSEYUCUM FIRST NATION INVOLVEMENT IN THE CONSULTATION** 2 **PROCESS**

3 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
4 sent a letter to these groups inviting comments on the draft Section 13 Order, including
5 consultation processes and opportunities.

6 On August 6, 2019, at the request of Canada, the EAO under the Section 13 Order amended the
7 geographic scope for the assessment of the marine shipping route and added the Indigenous
8 groups identified in Schedule D which included the Tseycum First Nation. For the review of the
9 MSA, the EAO led consultation activities with the Indigenous groups identified in Schedule D
10 and, as part of this work, invited Tseycum First Nation to participate in the Marine Shipping
11 Working Group. The EAO is of the view that it has approached consultation with Tseycum First
12 Nation at the deeper end of the spectrum, with the intent to identify potential impacts and
13 consider ways to address potential impacts to Aboriginal Interests that were identified by
14 Tseycum First Nation within in the MSA area.

15 During the MSA review, the EAO invited Tseycum First Nation to review and provide comments
16 on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including Part C of
17 the Assessment Report), the draft CPD, draft Certificate Conditions and recommended KMMs
18 under CEAA 2012. As part of the Marine Shipping Working Group, Tseycum First Nation was
19 invited to participate in Marine Shipping Working Group meetings during the MSA
20 Supplemental Analysis Review stages.

21 The EAO offered to meet directly with Tseycum First Nation to discuss TMJ, EA process, and any
22 potential concerns with TMJ.

23 **16.10.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

24 The following sections focus on potential impacts of TMJ to Tseycum First Nation's Douglas
25 Treaty rights and other interests. A discussion of the EAO's assessment approach is provided in
26 Impact Assessment Methods of Part C ([Section 12.2](#)).

27 The EAO considered information available, including from public sources. The EAO reached out
28 to Tseycum First Nation regarding potential effects on its Douglas Treaty rights and other
29 interests but did not receive a response.

30 The following sections focus on potential impacts of TMJ to Tseycum First Nation's Douglas
31 Treaty rights to hunt and fish and other interests, mitigations and accommodations to address
32 potential impacts.

1 A. POTENTIAL IMPACTS ON FISHING

2 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
3 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to the
4 potential shipping-related effects based on review of RBT2 and TMX processes. The EAO is
5 satisfied that the key impacts to biophysical components resulting in changes to fish quantity
6 and quality, changes in access to fishing resources, and changes to social, cultural, and spiritual
7 values associate with traditional fishing activities that apply to Tseycum First Nation are
8 summarized in [Section 13.3.1](#).

9 The MSA noted that Tseycum First Nation currently engage in both FSC and commercial
10 fisheries in the MSA Area. The MSA reported on marine harvesting and fishing locations
11 throughout the Tseycum First Nation territory, including Cowichan Bay, Southern Gulf Islands
12 and Island in the U.S.A. Tseycum First Nation noted that many of its fishers travelled in the
13 shipping lanes.

14 Additional issues and concerns with potential impacts related to fishing were raised by Tseycum
15 First Nation during the EAs of RBT2 and TMX. These concerns were not raised by Tseycum First
16 Nation during the TMJ EA but the EAO considers them applicable to the MSA area.

- 17 • Concerns regarding potential effect on salmon, salmon habitat, the ability to harvest
18 them, and overall impacts to fishing rights
 - 19 ○ As discussed in [Section 13.3.1](#), the EAO is recommending KMMs under CEAA
20 2012 for the Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset
21 Plan, and Vessel Traffic Management Plan to address these concerns. The EAO
22 did not predict any residual effects to fish and fish habitat in the MSA area.
 - 23 ○ In the Current Use section of this Report, the EAO predicted that regularly
24 occurring and short-duration TMJ-related vessel transits would have negligible to
25 low magnitude effects to access to harvesting sites in the MSA area. TJLP has
26 stated that TMJ's influence on TMJ-related vessel operations would be, TJLP has
27 committed a Marine Communication Plan out to 12 nm that would be developed
28 in consultation with Schedule B and D Indigenous Groups and include procedures
29 to inform Indigenous Groups of traffic schedules, for Indigenous Groups to
30 provide feedback on adverse effects related to navigation as a result of TMJ, and
31 for TJLP to document and respond to feedback in a timely manner.

32 Conclusion

33 In consideration of the available information, the EAO's consultation with Tseycum First Nation,
34 TJLP's commitments, the EAO's proposed EAC conditions if an EAC is issued and the
35 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor impact

1 on Tseycum First Nation's right to fish. The EAO considers TMJ-related increases to vessel traffic
2 during operations would be incremental compared to existing baseline conditions in the Traffic
3 Separation Scheme of the Salish Sea.

4 The key factors that were considered in support of the EAO's conclusion on the impacts to the
5 right to fish are summarized as follows:

6 **Biophysical:**

- 7 • The EAO's conclusions on adverse residual effects in the Fish and Fish Habitat chapter in
8 Part B which does not predict any residual effects to fish and fish habitat in the MSA
9 area.

10 **Geospatial:**

- 11 • Tseycum First Nation harvests marine invertebrates and fishes throughout the MSA area
12 including in areas near to, or requiring crossing of, the shipping lanes;
- 13 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 percent
14 for segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
15 Separation Scheme of the Salish Sea; and
- 16 • The EAO's conclusions in the Current Use of Part B that TMJ-related vessel transits
17 during operations (minimum 30 years) would result in negligible to low magnitude
18 effects due to relatively infrequent and short-duration interruptions to access to areas
19 in the Salish Sea.

20 **Social, Cultural and Experiential:**

- 21 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
22 traffic during operations affecting visual quality, noise, and vessel wake (with an
23 increasing magnitude of effect the closer one is to the vessels); and
- 24 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
25 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
26 Part B.

27 **Mitigations:**

- 28 • Proposed mitigations for impacts to Tseycum First Nation's right to fish include the
29 Marine Communications Plan recommended as KMMs under CEAA 2012.

30 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

31 The EAO evaluated the potential effects on hunting, trapping, and gathering activities
32 attributable to TMJ in [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical

1 components resulting in changes to wildlife and vegetation quantity and quality, changes in
2 access to hunting, trapping and gathering areas, and changes to social, cultural, and spiritual
3 values associated with traditional hunting, trapping and gathering activities that apply to
4 Tseycum First Nation are summarized in [Section 13.3.2](#).

5 **Conclusion**

6 In consideration of the available information in [Section 13.2.2](#), which outlines the potential
7 effect to hunting, trapping and gathering, TJLP's commitments, the EAO's proposed EAC
8 conditions if an EAC is issued and the recommended KMMs under CEAA 2012, TMJ is expected
9 to result in negligible impact on Tseycum First Nation's hunting, trapping and gathering.

10 The key factors that were considered in support of the EAO's conclusion on the impacts to the
11 right to hunt, trap and gather included the EAO's conclusions on adverse residual effects to
12 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
13 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
14 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
15 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
16 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
17 Heads to the 12 nm territorial limit.

18 To mitigate potential impacts to Tseycum First Nation's right to hunt, trap and gather, the EAO
19 is recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
20 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
21 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
22 considered that the small relative increase due to TMJ-related vessel traffic would have a
23 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
24 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
25 Regulations and Legislation regulating vessel noise and lighting.

26 **C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS**

27 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
28 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
29 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
30 pathways to impacts based on review of publicly available information from RBT2 and TMX
31 processes, and any information provided by Indigenous Groups during the MSA review. The
32 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
33 experience and SRKWs would be the pathways to impacts to Tseycum First Nation's other
34 cultural and traditional interests.

1 Additional issues and concerns related to traditional and cultural interests were raised by
2 Tseycum First Nation during the EA of RBT2, including the importance of not disturbing critical
3 habitat for SRKWs and concerns for impact of large vessels on the SRKWs, given the importance
4 of SRKWs to the W̱SÁNEĆ culture. Although, these concerns were not raised by Tseycum First
5 Nation during the TMJ EAO, the EAO considers them applicable to the MSA area.

- 6 • See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of concerns
7 related to the effects on whales. As discussed in [Section 13.3.3](#), the EAO concluded that
8 TMJ would not result in significant residual effects to Marine Mammals; however, the
9 EAO notes that the current baseline of cumulative effects to SRKWs are already high and
10 that TMJ would contribute additional residual effects from shipping noise and potential
11 avoidance behaviour by SRKWs to ships, such that cumulative effects to SRKWs are
12 considered significant; and
- 13 • The is EAO recommending a KMM under CEAA 2012 the Vessel Traffic Management
14 Plan that would require TJLP to incorporate contractual measures to support
15 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
16 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
17 participation in regional environmental management measures and cumulative effects
18 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
19 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
20 Banks, Haro Strait and Boundary Pass. The EAO also notes several regional initiatives
21 and measures have been implemented by the Government of Canada to better
22 understand and manage cumulative effects on the recovery of SRKWs (listed in [Section](#)
23 [13.1.1](#)).

24 The MSA noted that cumulative impacts to traditional marine resources have removed the
25 opportunities for Tseycum First Nation to engage in cultural activities including
26 intergenerational knowledge transfer. The MSA reported that Tseycum First Nation has a host
27 of cultural sites in the MSA area including villages and burial grounds in the southern Gulf
28 Islands and in the USA. (e.g. at Henry, Pearl and San Juan Islands).

- 29 • The EAO acknowledges Tseycum First Nation's worldview and perspective that there are
30 currently existing cumulative effects which have already affected Tseycum member's
31 ability to exercise their fishing rights as preferred within Tseycum First Nation's asserted
32 traditional territory; and
- 33 • As outlined in the Current Use assessment in Part B, potential negligible to low
34 magnitude impacts to the experiential aspect of fishing in the MSA due to TMJ-related
35 vessel traffic and potential concerns regarding safety regularly occurring vessels transits
36 during the operations for Indigenous Groups who harvest fish in, or in proximity to, the

1 navigational channel or shipping lanes, or those who need to cross these areas to access
2 fishing resources.

3 **Conclusion**

4 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
5 impacts on Tseycum First Nation's other cultural and traditional interests, although the EAO
6 acknowledges that there is uncertainty in the relationship between incremental increases in
7 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
8 the available information, the EAO's consultation with Tseycum First Nation, TJLP's
9 commitments, the EAO's proposed EAC conditions if an EAC is issued and the recommended
10 KMMs under CEAA 2012, the EAO concludes that TMJ-related marine shipping effects
11 combined with cumulative effects in the MSA area is expected to result in moderate-to-serious
12 impact on Tseycum First Nation's other traditional and cultural interests. The EAO's conclusions
13 of significant cumulative effects to SRKW was a major key factor considered in the EAO's
14 seriousness determination. The EAO notes several regional initiatives and measures have been
15 implemented by the Government of Canada to better understand and manage cumulative
16 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

17 The key factors that were considered in support of the EAO's conclusion on the impacts to
18 other traditional and cultural interests are summarized as follows:

19 **Cultural and Heritage Resources:**

- 20 • The EAO's conclusions in Part B found no residual effects to Heritage Resources ([Section](#)
21 [7.1](#)) from erosion due to wake effects along the shorelines of the MSA area;
- 22 • The EAO's conclusions in the Marine Mammals section in Part B, which found low to
23 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
24 cumulative effects to SRKWs; and
- 25 • The MSA area is a heavily utilized marine environment.

26 **Geospatial:**

- 27 • Tseycum First Nation has a host of cultural sites in the MSA area including villages and
28 burial grounds in the southern Gulf Islands and in the U.S.A. (e.g., at Henry, Pearl and
29 San Juan Islands), which would require crossing the shipping lanes.

30 The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
31 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
32 Separation Scheme and would result in negligible to low magnitude effects due to relatively
33 infrequent and short-duration interruptions to access to areas in the Salish Sea.

1 **Social, Cultural, Experiential:**

- 2 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
3 traffic during operations affecting visual quality, noise, and vessel wake (with an
4 increasing magnitude of effect the closer one is to the vessels); and
- 5 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
6 as assessed in the Accidents and Malfunctions ([Section 9](#)) and Effects of the
7 Environment ([Section 10](#)) sections in Part B.

8 **Mitigations:**

- 9 • Proposed mitigations for potential impacts to traditional and cultural interests are the
10 recommended key mitigations under CEAA 2012 for Marine Communications and Vessel
11 Traffic Management Plans and Marine Shipping Emergency Response Outreach
12 Program;
- 13 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
14 Plan that would require TJLP to incorporate contractual measures to support
15 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
16 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
17 participation in regional environmental management measures and cumulative effects
18 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
19 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
20 Banks, Haro Strait and Boundary Pass; and
- 21 • The EAO acknowledges that these mitigation measures would not reduce impacts for
22 baseline conditions and/ or impact of future projects, which are a source of issues for
23 many Indigenous Groups.

24 **16.11 SONGHEES NATION**

25 **16.11.1 COMMUNITY PROFILE**

26 Songhees Nation are descended from the Ləkʷəŋən (*Lekwungen*) speaking people identified as
27 Coast Salish. Songhees Nation has four reserves, and as of February 2022 has a registered
28 population of 638 people of which 351 live on Songhees Nation reserves, 244 live off-reserve,

1 and 43 live on other reserves²⁴⁷. *Tl'ches*, an area of great cultural importance to Songhees
2 Nation, is an archipelago located a few km off Oak Bay in the Strait of Juan de Fuca and
3 encompasses what are also known as the Chatham Islands and Discovery Island. Two of
4 Songhees Nation's reserves are located at *Tl'ches*. Songhees Nation speaks *Lekwungen*,
5 considered part of the Northern Straits Salish language family. In 1850, the *Lekwungen* entered
6 into Treaties with James Douglas. Songhees Nation has Douglas Treaty rights to hunt over
7 unoccupied lands and to carry on their fisheries "as formerly".

8 Songhees Nation members have used and continue to use Songhees Territory for a variety of
9 purposes including hunting, fishing, trapping, gathering, camping, spiritual practices, and
10 ceremony. The practices conducted on Songhees lands and waters have been integral to
11 Songhees's physical and cultural survival and are critical for ensuring the meaningful exercise of
12 rights and the ability to pass on Songhees culture to future generations. Prior to and after
13 contact, Songhees members traditionally harvested all types of seafood and fish and traded it
14 with other Indigenous groups in the area and continued to trade with European settlers, once
15 they arrived.

16 Traditionally, each *Lekwungen* household consisted of extended families who held areas in
17 which they could hunt, fish, collect plants, and build houses. Other areas were shared as
18 common amongst the different household groups. Historically, Songhees collected marine life
19 including many kinds of fish like Coho and spring salmon, Pacific halibut, herring, sea cucumber,
20 sea urchins (green, red and purple), seaweed, Dungeness crab, clams, octopus, seals and much
21 more. They would harvest berries, fruit from trees, and bark for teas. They would hunt a variety
22 of species including deer and rabbit.

23 Although *Tl'ches* includes several islands, translated from *Lekwungen*, the word *Tl'ches* means
24 "one island." *Tl'ches* has great cultural significance as it was once the site of a Songhees village
25 and contains middens, burial cairns and other sacred cultural sites. It is also one of the few
26 remaining places where Songhees members can experience their territory mostly undisturbed
27 by the extensive development of the Greater Victoria Area. Some members continue to use the
28 area for Camas bulb harvesting, gathering of medicinal plants, fishing, and other culturally
29 significant activities. *Tl'ches* is also home to vital kelp forests and eel grass beds, which provide
30 shelter, habitat and protection for species that are culturally significant to Songhees.

31 Culturally important species to Songhees include abalone, rockfish, rock scallop, lingcod,
32 salmon, herring, urchins, clams, cockles, mussels, oysters, harbor seals, river otter and sea

²⁴⁷ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Songhees Nation. https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=656&lang=eng, Accessed March 23, 2022.

1 otter. The SRKW is the subject of Songhees legends, art, and cultural practices. It is a sacred
2 animal to the Songhees.

3 A Songhees village was originally located at *Tl'ches* and there are 34 additional recorded coastal
4 archaeological sites at *Tl'ches*. Other unrecorded sites also exist. The intertidal zone has a very
5 high potential for undisturbed archaeological deposits, some of which show exceptional
6 preservation.

7 **16.11.2 SONGHEES NATION INVOLVEMENT IN THE CONSULTATION PROCESS**

8 Consultation with Indigenous groups identified in Schedule D began in July of 2019 when EAO
9 sent a letter to these groups inviting comments on the draft Section 13 Order, including
10 consultation processes and opportunities.

11 On August 6, 2019, at the request of Canada, the EAO under the Section 13 Order amended the
12 geographic scope for the assessment of the marine shipping route and added the Indigenous
13 groups identified in Schedule D which included the Songhees Nation. For the review of the
14 MSA, the EAO led consultation activities with the Indigenous groups identified in Schedule D
15 and, as part of this work, invited Songhees Nation to participate in the Marine Shipping
16 Working Group. The EAO is of the view that it has approached consultation with Songhees
17 Nation at the deeper end of the spectrum, with the intent to identify potential impacts and
18 consider ways to address potential impacts to Aboriginal Interests that were identified by
19 Songhees Nation within the MSA area.

20 During the MSA review, the EAO invited the Songhees Nation to review and provide comments
21 on TJLP's MSA Supplemental Analysis, the EAO's draft Assessment Report (including Part C of
22 the Assessment Report), the draft CPD, draft provincial Certificate Conditions and draft
23 recommended KMMs under CEAA 2012. As part of the Marine Shipping Working Group, the
24 Songhees Nation was invited to participate in Marine Shipping Working Group meetings during
25 the MSA Supplemental Analysis Review stages.

26 The EAO offered to meet directly with the Songhees Nation to discuss TMJ, EA process, and any
27 potential concerns with TMJ.

28 **16.11.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

29 The following sections focus on potential impacts of TMJ to Songhees Nation's Aboriginal
30 Interests and Douglas Treaty rights to hunt and fish. A discussion of the EAO's assessment
31 approach is provided in [Section 12.2](#) Impact Assessment Methods of this Report.

1 The EAO considered information available, including from public sources. The EAO reached out
2 to Songhees Nation regarding potential effects on Douglas Treaty rights and other interests but
3 did not receive a response.

4 The following sections focus on potential impacts of TMJ to Songhees Nation's Douglas Treaty
5 rights to right to fish and hunt and other interests, mitigations, and accommodations to address
6 potential impacts.

7 *A. POTENTIAL IMPACTS ON FISHING*

8 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
9 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to the
10 potential shipping-related effects based on review of RBT2 and the TMX processes. The EAO is
11 satisfied that the key impacts to biophysical components resulting in changes to fish quantity
12 and quality, changes in access to fishing resources, and changes to social, cultural, and spiritual
13 values associate with traditional fishing activities that apply to Songhees Nation are
14 summarized in [Section 13.3.1](#).

15 The specific issues and concerns with potential impacts related to fishing, based on RBT2 and
16 TMX are provided below. While these concerns were not specifically raised by Songhees Nation
17 during the TMJ EA, the EAO considered them applicable to the MSA area.

- 18 • Concerns about increase in vessel traffic and/or vessel size and the potential adverse
19 impacts to the ability of Songhees members to Treaty rights and other interests. Main
20 shipping lanes overlap preferred harvesting areas. Concern about safety of smaller boats
21 in high traffic areas, and the potential for collisions and accidents.
 - 22 ○ In the Current Use section of this Report, the EAO predicted that regularly
23 occurring and short-duration TMJ-related vessel transits would have negligible to
24 low magnitude effects to access to harvesting sites in the MSA area. The EAO is
25 recommending a KMM under CEAA 2012 for a Marine Communication Plan out
26 to 12 nm that would be developed in consultation with Schedule B and D
27 Indigenous Groups and include procedures to inform Indigenous Groups of
28 traffic schedules, for Indigenous Groups to provide feedback on adverse effects
29 related to navigation as a result of TMJ, and for TJLP to document and respond
30 to feedback in a timely manner.
 - 31 ○ Marine shipping associated with TMJ would be required to meet the
32 international standards and Canadian regulations set out by Canada's
33 compliance-based marine safety and security system, which is designed to
34 protect life, property, and the marine environment. The EAO is recommending a
35 KMM under CEAA 2012 for a Marine Shipping Emergency Response Outreach

- 1 Program to facilitate the integration of plans for responding to incidents in
2 transit into existing emergency response systems, primarily the CCG's Incident
3 Integrated Response Plans.
- 4 • Concern about potential impacts to plants and animals found in the marine
5 environments, potential for pollution to contaminate food sources, or a spill that could
6 impacts Songhees abilities members abilities to harvest, gather and exercise other
7 rights.
 - 8 ○ As discussed in [Section 13.3.1](#), the EAO is recommending KMMs under CEAA
9 2012 for the Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset
10 Plan, and Vessel Traffic Management Plan to address these concerns. The EAO
11 did not predict any residual effects to fish and fish habitat in the MSA area.
 - 12 ○ As discussed in the Accidents and Malfunctions and Effects of the Environment
13 section of Part B, vessels would be required to comply with internationally
14 recognized safety standards that include pollution prevention from ships,
15 including Canada's Ballast Water Regulations.
 - 16 ○ TJLP has stated that TMJ's influence on TMJ-related vessel operations would be
17 limited beyond TMJ's marine terminal area, but TJLP is committed to developing
18 a Marine Shipping Emergency Response Outreach Program that would facilitate
19 the integration of plans for responding to incidents in transit into existing
20 emergency response systems, primarily the CCG's Incident Integrated Response
21 Plans.

22 Conclusion

23 In consideration of the available information, the EAO's consultation with Songhees Nation,
24 TJLP's commitments, and the EAO's proposed EAC conditions if an EAC is issued and the
25 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor impact
26 on Songhees Nation's right to fish. The EAO considers TMJ-related increases to vessel traffic
27 during operations would be incremental compared to existing baseline conditions in the Traffic
28 Separation Scheme of the Salish Sea.

29 The key factors that were considered in support of the EAO's conclusion on the impacts to the
30 right to fish are summarized as follows:

31 Biophysical:

- 32 • The EAO's conclusions on adverse residual effects in the Fish and Fish Habitat chapter in
33 Part B which does not predict any residual effects to fish and fish habitat in the MSA
34 area.

1 **Geospatial:**

- 2 • Songhees Nation identified through the RBT2 and TMX process that the main shipping
3 lanes overlap preferred harvesting areas;
- 4 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 percent
5 for segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
6 Separation Scheme of the Salish Sea; and
- 7 • The EAO's conclusions in the Current Use of Part B that TMJ-related vessel transits
8 during operations (minimum 30 years) would result in negligible to low magnitude
9 effects due to relatively infrequent and short-duration interruptions to access to areas in
10 the Salish Sea.

11 **Social, Cultural and Experiential:**

- 12 • Negligible to low impacts due to incremental increases from TMJ-related vessel traffic
13 during operations affecting visual quality, noise, and vessel wake (with an increasing
14 magnitude of effect the closer one is to the vessels); and
- 15 • Concern about safety of smaller boats in high traffic areas, and the potential for
16 collisions and accidents.

17 **Mitigations:**

- 18 • Proposed mitigations for impacts to Songhees Nation's right to fish include the Marine
19 Communications Plan recommended as KMMs under CEAA 2012.

20 ***B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING***

21 The EAO evaluated the potential effects on hunting, trapping, and gathering activities
22 attributable to TMJ which apply broadly to Indigenous Groups. These potential effects are
23 summarized in [Section 13.3.2](#). The EAO is satisfied that the key impacts to biophysical
24 components resulting in changes to wildlife and vegetation quantity and quality, changes in
25 access to hunting, trapping and gathering areas, and changes to social, cultural, and spiritual
26 values associated with traditional hunting, trapping and gathering activities that apply to
27 Songhees Nation are summarized in [Section 13.3.2](#).

28 Additional issues and concerns with potential impacts related to hunting, trapping, and
29 gathering were raised by Songhees Nation during the EAs of RBT2 and TMX. These concerns
30 were not raised by Songhees Nation during the TMJ EA but the EAO considers them applicable
31 to the MSA area.

- 32 • Concerned about cumulative effects on wildlife, vegetation, and the exercise of rights
33 and the attendant socio-economic effects on Songhees members.

- 1 ○ In Part B of this Report the EAO predicted the only residual effect to wildlife in
2 the MSA area would be potential negligible to low magnitude mortality of select
3 marine bird species. The EAO did not predict cumulative effects to mortality of
4 marine bird species due to TMJ-related vessel traffic.
- 5 ○ The EAO considered that TMJ-related marine shipping in the MSA area may
6 cause infrequent, short-term, temporary disruptions predicted to result in
7 negligible effects on Indigenous access to terrestrially based gathering sites that
8 are accessed by boat from the pilot station at Sand Heads to the 12 nm territorial
9 limit.

10 **Conclusion**

11 In consideration of the available information, the EAO's consultation with Songhees Nation,
12 TJLP's commitments, and the EAO's proposed EAC conditions if an EAC is issued and the
13 recommended KMMs under CEAA 2012, TMJ is expected to result in negligible impact on
14 Songhees Nation's hunting, trapping, and gathering.

15 The key factors that were considered in support of the EAO's conclusion on the impacts to the
16 right to hunt, trap, and gather included the EAO's conclusions on adverse residual effects to
17 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird
18 species. The EAO also considered that in the MSA area, operations (30 years in duration) may
19 cause infrequent, short-term, temporary disruptions to marine-based hunting along the
20 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based
21 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand
22 Heads to the 12 nm territorial limit.

23 To mitigate potential impacts to Songhees Nation's right to hunt, trap and gather, the EAO is
24 recommending a KMM under CEAA 2012 for a Marine Communication Plan, including
25 procedures to inform Indigenous Groups of traffic schedules and for Indigenous Groups to
26 submit any feedback on potential adverse effects on navigation as a result of TMJ. The EAO also
27 considered that the small relative increase due to TMJ-related vessel traffic would have a
28 negligible effect to experiential aspects of hunting, trapping, and gathering from changes to
29 visual quality and noise in the MSA and that all TMJ related vessels would adhere to the Marine
30 Regulations and Legislation regulating vessel noise and lighting.

31 ***C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS***

32 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
33 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
34 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
35 pathways to impacts based on review of publicly available information from RBT2 and TMX

1 processes, and any information provided by Indigenous Groups during the MSA review. The
2 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
3 experience and SRKWs would be the pathways to impacts to Songhees Nation's other cultural
4 and traditional interests.

5 The MSA reported that *Tl'ches* is an important Songhees village site that contains middens,
6 burial cairns, and other cultural sites. Songhees Nation members currently use *Tl'ches* for
7 various traditional harvesting, gathering and cultural activities. The MSA noted that Songhees
8 Nation has raised concerns about cumulative impacts at *Tl'ches* due to development over the
9 past 200 years. Songhees Nation created a Marine Use Plan including a protective zone around
10 *Tl'ches*. The RBT2 Panel Report (2020) noted that the outbound shipping route passed directly
11 by, and very close to, the eastern boundary of this protective zone.

12 Additional issues and concerns with potential impacts related to traditional and cultural
13 interests were raised by Songhees Nation during the EAs of RBT2 and TMX. These concerns
14 were not raised by Songhees Nation during the TMJ EA but the EAO considers them applicable
15 to the MSA area.

- 16 • Concerned about adverse impacts to marine mammals, including SRKWs, and the
17 disruption this would cause to the marine ecosystem. The SRKWs is a culturally
18 important species to Songhees
 - 19 ○ See [Section 13.3.3](#) for a detailed discussion of the analysis and resolution of
20 concerns related to the effects on whales. As discussed in [Section 13.3.3](#), the
21 EAO concluded that TMJ would not result in significant residual effects to Marine
22 Mammals; however, the EAO notes that the current baseline of cumulative
23 effects to SRKWs are already high and that TMJ would contribute additional
24 residual effects from shipping noise and potential avoidance behaviour by
25 SRKWs to ships, such that cumulative effects to SRKWs are considered
26 significant. The EAO is recommending as a KMM a Vessel Traffic Management
27 Plan that would require TJLP to incorporate contractual measures to support
28 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal
29 slowdown initiatives (as amended) or a future equivalent, and annual reporting
30 on TJLP's participation in regional environmental management measures and
31 cumulative effects monitoring to protect SRKW, where feasible. The seasonal
32 slowdown initiatives currently request vessels to slow down in key SRKW
33 foraging areas such as Swiftsure Banks, Haro Strait and Boundary Pass.
- 34 • Concerned about the pollution due to increased marine traffic and the contamination of
35 food sources.
 - 36 ○ As discussed in the Accidents and Malfunctions and Effects of the Environment

- 1 section in Part B of this Report, vessels would be required to internationally
2 recognized safety standards that include pollution prevention of ships; and
- 3 ○ As discussed in the Human Health and Air Quality sections in Part B, changes to
4 air quality were determined to be the only primary pathway of potential effect
5 to human health in the MSA area. The EAO concluded that there would be no
6 predicted residual effects to human health in the MSA area.
- 7 ● Concerned about adverse impacts to important cultural, spiritual, archaeological, and
8 ecological sites and values at *Ti'ches* and impacts to spiritual and ceremonial
9 connections to lands and waterways.
- 10 ○ In the Current Use section in Part B of this Report it was determined that with
11 the marine transportation regulatory regime, as well as low frequency and short
12 duration of TMJ-related traffic there would be negligible to low magnitude of
13 effect of Indigenous access to known heritage sites.
- 14 ● Concerned with erosion of banks due to shipping wake and potential exposure of burial
15 sites and damage to docks and archeological sites. Concerns that heritage resources and
16 archeological sites could be disturbed or eroded by shipping wake, and these effects
17 may combine with climate-related rises in sea level. Concerned that wave disturbances
18 limit access to culturally important areas and the exercise of Treaty rights and other
19 interests.
- 20 ○ See [Section 13.3.3](#) for a detailed discussion to address this concern. As discussed
21 in [Section 13.3.3](#), the impacts to cultural sites from wakes are not anticipated
22 (see section on Vessel Wake in Part B) and access to tangible to tangible and
23 intangible heritage resources were considered negligible.
- 24 ○ The EAO's conclusions in the Heritage Resources section in Part B of this Report
25 which found no residual effects on Heritage Resources from erosion due to wake
26 effects along the shorelines of the MSA area.
- 27 ○ The EAO concluded that the TMJ-related vessel wake would be within natural
28 variation of the wave heights in this area, see Vessel Wake section of Part B of
29 this Report.
- 30 ● Concerned about potential impacts to Treaty rights and other interests including loss of,
31 or impaired access to, preferred harvesting and resource use areas due to increased
32 marine traffic and/or ship size and the effects of any spill on the marine ecosystem.
- 33 ○ In the Current Use section in Part B of this Report it was determined that with
34 the marine transportation regulatory regime, as well as low frequency and short

1 duration of TMJ-related traffic there would be negligible to low magnitude of
2 effect of Indigenous access to known resource harvesting areas in Songhees
3 Nation's traditional territory.

- 4 ○ In the Accidents and Malfunctions and Effects of the Environment in Part B of
5 this Report, with consideration of the MSA, that the risk of an LNG or bunker fuel
6 release would have consequence severities ranging from moderate to very high
7 with the very high being on SRKWs and heritage resources and having potentially
8 irreversible effects. However, the likelihood was estimated to be extremely rare
9 as the release need to occur in the vicinity of these susceptible sites.

- 10 ● Concerned about safety of smaller boats in high traffic areas, the potential for collisions
11 and accidents, and the safety of Songhees members exercising their Treaty rights and
12 other interests.

- 13 ○ Marine shipping associated with TMJ would be required to meet the
14 international standards and Canadian regulations set out by Canada's
15 compliance-based marine safety and security system, which is designed to
16 protect life, property, and the marine environment.

- 17 ○ In the Current Use section of this Report, the EAO predicted that regularly
18 occurring and short-duration TMJ-related vessel transits would have negligible to
19 low magnitude effects to access to harvesting sites in the MSA area. The EAO is
20 recommending a KMM under CEAA 2012 for a Marine Communication Plan out
21 to 12 nm that would be developed in consultation with Schedule B and D
22 Indigenous Groups and include procedures to inform Indigenous Groups of
23 traffic schedules, for Indigenous Groups to provide feedback on adverse effects
24 related to navigation as a result of TMJ, and for TJLP to document and respond
25 to feedback in a timely manner.

26 Conclusion

27 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
28 impacts on Songhees Nation's other cultural and traditional interests, although the EAO
29 acknowledges that there is uncertainty in the relationship between incremental increases in
30 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
31 the available information in [Section 13.3.3](#), the EAO's consultation with Songhees Nation, TJLP's
32 commitments and the EAO's proposed EAC conditions if an EAC is issued, and the
33 recommended KMMs under CEAA 2012, the EAO concludes that TMJ-related marine shipping
34 effects combined with cumulative effects in the MSA area is expected to result in moderate-to-
35 serious impact on Songhees Nation's other traditional and cultural interests. The EAO's
36 conclusions of significant cumulative effects to SRKW was a major key factor considered in the

1 EAO's seriousness determination. The EAO notes several regional initiatives and measures have
2 been implemented by the Government of Canada to better understand and manage cumulative
3 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

4 The key factors that were considered in support of EAO's conclusion on the impacts to other
5 traditional and cultural interests are summarized as follows:

6 **Cultural and Heritage Resources:**

- 7 • The EAO's conclusions Part B did not predict residual effects Heritage Resources ([Section](#)
8 [7.1](#)) from erosion due to wake effects along the shorelines of the MSA area;
- 9 • The EAO's conclusions in the Marine Mammals section in Part B, which found low to
10 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
11 cumulative effects to SRKWs; and
- 12 • The MSA area is a heavily utilized marine environment.

13 **Geospatial:**

- 14 • *Tl'ches* has great cultural significance as it was once the site of a Songhees village and
15 contains middens, burial cairns, and other sacred cultural sites. It is in proximity to the
16 shipping lanes; and
- 17 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
18 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
19 Separation Scheme and would result in negligible to low magnitude effects due to
20 relatively infrequent and short-duration interruptions to access to areas in the Salish
21 Sea.

22 **Social, Cultural, Experiential:**

- 23 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
24 traffic during operations affecting visual quality, noise and vessel wake (with an
25 increasing magnitude of effect the closer one is to the vessels);
- 26 • Potential concerns regarding safety of small vessels with large vessels and wake effects
27 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
28 Part B; and
- 29 • Songhees Nation's cultural and spiritual interest in SRKWs.

30 **Mitigations:**

- 31 • Proposed mitigations for potential impacts to traditional and cultural interests are the
32 recommended key mitigations under CEAA 2012 for a Marine Communications, and

- 1 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
2 Program; and
- 3 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
4 Plan that would require TJLP to incorporate contractual measures to support
5 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
6 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
7 participation in regional environmental management measures and cumulative effects
8 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
9 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
10 Banks, Haro Strait and Boundary Pass.

11 **16.12 SCIA'NEW (BEECHER BAY) FIRST NATION**

12 **16.12.1 COMMUNITY PROFILE**

13 Scia'new (Beecher Bay) First Nation, meaning "big fish", is part of the Te'mexw Treaty
14 Association which has members from five nations: Malahat, Nanoose, Songhees, T'Sou-ke, and
15 Scia'new. Scia'new First Nation is also part of the larger Coast Salish cultural group which has
16 occupied the Gulf of Georgia continuously for thousands of years. Scia'new First Nation's
17 traditional territory includes an area west of the Saanich Inlet to the southern tip of Vancouver
18 Island and has eight reserves; Beecher Bay 1 is the main and largest reserve. As of February
19 2022, Scia'new First Nation has a registered population of 266 people with 102 living on own
20 reserve, 152 living off-reserve, and 12 living on other reserves²⁴⁸.

21 Scia'new First Nation has used and occupied its traditional lands and waters territories since
22 time immemorial for hunting, fishing, transport, trade, ceremonies, and settlement. The people
23 of Scia'new First Nation originate from speakers of Clallam or Klallam (Nəxʷsłáɣəmúçən),
24 occupying present-day Washington, Halkomelem, and Northern Straits Salish. Motivated by
25 fishing and trading, the Clallam migrated from the Olympic Peninsula to Beecher Bay in the
26 mid-19th century but continued to travel back and forth across the Strait of Juan de Fuca by
27 dugout canoe and had strong extended families and ties in both places. The Treaty of
28 Washington (1846) divided the Clallam Nation and families in two along the Strait of Juan de
29 Fuca and imposed two different administrative systems.

²⁴⁸ Indigenous and Northern Affairs Canada. 2022. First Nation Profiles – Beecher Bay. https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=640&lang=eng, Accessed March 23, 2022.

1 Beecher Bay was a strategic fishing location, and its inhabitants adopted the reef net fishing
2 technology from neighbouring Nations. Beecher Bay is located on the sockeye migration route
3 and had responsibility for spreading the news of the sockeye's arrival. The Coast Salish believed
4 salmon were like people and showed them respect with the first salmon rite.

5 Scia'new First Nation has Douglas Treaty Rights to hunt over unoccupied lands and carry on
6 their fisheries "as formerly." The subsistence, cultural reproduction, and identity of Beecher
7 Bay depend on their marine environment.

8 The Strait of Juan de Fuca is an important travel way for Scia'new First Nation; members and
9 relatives still travel between Washington and Beecher Bay to visit families, deliver dried fish,
10 pick berries, and attend winter dances and summer festivals. Maintaining community ties and
11 respecting one's place of origin is a long-standing priority of the Coast Salish. Scia'new First
12 Nation members participate in Tribal Canoe Journeys, annual long-distance canoe trips hosted
13 by Pacific Northwest Nations to maintain and exchange cultures, identities, kinship, and inter-
14 generational teachings. Scia'new First Nation believes these trips are vulnerable to increased
15 shipping traffic.

16 Seafood is key to the identity of the Scia'new First Nation, which prides their territory as an
17 unpolluted source of seafood. Seafood consists of around 64 percent of members' diets and is
18 both food and medicine.

19 Vancouver Island Coast Salish communities have a traditional provider role where a
20 "superharvester" harvests seafood with every tide and procures most of the seafood shared in
21 networks and at community events, spiritual gatherings, and funerals. Individuals can also
22 specialize in fishing, bivalve harvesting, or diving for sea cucumber and urchin. Sea urchins are
23 prized and hold ceremonial significance for the Scia'new First Nation. Urchins at Beecher Bay
24 are relatively clean, and other Nations are starting to depend on Beecher Bay for urchins.
25 Bivalves are gathered during low tides. Clams are a longstanding staple in the Beecher Bay diet,
26 gathered up to twice a month from nearby beaches. Chitons, mussels, oysters, and herring roe
27 are a preferred food of Scia'new First Nation but are now hard to find within their traditional
28 territory. Abalone is a delicacy and carefully guarded resource.

29 Scia'new First Nation asserted that cumulative effects such as declining runs, environmental
30 degradation, fishing regulations, and vessel wakes limit their harvest. Scia'new First Nation
31 noted that, as climate change increases water temperatures, fish are moving into cooler water
32 in the deeper shipping lanes, where Beecher Bay First Nation fishers are forced to follow.
33 Scia'new First Nation fishers practice traditional resource management and conservation
34 techniques to rebuild stocks of traditional foods.

35 Orcas, sacred to the Scia'new First Nation, used to visit Beecher Bay by the hundreds; however,
36 Scia'new First Nation note that recently they are failing to return.

- 1 Scia’new First Nation’s economic interests tied to the marine environment include a marina, an
2 aquaculture project, and a real estate development on Beecher Bay 1.
- 3 The coastal area, islands, and open waters of the Strait of Juan de Fuca from Race Rocks to Port
4 Renfrew are preferred fishing areas for Beecher Bay and the location of registered
5 archaeological, burial, and sacred sites. Race Rocks is a biodiverse traditional hunting and
6 harvesting area with multiple uses, for example, to fish in the summer and hunt duck (especially
7 surf scoter, or “black duck,” which are hard to find today but are sacred to the Coast Salish) to
8 prepare for Long House season in the fall.
- 9 There were at least four reef net sites near Beecher Bay 1, including one at Race Rocks. Reef
10 netting was critical to the Salish economy, cultural identity, resource management, and
11 governance before it was outlawed by the Canadian government in 1916. Scia’new First Nation
12 is one of the communities working to revive this sacred fishery.
- 13 Scia’new First Nation families still troll near the historic Race Rocks reef net site for sockeye,
14 chinook, coho, chum, and halibut which are species critical for Beecher Bay subsistence,
15 economies, trade, and culture. Sea urchins were harvested at Race Rocks in the recent past, but
16 this is now a Marine Protected Area, and such activities are prohibited.

17 **16.12.2 SCIA’NEW FIRST NATION INVOLVEMENT IN THE CONSULTATION** 18 **PROCESS**

19 Consultation with Indigenous Groups identified in Schedule D began in July of 2019 when EAO
20 sent a letter to these groups inviting comments on the draft Section 13 Order, including
21 consultation processes and opportunities. On August 6, 2019, at the request of Canada, the
22 EAO under the Section 13 Order amended the geographic scope for the assessment of the
23 marine shipping route and added the Indigenous Groups identified in Schedule D which
24 included the Scia’new First Nation. For the review of the MSA, the EAO led consultation
25 activities with the Indigenous Groups identified in Schedule D and, as part of this work, invited
26 Scia’new First Nation to participate in the Marine Shipping Working Group. The EAO is of the
27 view that it has approached consultation with Scia’new First Nation at the deeper end of the
28 spectrum, with the intent to identify potential impacts and consider ways to address potential
29 impacts to Aboriginal Interests that were identified by Scia’new First Nation within the MSA
30 area.

31 During the MSA review, the EAO invited Scia’new First Nation to review and provide comments
32 on TJLP’s MSA Supplemental Analysis, the EAO’s draft Assessment Report (including Part C of
33 the Assessment Report), the draft CPD, draft Certificate Conditions and recommended KMMs
34 under CEAA 2012. As part of the Marine Shipping Working Group, Scia’new First Nation was

1 invited to participate in Marine Shipping Working Group meetings and teleconferences during
2 the MSA Supplemental Analysis Review stages.

3 During the MSA review, Scia'new First Nation submitted feedback on TJLP's MSA analysis,
4 including concerns that the MSA should be scoped to 200 nm, about inappropriate use of
5 information from the RBT2 process, insufficient assessment of impacts due to LNG carrier spill
6 or accident, and that cumulative impacts of development on the health of the ocean
7 ecosystems should be included in the assessment. Scia'new First Nation also requested that the
8 MSA should include new studies to understand impacts to Scia'new First Nation's rights and
9 that TJLP should be required to invest into the long-term health of the ocean. Further
10 information related to concerns raised by Indigenous Group's with respect to scoping of the
11 MSA and reliance on information from RBT2 and TMX processes is provided in [Section 13](#) of this
12 Report. During review of TJLP's BVSA Report, Scia'new First Nation's legal counsel attended
13 three Working Group meetings and raised concerns related to the increased bunker vessel
14 traffic, including potential effects to the distribution of vessels in the MSA Area, and marine
15 species that utilize the Fraser River watershed, which are important to its culture or to which it
16 has harvesting rights, including SRKWs and salmon, respectively.

17 The EAO offered to meet directly with Scia'new First Nation to discuss TMJ, EA process, and any
18 potential concerns with TMJ. Teleconference meetings with Scia'new First Nation's legal
19 representative were conducted at their discretion and when requested. Scia'new First Nation
20 met separately with TJLP in relation to TMJ, including more recent discussions regarding the
21 BVSA occurring in April 2022. The EAO considered Scia'new First Nation's feedback provided on
22 the MSA and the EAO endeavoured to reflect Scia'new Nation's concerns and perspectives
23 related to potential impacts to Scia'new First Nation's Aboriginal Interests due to TMJ and the
24 consultation process in Part C of the Assessment Report.

25 **16.12.3 POTENTIAL IMPACTS TO TREATY RIGHTS AND OTHER INTERESTS**

26 The following sections focus on potential impacts of TMJ to Scia'new First Nation's Douglas
27 Treaty rights to hunt and fish and other interests. A discussion of the EAO's assessment
28 approach is provided in in Impact Assessment Methods of Part C ([Section 12.2](#)).

29 The EAO considered information available, including from public sources as well as relevant
30 issues raised by Scia'new First Nation and members during the EA process (in meetings, letters
31 and Working Group comments), in the following assessments of the potential impacts of TMJ
32 on Scia'new First Nation's Douglas Treaty rights and other interests, mitigations, and
33 accommodations to address potential impacts.

1 A. POTENTIAL IMPACTS ON FISHING

2 The EAO evaluated the potential effects of TMJ on Aboriginal fishing rights and provided a
3 summary in [Section 13.3.1](#). In addition, the EAO considered relevant information related to
4 potential shipping-related effects based on review of the RBT2 Panel and TMX EA processes.
5 The EAO is satisfied that the key impacts to biophysical components resulting in changes to fish
6 quantity and quality, changes in access to fishing resources, and changes to social, cultural, and
7 spiritual values associated with traditional fishing activities that apply to Scia'new First Nation
8 are summarized in [Section 13.3.1](#).

9 Scia'new First Nation raised the following concerns regarding potential impacts on the right to
10 fish due to TMJ:

- 11 • Concern regarding the potential cumulative impact of TMJ on steelhead, chinook and
12 SRKWs, in relation to land and resources for traditional purposes.
 - 13 ○ As discussed in [Section 13.3.1](#), the EAO is recommending KMMs under CEAA
14 2012 for the Fish Mitigations to Reduce Harm and Mortality, Fish Habitat Offset
15 Plan, and Vessel Traffic Management Plan to address these concerns. The EAO
16 did not predict any residual effects to fish and fish habitat in the MSA area.

17 The EAO notes that the RBT2 panel report (2020) notes that Scia'new First Nation fish at
18 Swiftsure Bank, particularly for halibut. Scia'new First Nation also reported safety concerns
19 when encountering large vessels on the water.

20 Additional issues and concerns with potential impacts related to fishing were raised by Scia'new
21 First Nation during the EAs of RBT2 and TMX. These concerns were not raised by Scia'new First
22 Nation during the TMJ EA but the EAO considers them applicable to the MSA area.

- 23 • Concern that fishing rights have already been affected by shipping, in part because of
24 the requirement to make way for large ships. And the challenges of fishing for halibut
25 near Race Rocks because of vessel traffic.
 - 26 ○ See [Section 13.2.1](#) for a detailed discussion of the analysis and resolution of
27 concerns related to the effects of TMJ on fish and fishing rights. As discussed in
28 [Section 13.2.1](#), the proposed mitigation measures to addresses concerns around
29 fish and access to fishing are included in the fish and fish habitat monitoring and
30 mitigation plan in addition to the Marine Communications and Vessel Traffic
31 Management Plans.
- 32 • Concern about the impact of introduced and invasive species on traditional and
33 harvestable species.
 - 34 ○ In the Fish and Fish Habitat and Water sections of Part B of this Report, the EAO

1 notes that the potential introduction of invasive species from ballast water
2 discharge would be sufficiently managed through adherence to federal
3 regulations (*Canada Shipping Act, 2001*) and international conventions (for
4 example, MARPOL Convention) that prohibit these activities in the Fraser River
5 and MSA area.

6 **Conclusion**

7 In consideration of the available information in [Section 13.2.1](#), which outlines the potential
8 effect to fishing; consultation with Scia'new First Nation; Scia'new First Nation's engagement
9 with TJLP; TJLP's commitments; and the EAO's proposed EAC conditions if an EAC is issued and
10 the recommended KMMs under CEAA 2012, TMJ is expected to result in negligible-to-minor
11 impact on Scia'new First Nation's right to fish.

12 The key factors that were considered in support of the EAO's conclusion on the impacts to the
13 right to fish are summarized as follows:

14 **Biophysical:**

- 15 • The EAO's conclusions on adverse residual effects in the Fish and Fish Habitat chapter in
16 Part B which does not predict any residual effects to fish and fish habitat in the MSA
17 area; and
- 18 • The MSA area, including Swiftsure bank, is a heavily utilized marine environment with
19 occasionally high levels of marine traffic in the shipping lanes.

20 **Geospatial:**

- 21 • The coastal area, islands, and open waters of the Strait of Juan de Fuca from Race Rocks
22 to Port Renfrew are preferred fishing areas for Scia'new First Nation;
- 23 • RBT2 Panel reports Scia'new First Nation fish at Swiftsure Bank, particularly for halibut;
24 Swiftsure bank is intersected by shipping lanes where cumulative effects from shipping
25 traffic is a constraint; and
- 26 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
27 segments A – D) in vessel traffic when compared to baseline conditions in the Traffic
28 Separation Scheme and that TMJ-related vessel transits during operations (minimum 30
29 years) would result in negligible to low magnitude effects due to relatively infrequent
30 and short-duration interruptions to access to fishing areas in the Salish Sea.

31 **Social, Cultural and Experiential:**

- 32 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
33 traffic during operations affecting visual quality, noise, and vessel wake (with an

- 1 increasing magnitude of effect the closer one is to the vessels); and
- 2 • Safety concerns when encountering large vessels on the water and that fishing rights
- 3 have already been affected by shipping.

4 **Mitigations:**

- 5 • Proposed mitigations for impacts to Scia'new First Nation fishing rights include the
- 6 Marine Communications Plan recommended as KMMs under CEAA 2012; and
- 7 • The EAO acknowledges that these mitigation measures would not reduce impacts for
- 8 baseline conditions and/ or impact of future projects, which are a source of issues for
- 9 many Indigenous Groups.

10 **B. POTENTIAL IMPACTS ON HUNTING, TRAPPING AND GATHERING**

11 The EAO evaluated the potential effects on hunting, trapping and gathering activities

12 attributable to TMJ in [Section 13.3.2](#) above that apply broadly to Indigenous Groups. The EAO is

13 satisfied that the key impacts to biophysical components resulting in changes to wildlife and

14 vegetation quantity and quality, changes in access to hunting, trapping and gathering areas, and

15 changes to social, cultural, and spiritual values associated with traditional hunting, trapping and

16 gathering activities that apply to Scia'new First Nation are summarized in [Section 13.3.2](#).

17 Scia'new First Nation did not raise specific issues and concerns with potential TMJ impacts

18 related to hunting, trapping, and gathering.

19 **Conclusion**

20 In consideration of the available information in [Section 13.3.2](#), the EAO's consultation with

21 Scia'new First Nation; Scia'new First Nation's engagement with TJLP, TJLP's commitments, the

22 EAO's proposed EAC conditions if an EAC is issued and the recommended KMMs under CEAA

23 2012, TMJ is expected to result in negligible impact on Scia'new First Nation's hunting, trapping

24 and gathering.

25 The key factors that were considered in support of the EAO's conclusion on the impacts to

26 hunting, trapping, and gathering included the EAO's conclusions on adverse residual effects to

27 wildlife in the MSA area predict negligible to low magnitude mortality of select marine bird

28 species. The EAO also considered that in the MSA area, operations (30 years in duration) may

29 cause infrequent, short-term, temporary disruptions to marine-based hunting along the

30 proposed LNG vessel route and negligible effects on Indigenous access to terrestrially based

31 hunting, trapping, and gathering sites that are accessed by boat from the pilot station at Sand

32 Heads to the 12 nm territorial limit. To mitigate potential impacts to Scia'new First Nation's

33 right to hunt, trap and gather, the EAO is recommending a KMM under CEAA 2012 for a Marine

34 Communication Plan, including procedures to inform Indigenous Groups of traffic schedules

1 and for Indigenous Groups to submit any feedback on potential adverse effects on navigation as
2 a result of TMJ. The EAO also considered that the small relative increase due to TMJ-related
3 vessel traffic would have a negligible effect to experiential aspects of hunting, trapping, and
4 gathering from changes to visual quality and noise in the MSA and that all TMJ related vessels
5 would adhere to the Marine Regulations and Legislation regulating vessel noise and lighting.

6 *C. POTENTIAL IMPACTS ON OTHER TRADITIONAL AND CULTURAL INTERESTS*

7 The EAO evaluated the potential for TMJ-related residual and cumulative effects to impact
8 other traditional and cultural interests of Indigenous Groups in the MSA, as summarized in
9 [Section 13.3.3](#). In its evaluation, the EAO considered potential marine-shipping related effects
10 pathways to impacts based on review of publicly available information from RBT2 and TMX
11 processes, and any information provided by Indigenous Groups during the MSA review. The
12 EAO is satisfied that TMJ's marine shipping-related effects in the MSA area to access, quality of
13 experience and SRKWs would be the pathways to impacts to Scia'new First Nation's other
14 cultural and traditional interests.

15 During the MSA review, Scia'new First Nation raised concerns about potential environmental
16 effects from an accident or malfunction, resulting in a spill in the waterways of Scia'new First
17 Nation's traditional territory and that the Accidents and Malfunctions risk assessment in the
18 MSA failed to provide rationale for the bunker fuel estimate and was limited by assessing a spill
19 at only one location and at one time of year.

- 20 • In the Accidents and Malfunctions and Effects of the Environment section in Part B, with
21 consideration of the MSA, it was determined that the risk of an LNG or bunker fuel
22 release would have consequence severities ranging from moderate to very high with
23 the very high being on SRKWs and heritage resources and having potentially irreversible
24 effects. However, the likelihood was estimated to be extremely rare as the release
25 would need to occur in the vicinity of these susceptible sites or SRKWs;
- 26 • TJLP clarified that the lower volume estimate for bunker fuel spill assessment did not
27 affect the MSA, which was conservatively based on the oil spill modelling results
28 performed for TMX, and the modelling results from RBT2 and TMX were qualitatively
29 expanded for the MSA area, which included seasonal variation; and
- 30 • Marine shipping associated with TMJ would be required to meet the international
31 standards and Canadian regulations set out by Canada's compliance-based marine
32 safety and security system, which is designed to protect life, property, and the marine
33 environment. The EAO is recommending a KMM under CEAA 2012 for a Marine Shipping
34 Emergency Response Outreach Program to facilitate the integration of plans for
35 responding to incidents in transit into existing emergency response systems, primarily

1 the CCG's Incident Integrated Response Plans.

2 Scia'new First Nation also identified that cumulative impacts of development on the health of
3 the ocean is a major concern, including the collapsing steelhead, chinook and SRKW
4 populations, which Scia'new First Nation considers are signs of an imbalance in the marine
5 environment. Scia'new First Nation requested that TJLP contribute to supporting the long-term
6 recovery and health of the ocean such as enhanced tug escorts for LNG carriers or additional
7 investments in government spill response capacity.

- 8 • The EAO acknowledges Scia'new First Nation's concerns regarding cumulative impacts
9 to the health of the ocean, including potential effects to fish and SRKWs and the entire
10 ecosystem;
- 11 • See [Section 13.2.3](#) for a detailed discussion of the analysis and resolution of concerns
12 related to the effects on whales. As discussed in [Section 13.2.3](#), the EAO concluded that
13 TMJ would not result in significant residual effects to Marine Mammals; however, the
14 EAO notes that the current baseline of cumulative effects to SRKWs are already high and
15 that TMJ would contribute additional residual effects from shipping noise and potential
16 avoidance behaviour by SRKWs to ships, such that cumulative effects to SRKWs are
17 considered significant;
- 18 • TJLP stated that they are commitment to adhering to the mitigation measures outlined
19 in the MSA and that TJLP adaptive management of mitigation measures would be an
20 essential part of the overall management strategy to promote ocean health. TJLP also
21 stated they have included a requirement that management measures related to SRKWs
22 would be reviewed on an annual basis to determine if changes need to be incorporated
23 into TMJ shipping practices. TJLP also anticipates that tug escorts would be required for
24 LNG vessels in Boundary Pass and Haro Strait; and
- 25 • The EAO is recommending as a KMM under CEAA 2012 a Vessel Traffic Management
26 Plan that would require TJLP to incorporate contractual measures to support
27 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
28 initiatives (as amended) or a future equivalent, and annual reporting on TJLP's
29 participation in regional environmental management measures and cumulative effects
30 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
31 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
32 Banks, Haro Strait and Boundary Pass. The EAO notes several regional initiatives and
33 measures have been implemented by the Government of Canada to better understand
34 and manage cumulative effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

35 Additional issues and concerns with potential impacts related to traditional and cultural
36 interests were raised by Scia'new First Nation during the EAs of RBT2 and TMX. These concerns

- 1 were not raised by Scia’new First Nation during the TMJ EA but the EAO considers them
2 applicable to the MSA area.
- 3 • Concerns about the effect of large-vessel wakes on marine uses and concerns about
4 safety.
 - 5 ○ The EAO concluded that the TMJ-related vessel wake would be within natural
6 variation of the wave heights in this area (see Vessel Wake section in Part B of
7 this Report.
 - 8 ○ In the Current Use section in Part B, it was determined that with the marine
9 transportation regulatory regime, as well as low frequency and short duration of
10 TMJ-related traffic there would be negligible to low magnitude of effect of
11 Indigenous access to fishing areas.
 - 12 • Concern that the routine operation of ships impacting the exercise of Treaty rights and
13 other interests, including restricting the times and locations in which those rights can be
14 exercised; disrupting travel ways utilized by Scia’new First Nation members to exercise
15 those activities; and increasing the likelihood of a collision between a large ship and a
16 vessel owned or operated by Scia’new First Nation or a Scia’new First Nation member
 - 17 ○ In the Current Use section of this Report, the EAO predicted that regularly
18 occurring and short-duration TMJ-related vessel transits would have negligible to
19 low magnitude effects to access to harvesting sites in the MSA area. The EAO is
20 recommending a KMM under CEAA 2012 for a Marine Communication Plan out
21 to 12 nm that would be developed in consultation with Schedule B and D
22 Indigenous Groups and include procedures to inform Indigenous Groups of
23 traffic schedules, for Indigenous Groups to provide feedback on adverse effects
24 related to navigation as a result of TMJ, and for TJLP to document and respond
25 to feedback in a timely manner.
 - 26 • Concern about the difficulty securing compensation for damages to culture and Treaty
27 rights in the event of an accident or spill involving a vessel.
 - 28 ○ As described in the Accidents and Malfunctions and Effects of the Environment
29 section in Part B of this Report, Canada has a comprehensive liability and
30 compensation regime covering different types of marine risks involving ships,
31 including oil pollution, the release of HNS, collisions, and wreck removal. Refer to
32 the Accidents and Malfunctions chapter ([Section 9.3](#)) for more details.

33 Conclusion

34 The EAO predicts the TMJ-related marine shipping effects alone would have negligible-to-minor
35 impacts on Scia’new First Nation’s other cultural and traditional interests, although the EAO

1 acknowledges that there is uncertainty in the relationship between incremental increases in
2 shipping and the availability of cultural resources, such as SRKW. However, in consideration of
3 the available information, the EAO's consultation with Scia'new First Nation, TJLP's
4 commitments, the EAO's proposed EAC conditions if an EAC is issued and the recommended
5 KMMs under CEAA 2012, the EAO concludes that TMJ-related marine shipping effects
6 combined with cumulative effects in the MSA area is expected to result in moderate-to-serious
7 impact on Scia'new First Nation's other traditional and cultural interests. The EAO's conclusions
8 of significant cumulative effects to SRKW was a major key factor considered in the EAO's
9 seriousness determination. The EAO notes several regional initiatives and measures have been
10 implemented by the Government of Canada to better understand and manage cumulative
11 effects on the recovery of SRKWs (listed in [Section 13.1.1](#)).

12 The key factors that were considered in support of EAO's conclusion on the impacts to other
13 traditional and cultural interests are summarized as follows:

14 **Cultural and Heritage Resources:**

- 15 • The EAO's conclusions Part B did not predict residual effects to Heritage Resources
16 ([Section 7.1](#)) from erosion due to wake effects along the shorelines of the MSA area;
- 17 • The EAO's conclusions in the Marine Mammals section in Part B, which found low to
18 moderate magnitude residual effects from TMJ-related vessels on SRKWs and significant
19 cumulative effects to SRKWs; and
- 20 • The MSA area is a heavily utilized marine environment.

21 **Geospatial:**

- 22 • The Strait of Juan de Fuca is an important travel way for Scia'new First Nation. Scia'new
23 First Nation members participate in Tribal Canoe Journeys, annual long-distance canoe
24 trips in the MSA area, including crossing shipping lanes, to maintain and exchange
25 cultures, identities, kinship, and inter-generational teachings; and
- 26 • The EAO considers TMJ would result in an incremental increase (i.e., 0.2 – 1.1 % for
27 segments A – D) to vessel traffic when compared to baseline conditions in the Traffic
28 Separation Scheme and would result in negligible to low magnitude effects due to
29 relatively infrequent and short-duration interruptions to access to areas in the Salish
30 Sea.

31 **Social, Cultural, Experiential:**

- 32 • Potential negligible to low impacts due to incremental increases from TMJ-related vessel
33 traffic during operations affecting visual quality, noise, and vessel wake (with an

- 1 increasing magnitude of effect the closer one is to the vessels);
- 2 • Potential concerns regarding safety of small vessels with large vessels and wake effects,
- 3 as assessed in the Accidents and Malfunctions and Effects of the Environment section in
- 4 Part B; and
- 5 • Scia’new First Nation’s cultural and spiritual interest in SRKWs.

6 **Mitigations:**

- 7 • Proposed mitigations for potential impacts to traditional and cultural interests are the
- 8 recommended key mitigations under CEAA 2012 for a Marine Communications, and
- 9 Vessel Traffic Management Plans, and a Marine Shipping Emergency Response Outreach
- 10 Program; and
- 11 • The EAO is recommending as KMMs under CEAA 2012 for a Vessel Traffic Management
- 12 Plan that would require TJLP to incorporate contractual measures to support
- 13 participation of TMJ-related vessels in the VFPA-led ECHO Program seasonal slowdown
- 14 initiatives (as amended) or a future equivalent, and annual reporting on TJLP’s
- 15 participation in regional environmental management measures and cumulative effects
- 16 monitoring to protect SRKW, where feasible. The seasonal slowdown initiatives
- 17 currently request vessels to slow down in key SRKW foraging areas such as Swiftsure
- 18 Banks, Haro Strait and Boundary Pass.

19 **17 WEIGHT OF IMPACTS TO ABORIGINAL INTERESTS**

20 **WITH PROVINCIAL INTERESTS**

21 The Crown has a responsibility to weigh the potential impacts and accommodations on

22 Aboriginal Interests with other societal interests, including the social, environmental and

23 economic benefits of TMJ. This evaluation is an important component informing the Ministers’

24 decision on whether or not to approve TMJ. In weighing the benefits of TMJ with the impacts

25 on Aboriginal Interests, the EAO holds the view that the following factors are relevant to

26 consider:

- 27 • Importance of TMJ to the local, regional, and provincial economy;
- 28 • The nature of TMJ;
- 29 • Resources or values available for future generations; and
- 30 • Benefits of TMJ to affected Indigenous Groups.

1 The EAO has summarized the estimated TMJ benefits during construction and operations in
2 section 2.3 (Project Benefits and Purpose) of Part A of the EAO's Assessment Report. The nature
3 of TMJ including TMJ components and activities are described in section 2.2 (Project
4 Description and Scope) of Part A the EAO's Assessment Report.

5 **17.1 IMPORTANCE OF THE PROPOSED PROJECT**

6 Canada is seen as a desirable source of natural gas supply because of its political and regulatory
7 stability. Exporting LNG offers the opportunity for Canadian producers to access international
8 markets. TMJ would provide a key link between natural gas produced in Canada and growing
9 global LNG markets. Regarding ship-to-ship LNG marine refuelling (i.e., bunkering) service, the
10 use of LNG to power the world's ocean-going vessels is forecast to expand and BC is well
11 positioned to benefit from this growth. TJLP has noted that the BVS would support the Port of
12 Vancouver in its goal to shift from marine oil fuel to cleaner LNG fuel, and open up BC's natural
13 resources to markets that need low-carbon energy to displace coal. The increased activity of
14 LNG-powered ships would reduce the GHG emissions produced by the international marine
15 shipping industry, in line with efforts to lower other transportation emissions under CleanBC.
16 According to industry standards, replacing diesel fuel with LNG has the potential to reduce GHG
17 emissions by approximately 20 percent. It also offers an opportunity for provincial economic
18 growth and job creation. Over the construction phase, TJLP proposes to spend up to \$200
19 million dollars in BC.

20 TJLP estimates that in BC, construction would create approximately 276 FTEs of direct
21 employment and anticipates contributing approximately \$1.7 million annually during
22 construction to provincial government revenue. During operations, direct annual operational
23 expenditures, employment and labour income would result in very small annual changes
24 provincial government revenue relative to that of the provincial and local (Metro Vancouver)
25 economy.

26 ***RESOURCES OR VALUES AVAILABLE FOR FUTURE GENERATIONS***

27 The scope of TMJ relates to the transport of liquid natural gas, rather than involving primary
28 resource extraction. As described above and in the Report, traditional subsistence activities,
29 such as hunting, trapping, gathering, and in particular, fishing, and access to areas where these
30 activities are conducted may be altered as a result of TMJ, which could manifest itself through
31 changes to local harvesting locations, behavioural alteration or sensory disturbance of
32 environmental resources.

1 The EAO believes there could be potential impacts to resources or values of importance to
2 Indigenous groups. The EAO is of the view that TJLP has made efforts to demonstrably
3 understand and avoid high value areas for Indigenous groups, by building on or adjacent to
4 existing disturbed and industrial lands, minimizing clearing wherever possible, designing and
5 constructing the jetty to minimize impacts to fish and fish habitat, offsetting impacts to fish
6 habitat where long-term effects are unavoidable, committing to avoid, where possible, impacts
7 to archaeological sites and committing to reduce impacts to access to Indigenous or
8 commercial fisheries openings in the Fraser River, and providing appropriate mitigation
9 measures to reduce the potential effects of TMJ-related shipping. Further consultation and
10 analysis to support the development of management and monitoring plans prior to
11 construction and operation would require that any additional KMMs are implemented to
12 ensure potential impacts are minimized, as required by the EAO's proposed EAC conditions and
13 recommended KMMs under CEAA 2012.

14 **17.2 BENEFITS TO AFFECTED INDIGENOUS GROUPS**

15 In addition to ongoing capacity funding to support consultation activities, TJLP has indicated
16 that they would support employment, contracting and business development for Indigenous
17 groups including as follows:

- 18 • Identifying training and capacity building partnerships or other arrangements to
19 increase opportunities for Indigenous participation;
- 20 • Encouraging and supporting the use of Indigenous and local businesses by
21 encouraging suppliers and subcontractors to adopt local procurement; and
- 22 • Ongoing active engagement with Indigenous groups to ensure that local Indigenous
23 communities benefit directly from TMJ, including opportunities related to
24 employment, training and contracting.

25 The EAO proposes a condition requiring the development of an Indigenous Training,
26 Employment and Procurement Plan which would outline the means by which local and
27 Aboriginal hiring and procurement policies would be implemented and methods for
28 communicating training, employment and procurement opportunities to Indigenous Groups
29 and their members. The Plan would also describe measures to provide opportunities and
30 training for Indigenous monitors and enhance the hiring and retention of Indigenous Groups
31 and their members, support Indigenous Groups in accessing employment and procurement
32 benefits from TMJ, and procurement of goods and services from businesses owned by
33 Indigenous Groups.

1 The EAO also proposes an Indigenous Cultural Awareness and Recognition condition which
2 states that TJLP must offer opportunities to Indigenous Groups on Schedule B in the Lower
3 Fraser to lead or support activities such as ceremonies, installation of signage, executing
4 cultural protocols, transmission of knowledge or language, recognizing cultural heritage and
5 providing cultural awareness training to TMJ employees.
6

7 The EAO also understands that TJLP is currently negotiating some benefits agreements for TMJ.
8 These agreements would provide benefits that include opportunities in the areas of
9 construction contracts, monitoring, cultural heritage protection, Indigenous awareness and
10 cultural recognition, training, and other potential benefits of interest. The EAO is aware that
11 TJLP has proposed to contribute up to \$2 million to the FNFLF⁷⁴, which is an Indigenous-led
12 program that support recovery programs for chinook salmon, eulachon and sturgeon in the
13 Fraser River and Salish Sea. The EAO has heard from FNFLF that the investment is viewed as a
14 meaningful contribution to Indigenous led stewardship, transmission of knowledge, and
15 access/experience of fishing for future generations. For more information about the EAO's
16 consideration of TJLP's contribution proposal, refer to [Section 13.1](#) on Current Context and
17 Cumulative Effects in Part C.

1 PART D - CONCLUSIONS

2 Based on:

- 3 • Information contained in TJLP's original Application and MSA, and supplemental
4 information provided by TJLP, Indigenous Groups and Working Group members during the
5 Application review;
- 6 • TJLP and the EAO's efforts at consultation with Indigenous Groups, federal, provincial, and
7 local government agencies and the public, and TJLP's commitment to ongoing consultation;
- 8 • Comments on TMJ made by Indigenous Groups, federal, provincial and local government
9 agencies as members of the EAO's Working Group, and TJLP's and the EAO's responses to
10 those comments;
- 11 • Comments on TMJ received during the public comment periods, and TJLP's responses to
12 those issues;
- 13 • Issues raised by Indigenous Groups regarding the potential effects of TMJ to their
14 Aboriginal Interests and Treaty rights, and TJLP's response and best effort to address those
15 issues;
- 16 • Issues raised by Indigenous Groups that were outside of the scope of the TMJ EA, and the
17 federal and provincial agencies' and TJLP's approaches to address those issues;
- 18 • The design of TMJ as specified in the EAO's proposed 1 (Certified Project Description) of the
19 EAC to be implemented by TJLP during all phases of TMJ;
- 20 • Mitigation measures identified as proposed conditions in the EAO's proposed Schedule B
21 (Table of Conditions) of the EAC to be undertaken by TJLP during all phases of TMJ;
- 22 • The EAO's recommended KMMs under CEAA 2012, to be undertaken by TJLP during all
23 phases of TMJ, intended to inform federal conditions;
- 24 • The EAO's understanding that existing constraints and cumulative effects in the lower
25 Fraser River and in the shipping lanes in the Salish Sea may increase the overall seriousness
26 of effect of TMJ on Aboriginal Interests and Treaty rights;
- 27 • The Government of Canada is currently leading several initiatives already underway to
28 collect habitat and monitoring information, implement management measures to address
29 cumulative effects, and support capacity building by Indigenous groups to undertake studies
30 and stewardship activities in the Salish Sea. The EAO views this as relevant context for
31 understanding regional cumulative effects; and
- 32 • TJLP's proposal, which is currently under discussion with Indigenous Groups, to contribute
33 up to \$2 million to the First Nations Fisheries Legacy Fund, which is an Indigenous-led

1 program that support recovery programs for chinook salmon, eulachon and sturgeon in the
2 Fraser River and Salish Sea.

3

4 The EAO is satisfied that:

- 5 • Potential accidents and malfunctions associated with TMJ have been adequately identified
6 and assessed for this EA;
- 7 • The EA process has adequately identified and assessed potential adverse environmental,
8 economic, social, heritage and health effects of TMJ, having regard to the proposed
9 conditions set out in Schedule B (Table of Conditions) to the EAC, if issued, and the
10 recommended KMMs under CEAA 2012;
- 11 • Consultation with agencies and the public has been adequately carried out;
- 12 • Issues identified by government agencies, and members of the public, which were within
13 the scope of the EA, were adequately and reasonably addressed during Application Review;
- 14 • Although the EAO did not conduct a comprehensive regional cumulative effects assessment
15 on all the various existing constraints and pathways of effect for Current Use of Lands and
16 Resources for Traditional Purposes for fishing or Cultural Heritage for the TMJ EA, the EAO
17 considered where TMJ effects intersect with known constraints and cumulative effects and
18 information provided by Indigenous Groups to better inform decision makers on how
19 cumulative effects may be experienced by Indigenous Groups;
- 20 • There are existing significant cumulative effects to SRKWSRKW, current use of lands and
21 resources for traditional purposes for fishing in the lower Fraser River and at Swiftsure
22 Bank, and to cultural heritage for some Indigenous Groups. Although the EAO concludes
23 that the residual effects from TMJ alone would not be significant, TMJ would interact with
24 these baseline effects and those from reasonably foreseeable projects in a cumulative
25 manner, and the EAO is concluding significant cumulative effects for these VCs; and
- 26 • TMJ would result in adverse residual or cumulative effects to other environmental, social,
27 heritage and health VCs, but with the application of mitigation measures and legally-binding
28 conditions, these effects would not be significant.

29

30 The EAO also notes that consultation with Indigenous Groups will be ongoing during the public
31 comment period, including engagement on Part C, conditions, and recommended KMMs under
32 CEAA 2012. This work includes engagement on Indigenous Groups' views on seriousness of
33 effects, and further dialogue on the sufficiency of proposed mitigation and accommodation
34 measures.

1 **APPENDIX 1 – THE EAO’S RECOMMENDED KEY MITIGATION MEASURES UNDER THE CANADIAN ENVIRONMENTAL ASSESSMENT**
 2 **ACT, 2012 (CEAA 2012)**

3 Please note that the recommended Key Mitigation Measures (KMMs) under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) inform the draft federal conditions. If Tilbury Marine Jetty Project (TMJ) is
 4 approved, the federal conditions would be legally binding on the Tilbury Jetty Limited Partnership (TJLP), whereas the KMMs are not. [Please see LINK for the Draft Federal Potential Conditions.](#)

5 The draft KMMs apply to the Marine Terminal Area, as specified in Figure 1 of the provincial draft Certified Project Description (CPD), unless otherwise noted. Consultation on all plans is required with Indigenous Groups
 6 identified in Schedule B in the provincial Section 11 and 13 Orders. Consultation is required with Indigenous Groups identified in Schedule D of the Section 13 Order dated August 6, 2019 where noted.

7 **Table 33: The EAO’s Recommended Key Mitigations Measures Under the Canadian Environmental Assessment Act, 2012, for the Tilbury Marine Jetty Project**

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
Fish and Fish Habitat	5(1)(a)(i)	Water Quality	Water Quality Mitigations: <i>In-water works Mitigations:</i> a) Reduce sediment disturbance and prevent discharge containing total suspended solids, concrete wash water and fuel from entering the aquatic environment; b) Conduct real-time on-site monitoring and compare to BC Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments (2001), or as replaced or updated from time to time by a qualified Environmental Monitor during high risk activities (i.e., in water works with the potential to increase suspended sediments such as dredging and pile driving); c) Implement real-time turbidity monitoring of both background and project-related releases during in-water works, including pile driving and removal of temporary piles, and compare against B.C. Water Quality Guidelines. If turbidity levels exceed these guidelines, pre-determined decision criteria with specific management actions will be followed; d) Define triggers for mitigation (e.g., concentrations, differences in turbidity, etc.); e) Develop and implement a response plan that includes specific management actions when pre-determined decision criteria are exceeded; f) Implement best practices for in-water works that minimize contamination, sediment disturbance and TSS generation (including the use of bottom feed when completing vibro-replacement stone columns for ground stabilization); g) Implement best practices for removal of temporary piles (Hutton & Samis, 2000 ²⁴⁹ ; and MOTI, 2013 ²⁵⁰); h) Maintain onshore refueling activities to areas more than 50 m from watercourses. Maintain onshore stockpiling activities to areas south of the dyke; and i) When operating hydraulic machinery in and over the water use either biodegradable hydraulic fluids or ensure that additional measures are in place to prevent non-biodegradable fluids from entering the water. <i>Dredging Mitigations:</i> a) Implement dredging mitigations outlined below during construction and maintenance dredging;

²⁴⁹ Hutton, K.E and S.C. Samis. 2000. Guidelines to Protect Fish and Fish Habitat from Treated Wood used in Aquatic Environments in the Pacific Region. Habitat and Enhancement Branch, DFO. Available at CREOSOTE (arlis.org)

²⁵⁰ MOTI. 2013. Guidelines for Use of Treated wood In and around Aquatic Environments and Disposal of Treated wood. Available at Guidelines for Use of Treated Wood In and Around Aquatic Environments and Disposal of Treated Wood (gov.bc.ca)

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>b) Implement real-time turbidity monitoring of both background and project-related releases during dredging and compare against B.C. Water Quality Guidelines (or as replaced or updated from time to time). If turbidity levels exceed these guidelines, pre-determined decision criteria with specific management actions will be followed;</p> <p>c) Define triggers for mitigation (including concentrations and differences in TSS);</p> <p>d) Develop the decision framework and management actions in accordance with established guidance for dredging in the Fraser River, such as the Fraser River Estuary Management Program (FREMP) Dredging Guidelines and CEMP guidance from the Port of Vancouver;</p> <p>e) Employ dredging practices that minimize the release of sediments to the water column;</p> <p>f) Employ a soft start procedure for dredging, beginning with lower levels of noise and movement before proceeding;</p> <p>g) If suction dredging is used, section-head must be operated within 1.5 metres (m) of the river bottom; and</p> <p>h) Measures to manage return water from dredge material placed upland, such as treatment through sedimentation basins to remove suspended sediment prior to discharge and returning water to the Fraser River via a pipe that extends far enough offshore that water is discharged beneath the water surface. If sediment basins are employed, they would be located on previously disturbed asphalt areas.</p> <p><i>Stormwater Management Mitigations:</i></p> <p>a) Surface drains and ditches graded according to best management practices and vegetated / lined to reduce runoff;</p> <p>b) Collection of water in temporary sediment control structures and discharge to ground (assumed option) or offsite to municipal storm water system; and</p> <p>c) If discharge off site is needed, then water quality will be analyzed and treated if needed.</p> <p><i>Creosote Pile Removal Mitigations (for removal of potential subsurface remnants):</i></p> <p>a. Implement mitigation measures consistent with Fisheries and Oceans Canada’s (DFO) <i>Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region</i>;</p> <p>b. Review and consider Washington Department of Natural Resources Derelict Creosote Piling Removal Best Management Practices for Pile Removal & Disposal in development of mitigations²⁵¹;</p> <p>c. Attempt to remove entire creosote-treated pile;</p> <p>d. Pile removed by slow and steady pull to reduce disturbance of riverbed habitats – if pile breaks below biologically active zone it may not be advisable to dredge the remainder out.</p> <p><i>Erosion and Sediment Control Mitigations:</i></p> <p>a) Minimize activities within 30 m wide riparian management area along the Fraser River. In doing so the proponent will avoid vegetation clearing within this area (except for what is required to construct project components) and will not stockpile erodible material in this area;</p> <p>b) Follow existing provincial and federal guidelines; and</p> <p>c) Implement Erosion and sediment control measures as required.</p> <p><i>Scour Protection Mitigations:</i></p>

²⁵¹ Washington Department of Natural Resources. 2017. Derelict Creosote Pile Removal Best Management Practices for Pile Removal and Disposal. Available at Best Management Practices (BMPs) For Pile Removal & Disposal (wa.gov)

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>a) Position vessels and barges in a manner to minimize re-suspension of riverbed sediments based on results of annual review of effectiveness of scour protection and results of annual soundings; and</p> <p>b) Identify shallow areas and avoid these areas when maneuvering of work vessels to avoid propeller scour and re-suspension of sediments.</p> <p><i>Concrete Works Mitigations:</i></p> <p>a) Use of pre-cast, rather than cast-in-place, structures where possible;</p> <p>b) Use of concrete-tight forms to isolate concrete from receiving environment (when cast-in-place methods are necessary);</p> <p>c) Conduct work on structures below high-water mark during low tide in dry conditions; and</p> <p>d) When undertaking in-water work activities that use concrete, do so in a manner consistent with the <i>Fisheries Act</i>.</p>
		Fish and Fish Habitat	<p>Fish Mitigations to Reduce Harm and Mortality:</p> <p>a. Identification of reduced-risk work windows identified by Fisheries and Oceans Canada (DFO) and Ministry of Land, Water and Resource Stewardship (LWRS), including those windows for eulachon, sturgeon, salmon species and species at risk; and identification of reduced-risk work windows communicated by Indigenous Groups to the Holder, for In Water works, and the work that will occur within any of these reduced-risk work windows;</p> <p>b. Conduct in-water work activities during reduced risk work windows identified by DFO (June 16 to February 28) unless otherwise authorized by DFO.</p> <p>c. Identification of, and justification for, any work that will occur outside of the reduced-risk work windows identified by DFO and LWRS and Indigenous groups, as determined by a qualified professional (QP);</p> <p>d. Identification of frequency and method of monitoring immediately prior to pile driving and dredging for fish presence. Side-scan sonar surveys shall be used to detect sturgeon;</p> <p>e. A description of criteria and triggers to modify or stop in water works in response to fish presence within 10 m of pile driving or fish kill during pile driving and dredging as determined by the QP listed above. If dredging and pile driving activities are stopped due to fish kill, the steps that will be taken to determine if dredging can resume will be determined by a QP. Fish kills will be reported to LWRS, DFO and Indigenous groups without delay;</p> <p>f. Notification of Indigenous Groups as soon as possible if work is authorized outside the DFO reduced risk window;</p> <p>g. Details on the means and timing of side-scan sonar surveys for sturgeon once the dredge pocket has been established to inform sturgeon occupancy mitigation:</p> <ol style="list-style-type: none"> 1. Identification of additional mitigations or other actions and the thresholds or triggers to implement these actions resulting from the above monitoring information, in consultation with LWRS, DFO and Indigenous groups; <p>h. Details on the acoustic and vibratory fish deterrent measures to reduce risk of entrainment and harm in response to sturgeon presence, namely, implementation of ramp-up procedures (e.g., Waving/tapping the cutter head through the midpoint of the water column and waiting 30 seconds or soft starts and stops, to give fish time to swim away), each time the dredge is reactivated (e.g., beginning of the day, following breaks, etc.) to avoid entrainment;</p> <p>i. A description of the means by which:</p> <ol style="list-style-type: none"> 1. Monitoring results will be shared, and timing of sharing, with LWRS, DFO and Indigenous Groups; and 2. Data would be stored and available for future monitoring during the life of the project; <p>j. Seasonal (DFO least risk windows) restrictions on hydraulic suction and clamshell dredging to avoid entrainment of juvenile salmonids and eulachon following established Fraser River dredging management guidelines;</p>

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>k. Recording and reporting of any observations of sturgeon mortality or injury at the Marine Terminal Area to Indigenous groups. In the event of an observed sturgeon strike at TMJ, TJLP will report the strike to DFO and Indigenous Groups, determine whether the operation of the TMJ played any role and if so, report to DFO and Indigenous Groups on whether further mitigation is appropriate;</p> <p>l. Underwater noise management mitigations:</p> <ul style="list-style-type: none"> i. Monitor underwater noise – if monitoring demonstrates that sound levels may exceed injury thresholds, the Proponent will provide alternative mitigations in consultation with Indigenous Groups and DFO, to ensure that these thresholds are not exceeded; ii. Minimize multiple underwater noise generating activities at the same time (sequence activities); iii. Conduct works in least risk work window identified by DFO for the region; iv. Use vibratory pile driving as the primary driving method; v. Use of impact pile driving when vibratory pile driving is not technically feasible; vi. Ramp up technique used where pile driving allows to build noise up slowly to allow time for aquatic wildlife to leave; vii. Use of sound attenuation devices or techniques during impact pile driving; viii. Identification of the geographic areas where, the means by which, and the frequency of underwater noise monitoring must occur; and ix. Identification of applicable injury noise threshold for fish and identification of mitigation measures to be implemented in the event that noise levels are approaching thresholds, for example through the use of bubble curtains. <p>Fish habitat offset plan:</p> <ul style="list-style-type: none"> a) Description of measures that will be implemented to offset habitat loss; b) A timeline for the implementation of the offsetting plan; c) Means to ensure offsetting habitat will provide a higher value than the fish habitat it is replacing, as determined by a qualified professional; d) A description of the measures and standards that will be put in place to avoid or mitigate adverse effects on fish and fish habitat that could result from the implementation of the offsetting measures; e) Monitoring measures to assess effectiveness of the offsetting measures, until offset habitat meets performance standards, to the satisfaction of DFO; f) Description of the contingency measures and associated monitoring measures that will be put into place if the offsetting measures are not successful in offsetting the residual loss or effects on fish habitat resulting from TMJ. The Holder will consult with Indigenous Groups during development and implementation of contingency measure, including roles for Indigenous participation in monitoring; g) The offset plan must include a performance review of previous offsetting plans in the region, where they are publicly available; and h) Identification of opportunities to include wildlife and migratory bird habitat enhancement measures into habitat offsetting plan.
		Marine Mammals	<p>Marine Mammal Management Plan:</p> <ul style="list-style-type: none"> a) Identification of the activities that could cause injury to marine mammals or behavioural change disturbance to marine mammals; b) Identification of geographic areas where, and periods of time when, underwater noise monitoring will be conducted; c) Description of the goals and objectives of the plan, in addition to any thresholds required for management action; d) Specification of the role of a Qualified Professional in overseeing implementation of the Plan, including implementation of visual monitoring program by a marine mammal observer during pile driving and dredging and reporting marine mammal presence in areas of potential injury to marine mammals;

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>e) Conduct activities that could cause noise above the marine mammal injury threshold in the areas above only during daylight hours, when visibility is such that marine mammal observers are able to observe marine mammals;</p> <p>f) Identification of the activities which must stop or not start if a marine mammal is sighted in areas where marine mammals may be exposed to underwater noise at levels that can result in physical injury, and which activities must not re-start until the marine mammal has moved out of the relevant area, as determined by a Qualified Professional;</p> <p>g) Mitigation measures to reduce underwater noise:</p> <ol style="list-style-type: none"> 1. Identification of the mitigation measures that will be implemented to reduce behavioural disturbance and prevent injury to marine mammals from underwater noise; 2. Prioritization of vibratory pile driving methods; 3. Sound attenuation devices: use of sound attenuation devices during impact pile driving and vibratory pile driving if noise levels exceed injury thresholds; 4. Use of acoustic monitoring to validate effectiveness of sound attenuation devices to reduce noise in the aquatic environment and to determine when approaching or exceeding injury thresholds; 5. Employ a ramp-up/soft-start procedure to activate equipment (e.g., for the louder construction activities including dredging and pile driving) at the quietest level possible and then gradually increasing the sound; and 6. Sequencing of in-water works to reduce the extent to which underwater noise levels are compounded by multiple sources. <p>Vessel Traffic Management Plan (Figure 3 of CPD; Schedule D):</p> <p>To the extent that it is technically and economically feasible through agreements with customers, the proponent must require that the vessels calling at TMJ follow the below mitigations:</p> <ol style="list-style-type: none"> a) As per guidance provided through the Port of Vancouver TCZ-4, LNG carriers and bunkers will move at a safe speed which will allow them to properly respond to the prevailing circumstances and conditions and will otherwise maintain speeds no greater than 10 knots within the Fraser River when safe to do so; b) Vessels will follow established routes, where they exist; c) Regular propeller cleaning (minimum once every five years) and repair as needed; d) Participation in Vancouver Fraser Port Authorities-led ECHO Program seasonal slowdown initiatives (as amended from time to time), or a future equivalent program if ECHO ceases to exist; e) Report to the Agency annually on compliance of vessels berthing at the Jetty with the ECHO Program speed limits and explanations for any instances of non-compliance; f) Operators of LNG carriers and bunkers calling on TMJ to use WhaleReport Alert System or equivalent app to aid in the detection of whales; g) Operators of LNG carriers to report any sightings of cetaceans within the marine shipping assessment area as soon it is safe to do so using the B.C. Cetacean Sightings Network's WhaleReport system or other equivalent system for reporting observations of cetaceans in the Salish Sea; h) LNG carrier masters to undergo training on how to visually detect and navigate vessels safely in the presence of cetaceans in the Salish Sea using the Whales in Our Waters tutorial provided by the Vancouver Fraser Port Authority's Enhancing Cetacean Habitat and Observation (ECHO) Program or other equivalent training, and take into account these navigation strategies when navigating vessels in the presences of cetaceans; i) Report vessel marine mammal collisions to DFO and Indigenous Groups; j) Identify how the Proponent is participating (where possible and operationally / economically feasible) in the identification and implementation of regional environmental management measures and cumulative effects monitoring to protect SRKW such as the federal Oceans Protection Plan, the federal Whales Initiative and other relevant initiatives that might exist in the future that have a role for marine terminal operators (e.g., related to vessel noise management). Notify, at a frequency determined in consultation with the parties responsible for these measures and monitoring, these parties of the Proponent's continued interest in participating in any new

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>or existing measures and monitoring. Report on this annually. If the Proponent has not participated in these measures or monitoring, the Proponent will provide justification for why it has not participated; and</p> <p>k) Report annually throughout operations the following information to the Agency and Transport Canada:</p> <ol style="list-style-type: none"> 1. the total number of LNG carrier calls to the jetty per year, vessel sizes (expressed in conventional dimensions), vessel ages and primary fuels (diesel, LNG, other); 2. the total number of bunkering vessel calls to the jetty per year; 3. the number of tugs escorting LNG carriers to the jetty; and 4. the number of LNG vessels loaded for export.
Migratory Birds	5(1)(a)(iii)	Wildlife – Migratory Birds	<ul style="list-style-type: none"> • Carry out all phases of the Project in a manner that protects migratory birds and avoids harming, killing or disturbing migratory birds or destroying or taking their nests or eggs. • Consider Environment and Climate Change Canada's Avoidance Guidelines to reduce the risk to migratory birds. • Carry out all phases of the Project in compliance with the <i>Migratory Birds Convention Act, 1994</i>, the Migratory Birds Regulations and the <i>Species at Risk Act</i>. • Provide notice to Indigenous Groups, as soon as possible, when the Proponent schedule requires that vegetation clearing activities occur during nesting periods. • Avoiding work in areas or during times where tidal water levels are such that barges or vessels would ground or strike the bottom, particularly where sensitive benthic habitats such as mudflats or estuarine marshes may be present. • Delineate clearing boundaries prior to the commencement of Construction and respect those boundaries during construction to manage adverse effects on wetlands. • Manage surface water and avoid erosion or sedimentation to maintain hydrology of adjacent wetlands and protect water quality. • Revegetate disturbed soils and temporary workspaces with native plants compatible with surrounding vegetation communities. • Offset direct loss of wetland and riparian vegetation and ecosystems through restoration, enhancement, and creation of wetland and riparian ecosystem, and identify opportunities to include wildlife and migratory bird habitat enhancement measures into habitat offsetting plan. • Salvage plants from wetlands affected by Construction and translocate to wetland restoration sites. • Plant native species compatible with surrounding vegetation communities, including incorporation of traditional use plants. • Conduct a monitoring program to assess biological, hydrological, and structural characteristics of newly established, restored, and/or enhanced wetland areas to determine the success of mitigation based on performance standards. • Implement corrective actions if the restored and/or enhanced wetlands do not fulfill performance standards. • Implement long-term monitoring and adaptive management after performance standards have been achieved for wetland mitigation sites, to maximize the success of wetland enhancement/creation. <p>Where lighting is not standardized based on navigational and safety requirements, strategies to minimize glare such as direction, timing and intensity will be employed.</p> <p>Wetland Compensation Plan:</p> <ol style="list-style-type: none"> a) The plan should take into account ECCC's Operational Framework for Use of Conservation Allowances, and habitat functions for wildlife, including migratory birds and species at risk; b) Wetland mitigation measures should prioritize wetland restoration over enhancement or creation and prioritize on-site wetlands over off-site wetlands. c) Project activities should be conducted in a manner that refrains from environmental effects on wetland functions, following the mitigation hierarchy of avoid, minimize, on-site restoration, offset.

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<ul style="list-style-type: none"> d) The Proponent should conduct pre-construction surveys to identify wetland functions to inform the design of the Wetland Compensation Plan and follow-up monitoring program. e) The Wetland Compensation Plan and follow-up monitoring program need to be designed to ensure any loss of wetland functions are appropriately compensated (i.e., using the principal of equivalency or “like-for-like” offsetting), including through the design of appropriate criteria by which functions will be measured (e.g., abundance, distribution) in order to meet the objective of no net loss as per the Federal Policy on Wetland Conservation (Government of Canada, 1991); f) The plan should be developed and implemented to the satisfaction of a Qualified Professional, in consultation with government agencies and Indigenous Groups. g) The plan should include adaptive management strategies, performance standards, reporting requirements, and the design and duration of an appropriate follow-up monitoring program, as determined by a QP, including a minimum of five years annual monitoring, to ensure that all compensatory wetland sites meet or exceed performance standards for wetland function and provide a higher value and larger area (than the area described in Table 4.7-11 in the Application) than the wetland habitat it is replacing.
		Wildlife - Barn Owl	<p>Barn Owl Management Plan that identifies / requires:</p> <ul style="list-style-type: none"> a) Nocturnal and diurnal pre-construction surveys, including identification of potentially suitable roosting habitat, structures, or buildings, as well as design of avoidance strategies and adaptive management measures; b) Mitigations related to sensory disturbance, including acoustic screens, timing, and setback requirements, where there is evidence of barn owls roosting (e.g., pellets, white wash, adult territorial calls); c) The type(s) of physical barriers to be installed, locations, and maintenance regime; and d) Annual reporting to assess mitigation effectiveness and any need for adaptive management measures.
		Wildlife – Northern Red-legged Frog	<p>The Proponent shall develop in consultation with Indigenous Groups and Environment and Climate Change Canada measures to mitigate project effects on northern red-legged frog (<i>Rana aurora</i>). In doing so, the Proponent must have a QP:</p> <ul style="list-style-type: none"> a) Conduct pre-construction surveys to identify breeding habitat for northern red-legged frog; b) Establish no work buffer zones for habitat identified, taking into account British Columbia’s Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia, except where required to construct project components; c) Salvage and relocate northern red-legged frog to suitable habitat prior to conducting any construction activities within the habitat where frogs have been identified taking into account British Columbia’s Best Management Practices for Amphibian and Reptile Salvages in British Columbia.
Indigenous Health	5(1)(c)(i) 5(1)(c)(iii)	Air Quality	<p>Air Quality Management Plan</p> <ol style="list-style-type: none"> 1. Identify mitigation measures, including those for reducing fugitive dust and air quality emissions from sources identified in the Application, measures shall include the following: <ul style="list-style-type: none"> a) Routine maintenance of vehicles and idling restrictions of vehicles/vessels during construction when not in use; b) Require reduced engine use of marine vessels at the terminal during operations when safe to do so; and c) Implement a designed leak detection and repair programs for the Project’s LNG conveyance system.

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>2. LNG carriers and bunkering vessels calling at the Project must have a mechanism to handle boil-off gas to prevent venting to the atmosphere, except in emergency circumstances as determined by the vessel's Captain, its pilot, or in accordance with an emergency response plan.</p> <p>3. Determine the frequency with which the plan should be reviewed in consultation with relevant authorities and include any additional or modified mitigation measures the Proponent will implement. Provide these additional or modified mitigation measures to the Agency including a description of these measures, planned timing of implementation, and estimated reductions in air emissions or fugitive dust associated with these measures. If no measures are available, the Proponent shall provide justification for why not.</p> <p>4. Identify how the Proponent is participating (where possible and operationally / economically feasible) in the identification and implementation of regional environmental management measures and cumulative effects monitoring to manage Air Quality, including relevant initiatives that might exist in the future that have a role for marine terminal operators (e.g., related to vessel Air Quality management). Notify, at a frequency determined in consultation with the parties responsible for these measures and monitoring, these parties of the Proponent's continued interest in participating in any new or existing measures and monitoring. Report on this annually. If the Proponent has not participated in these measures or monitoring, the Proponent will provide justification for why it has not participated.</p> <p>Non-LNG-Fueled Vessel Limitation: Limit the number of LNG vessels, excluding LNG barges driven by tugs, calling on the jetty that use crude oil-based fuels (such as diesel) as their primary fuel shall not exceed 13 calls annually.</p>
	5(1)(c)(i) 5(1)(c)(iii)	Noise	<p>Noise Management Plan:</p> <ul style="list-style-type: none"> • Measures to mitigate noise effects, including effects to uses of lands and water by Indigenous groups; • Advise nearby residents of construction schedule (at least several days in advance of works); • Schedule construction events to reduce disruption to them. The Proponent will consult with nearby residents and Indigenous groups using the area, and attempt to schedule particularly noisy activities to minimize disruption; and • Implement a complaint resolution process.
CULRTP and Socio-Economic Conditions	5(1)(c)(i) & (iii) 5(2)	Marine Use & CULRTP	<p>Marine Communication Plan (Figure 3 of CPD; Schedule D)</p> <p>The plan will identify:</p> <ol style="list-style-type: none"> a) Procedures to notify Indigenous Groups and other marine users of planned activities associated with the Project; b) The type of information that will be communicated to Indigenous Groups and other marine users, including anticipated traffic schedules and the timing of distribution of this information as it relates to the Project; and c) Procedures for Indigenous Groups and other marine users to provide feedback to the Proponent on adverse effects related to navigation as result of project activities and procedures for the Proponent to document and respond in a timely manner. <p>Marine Access and Transportation Plan (Figure 1 of CPD to Sand Heads)</p> <p>The Plan will identify the following:</p>

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>d) Marine uses and navigation in the Project area, including commercial and non-commercial routes and use areas, including fishing areas and harvesting areas, as identified through DFO fishing licences under the Fisheries and Oceans Canada's <i>Aboriginal Communal Fishing Licences Regulations</i> as communicated by Indigenous Groups, and DFO via any publicly accessible information on recently issued licences under this regulation, and any associated timing windows;</p> <p>e) Methods to coordinate activities and communicate with other marine users and regulators;</p> <p>f) In-Water Construction, habitat offsetting and Operations areas, activities, schedules and planned annual shutdowns of the jetty for maintenance, marine safety protocol(s) and their implementation procedures to maintain navigation and safety;</p> <p>As part of the Plan, the holder must:</p> <p>a) review annually at a minimum three months prior to the start of the calendar year, in consultation with Indigenous groups, and taking into account the most up-to-date publicly posted DFO information on fishing licences issued under the Fisheries and Oceans Canada's <i>Aboriginal Communal Fishing Licences Regulations</i>, the anticipated locations and timing windows for Fisheries and Oceans Canada fishing licences under the <i>Aboriginal Communal Fishing Licences Regulations</i> and other Indigenous traditional uses identified during the development of the plan and update this information as needed</p> <p>b) Develop and describe procedures to receive complaints from Indigenous groups and other marine users on adverse effects related to navigation and marine use related to project activities from project area to Sand Heads, including marine shipping and procedures to document and respond to complaints.</p> <p>c) Describe procedures, safety training for Indigenous Groups and other measures to address the safety of marine users, fishers and construction personnel and to minimize the likelihood of vessel collisions during construction and operations.</p> <p>d) Provide opportunities for Indigenous Monitors to participate in monitoring during FSC windows to determine the effectiveness of mitigation measures established in the Plan;</p> <p>e) Determine frequency at which the plan will be reviewed and updated.</p> <p>f) Develop measures to mitigate the project effects on Indigenous traditional use activities, including Indigenous fishers operating under Fisheries and Oceans Canada fishing licences under the <i>Aboriginal Communal Fishing Licences Regulations</i> (Figure 2 of CPD to Sand Heads). Measures will include, but are not limited to, the following:</p> <ol style="list-style-type: none"> 1. adjusting the LNG carrier call schedule annually to reduce the number of LNG carrier transits to and from the marine jetty during anticipated timing windows for DFO fishing licences under the Fisheries and Oceans Canada's <i>Aboriginal Communal Fishing Licences Regulations</i> that are updated annually as part of the Marine Access and Transportation Plan (see bullet e), to the extent that these adjustments do not interfere with operational requirements. 2. synchronizing bunker vessel arrivals at and departures from the marine jetty with regularly scheduled marine traffic not associated with the Designated Project when Indigenous fishers are operating under Fisheries and Oceans Canada fishing licences under the <i>Aboriginal Communal Fishing Licences Regulations</i> on the Fraser River from Sand Heads through the Designated Project area, unless not feasible for technical or safety reasons; 3. implementing protocols to adjust LNG carrier arrival and departure times at the marine jetty while still remaining within the allotted vessel loading window when Indigenous fishers are operating under Fisheries and Oceans Canada fishing licences under the <i>Aboriginal Communal Fishing Licences Regulations</i> on the Fraser River from Sand Heads through the Designated Project area, as communicated by Indigenous groups and other relevant authorities; and 4. providing opportunities for safety training for Indigenous groups related to marine navigation in the marine terminal area (Figure 1 of the CPD). <p>g) Determine the frequency with which the Plan and the measures to mitigate project effects on Indigenous traditional use activities on the Fraser River from Sand Heads through the Project area should be reviewed in consultation with relevant authorities and include any additional or modified mitigation measures the Holder will implement. When doing the review the Proponent should take into account updated information in the Marine Access and Transportation Plan, complaints received, and results of the follow up program pertaining to adverse effects on CULRTP.</p> <p>Manage, during operations, the number of LNG vessels berthing with the Marine Terminal Area, such that the number of LNG carriers berthing within the Marine Terminal Area to be loaded for export does not exceed 68 carriers per year, as described in the EAO's Assessment Report.</p>

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>Participation in Regional Initiatives for Current Use of Lands and Resources for Traditional Purposes</p> <p>Identify how the Proponent is participating (where possible and operationally / economically feasible) in the identification and implementation of regional initiatives, including as part of the Oceans Protection Plan, or equivalent, related to effects on current use of lands and resources for traditional purposes as a result of marine shipping. Notify, at a frequency determined in consultation with the parties responsible for these measures and monitoring, these parties of the Proponent’s continued interest in participating in any new or existing measures and monitoring. Report on this annually. If the Proponent has not participated in these initiatives, the Proponent will provide justification for why it has not participated.</p>
		Air quality, noise, lighting, water quality, fish and fish habitat, marine mammals, heritage, wildlife, vegetation	See key mitigation measures recommended in the associated valued component rows in this table.
Physical and Cultural Heritage	5(1)(c)(ii)	Heritage	<ol style="list-style-type: none"> a) Conducting an Archaeological Impact Assessment or other field investigations in areas with high archaeological potential landward of the dyking system prior to Construction. b) Realign or redesign Project components to avoid Heritage Resources, where possible, should any be found during subsequent studies or during Construction. c) If avoidance is not feasible, implementing alternative protection methods including protective coverings, stabilization and physical barriers aimed to reduce project effects on Heritage Resources. d) If effects cannot be avoided or minimized, effects will be reduced through a variety of measures including surface artifact collection, additional inventory studies or systematic data recovery (e.g., excavation, detailed recording and documentation, construction surveillance or monitoring). e) Implement a Heritage Resources Chance Find Management Procedure to ensure preservation and proper management of Heritage Resources that are unexpectedly encountered during Project activities. The document will include general guidelines and specific steps to follow for the appropriate response to the discovery of known or suspected heritage materials during the course of Project activities.
		Cultural Heritage	Develop, prior to construction, nation-specific measures to address the effects on tangible and intangible cultural losses caused by the construction and operation of the Project, in consultation with those Indigenous Groups experiencing the effects in the lower Fraser River, as described in the EAO’s Assessment Report. The Proponent must: <ol style="list-style-type: none"> a) invite those Indigenous Groups to co-lead the development of these measures; b) consider developing or contributing to Indigenous-led programs to preserve and enhance cultural heritage; c) implement the measures during all phases of the Project; d) ensure that confidential information is protected; and e) report on the Proponent’s discussions with the Indigenous Groups, including the level of satisfaction of Indigenous Groups on the implementation of the measures.

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
Accidents and Malfunctions	19(1)(a)		<p>Emergency Response Plan (Figure 1 of CPD;)</p> <p>Plan must identify the following:</p> <ul style="list-style-type: none"> a) Description of the emergency response training, including for spills and fires, that the Proponent will provide for their personnel. The Proponent will offer opportunities to relevant authorities and Indigenous Groups to participate in training. The Proponent will update the plan to address any concerns from the training and provide updates to parties that were consulted on the plan; b) Potential accidents and malfunctions, including spills and fires, and the measures to mitigate adverse effects and operating procedures to prevent them; c) Description of the integrated response planning, including roles and responsibilities, and equipment requirements, between proponent and government agencies / local government / emergency response departments; and d) implementation of exercises of the Spill Response Plan in cooperation with relevant authorities beginning prior to loading LNG and at subsequent intervals determined in during the development of the plan, and incorporate learnings from the exercise into the spill response component of the emergency response plan. <p>Communication plan to notify Indigenous Groups and marine users related to the accidents and malfunctions occurring within the marine terminal area (Figure 1 of CPD)</p> <p>The plan must include the following:</p> <ul style="list-style-type: none"> a) Types of accidents and malfunctions requiring notification; b) Manner in which notification will occur; and c) Effects to access, including Indigenous use (e.g., duration and extent of exclusions zone for fishing if an incident occurs). <p>Marine shipping Emergency Response Outreach Program (Figure 3 of CPD)</p> <p>The program must include:</p> <ul style="list-style-type: none"> a) identification of equipment that the proponent could provide to assist with marine shipping spill or emergency response associated with LNG vessels that have called on the jetty that are travelling within Figure 3 of CPD; b) delivery or arrangement by Proponent for LNG safety related courses for the CCG, Indigenous Groups, provincial and municipal government personnel, industry sector, and community responders who may request training; and c) participation of Proponent in CCG marine shipping incident response coordination and exercises if requested.
Follow Up Program	54(4)(b)	Multiple	<p>Water Quality</p> <ul style="list-style-type: none"> • Turbidity monitoring will be implemented during in-water works, including pile driving, and compared against B.C. Water Quality Guidelines. If turbidity levels exceed these guidelines, pre-determined decision criteria with specific management actions will be followed. <p>River Processes Monitoring (Area shown in Figure 3.2 of Appendix 4.1-1, Appendix A of TJLP’s Application for an Environmental Assessment Certificate, 2019):</p> <ul style="list-style-type: none"> • Annual soundings; and • Reach wide bathymetry (every 5 years).

Federal Conditions Section	CEAA 2012 linkage	BC EAO Valued Component	Key Mitigation Measures
			<p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> Follow up program for effectiveness of fish and fish habitat mitigations. <p>Marine Access and Transportation Plan</p> <ul style="list-style-type: none"> Follow up program for Marine Access and Transportation Plan - to monitor and follow up on potential effects to CULRTP, including fishing. <p>Lighting and Birds</p> <ul style="list-style-type: none"> The Proponent shall develop, prior to construction and in consultation with Environment and Climate Change Canada and Indigenous Groups, and other relevant authorities, and implement during all phases of the project, a follow-up program in the Marine Terminal Area to verify the predictions of the environmental assessment as it pertains to the effect of artificial light on coastal birds. The follow-up program will assist in evaluating the extent to which mortalities occur in the presence of mitigation and will inform the subsequent need for adaptive management. The effectiveness of adaptive management, if required, will be measured against initial monitoring results and best available industry standards, at the time of implementation. The follow-up program shall be developed in consideration of Environment and Climate Change Canada’s methods and standards, and best available guidelines, including but are not limited to provincial and federal standards for wind farms; and Fatal Light Awareness Program (FLAP) Canada. <p>Air Quality</p> <p>A follow up program for Air Quality during Operations including triggers for management action, in consultation with ECCC, Metro Vancouver and Indigenous Groups, taking into account applicable government air quality objectives.</p>
Multiple		Multiple	<p>Indigenous Monitors</p> <ul style="list-style-type: none"> Discuss and determine, in consultation with Indigenous groups, opportunities for Indigenous group participation in the implementation of required monitoring. When determining opportunities, identify: <ul style="list-style-type: none"> all monitoring activities required in conditions including those of follow-up programs. if opportunities for Indigenous monitor participation in certain monitoring does not exist, an explanation for why. how Indigenous monitors will be involved in any monitoring (including the location, frequency, timing and duration of their participation). how the Holder will support Indigenous monitor participation including by providing training, equipment, access to the project site.

1

2

APPENDIX 2 – ENVIRONMENTAL ASSESSMENT METHODOLOGY AND OVERVIEW OF POTENTIAL EFFECTS

1 ENVIRONMENTAL ASSESSMENT METHODS

In the Environmental Assessment Office’s (EAO) Assessment Report (EAO’s Report), the EAO assessed whether the TMJ is likely to have significant adverse environmental, economic, social, heritage and health effects, including cumulative effects. The EAO’s assessment included contemplation of the mitigation measures proposed in the Application and Marine Shipping Assessment, or otherwise developed through the provincial and federal Environmental Assessment (EA) processes, in addition to conditions proposed by the EAO and recommended Key Mitigation Measures (KMMs) under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

To conduct this assessment, the EAO followed the methods outlined in its [Guideline for the Assessment of Valued Components and Assessment of Potential Effects \(2013\)](#). This section provides a brief summary of the methodology followed. The methodological steps in B.C.’s EA process are shown in Figure 22.

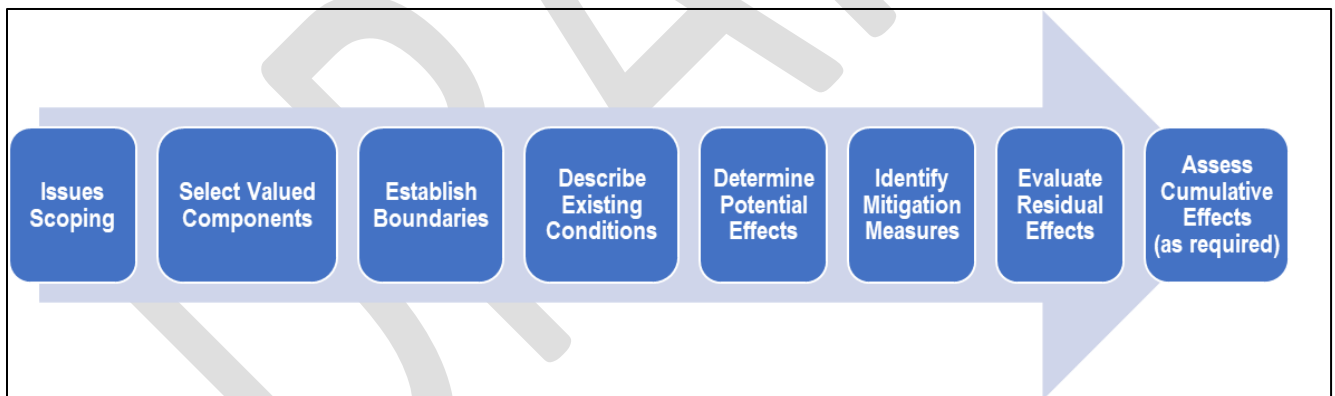


Figure 22: EAO’s Environmental Assessment Methods

EA in B.C. uses a values-based framework to promote a comprehensive, yet focused, understandable, and accessible assessment of the potential effects of proposed projects. This framework relies on the use of Valued Components (VCs) and Pathway Components (PCs) as a foundation for the assessment. VCs are components of the natural and human environment that are considered by the proponent, public, Indigenous Groups, scientists and other technical specialists, and government agencies involved in the assessment process to have scientific, ecological, economic, social, cultural, archaeological, historical or other importance.

1 Appropriate VCs and PCs are identified and selected during the Pre-Application phase of the EA.
2 Ultimately, the VCs and PCs required to be in the Application are established by the EAO upon
3 finalization of the AIR. Much of the early part of the Pre-Application phase is focused on
4 consultation on the VCs, PCs, key indicators, study area boundaries and technical requirements
5 with Working Group (Working Group) members (including Indigenous Groups) and the public.

6 For the MSA, subject matter experts in the technical disciplines identified the VCs and PCs that
7 represented key issues when considering the potential for them to interact with the marine
8 shipping activities from the Sand Heads location to the 12-mile nautical limit. The VCs and PCs
9 were selected based on:

- 10 • The VCs or PCs is known or suspected to be present in the Marine Shipping Assessment
11 Area;
- 12 • Working Group comments provided during the EAC Application review;
- 13 • Predicted interactions between shipping activities and the marine and human
14 environments; and
- 15 • Aboriginal Interests.

16
17 The identified VCs or PCs, along with their selection rationale for inclusion in the MSA, were
18 reviewed by the EAO and Working Group prior to finalization of the Tilbury Marine Shipping
19 Assessment (MSA) Information Request. The process is further detailed in the [Guideline for the
20 Assessment of Valued Components and Assessment of Potential Effects \(2013\)](#).

21 **2 RECEPTOR AND PATHWAY COMPONENTS**

22 Pathway Components are part of the pathway between a proposed project and the receptor
23 components, which are the ultimate receptor for effects from a proposed project.

24 For example, sediment-laden discharge from a project to a stream may adversely affect water
25 quality and benthic habitat and these changes may consequently affect the health and survival
26 of fish that depend on those habitat attributes. In this example, water quality and benthic
27 habitat would be pathway VCs and fish health and survival would be the receptor VC.

28 The EAO considered the potential effects of the changes to both pathway and receptor
29 components through the assessment of VCs in this Report.

30 **3 STUDY BOUNDARIES**

31 Study boundaries serve to define the scope or limits of the assessment and encompass the
32 areas within which TMJ is expected to have potential effects of the selected VCs.

33 The study areas for the original Application generally include the:

- 34 • Project area or Project footprint – the area directly disturbed by TMJ’s physical works
35 and activities;

- 1 • Local Assessment (LAA) – varies by VC, the area surrounding and including the Project
2 area, where there would be reasonable potential for TMJ-related activities to interact
3 with and potentially have an adverse effect on the VC; and
- 4 • Regional Assessment Area (RAA) – varies by VC, provides the regional context for the
5 assessment of potential TMJ-related effects within the LAA, in most cases encompassing
6 the area within which potential residual adverse effects of TMJ would likely to cumulate
7 with effects of other project and activities. The cumulative effects assessment area may
8 include the RAA as well as areas outside of the RAA.

9 The MSA encompasses the inbound and outbound shipping lanes that would be used by vessels
10 associated with TMJ transiting between Sand Heads and the 12-nautical mile Canadian
11 territorial limit (the MSA Area). The spatial boundaries used in the assessment vary to reflect
12 the potential extent of interaction between VCs and transiting vessels and are defined by each
13 of the following areas:

- 14 • MSA LAA – encompasses the area within which potential TMJ-related disturbances from
15 transiting vessels could affect VCs.
- 16 • MSA RAA – is the area surrounding and including the MSA LAA and provides context for
17 assessment of the potential marine shipping effects and is used as a boundary for
18 assessing potential cumulative effects. MSA RAAs were selected to be larger in scope,
19 encompassing an area broader than the immediate shipping corridor, to consider
20 potential wider range direct and indirect effects of TMJ.

21
22 The temporal boundary is defined as the life of the project, from construction through
23 decommissioning (phases described below). For the effects assessments within this Report, the
24 temporal boundaries are as follows:

- 25 • Construction - 3 years;
- 26 • Operations - minimum of 30 years; and
- 27 • Decommissioning - 1 year.

28
29 **Construction:** The phase of TMJ during which physical alteration of land, vegetation or any
30 other aspect of the natural environment, occurs.

31 **Operations:** The phase of TMJ beginning on the date where full commercial operations and
32 marine shipping to customers begins. The operations phase ends when commercial operations
33 permanently cease, and the decommissioning phase begins.

34 **Decommissioning:** The phase of TMJ where all commercial operations cease and the removal of
35 marine shipping facilities and infrastructure are decommissioned, demolished and/ or removed
36 from the TMJ site. Reclamation activities including foreshore slope protection and re-planting
37 of vegetation would be conducted as part of decommissioning.

1 As a substituted EA, the EAO conducted the EA for TMJ in accordance with the Memorandum of
2 Understanding between the Canadian Environmental Assessment Agency (now known as the
3 Impact Assessment Agency of Canada [the Agency]) and the B.C. Environmental Assessment
4 Office on Substitution of Environmental Assessments (CEA Agency, 2013). The study boundaries
5 were established to inform the assessment of environmental effects described in Section 5(1)
6 and 5(2) of CEEA 2012.

7 **4 ASSESSMENT OF VALUED COMPONENTS**

8 For each selected VC (or grouping of VCs), the Application describes the existing conditions
9 within the study area in sufficient detail to enable potential TMJ-VC interactions to be
10 identified, understood and assessed. The description of existing conditions includes, as
11 relevant, natural and/ or human-caused trends that may alter the environmental or socio-
12 economic setting irrespective of the changes that may be caused by the project or other
13 projects and activities in the local area.

14 The assessment then considers the potential interactions of the project with the VC, and the
15 potential effects that could arise. These potential effects are identified and described, and an
16 analysis is presented of the potential adverse effects resulting from the project.

17 The assessment then describes the mitigation measures that would be incorporated into TMJ,
18 including: site and route selection; project scheduling; project design; and construction and
19 operation procedures and practices.

20 Consistent with the B.C. Ministry of Environment and Climate Change Strategy (ENV)
21 Environmental Mitigation Policy and Procedures, the EAO considers mitigation to be any
22 practical means or measures taken to avoid, minimize, restore on-site, compensate or offset
23 potential adverse effects. Also described are standard mitigation, BMPs, EMPs, contingency
24 plans, Emergency Response Plans, and other practices proposed to be implemented.

25 The residual effects on each VC (or grouping of VCs) are then identified. Residual effects are
26 those effects remaining after the implementation of all mitigation measures, and are,
27 therefore, the expected consequences of TMJ for the selected VCs. To inform the
28 determination of the significance of a residual (adverse) effect, it is necessary to characterize
29 the residual effect.

30 Residual effects are usually described using standard criteria: context, magnitude, extent,
31 duration, reversibility and frequency. These criteria, as well as likelihood, are summarized in the
32 box below, and definitions for TMJ are provided in Appendix 5.

Summary of Criteria for Characterizing Residual Effects

Context refers primarily to the current and future sensitivity and resilience of the VCs to change caused by the Project. Consideration of context draws heavily on the description of existing conditions of the VC, which reflect cumulative effects of other projects, and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.

Magnitude refers to the expected size or severity of the residual effect. When evaluating magnitude of residual effects, consider the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristic).

Extent refers to the spatial scale over which the residual effect is expected to occur.

Duration refers to the length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).

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.

Frequency refers to how often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.

Likelihood refers to whether or not a residual effect is likely to occur. It may be influenced by a variety of factors, such as the likelihood of a causal disturbance, occurring or the likelihood of mitigation being successful. Generally speaking, the residual effects described in the assessment comprise the best prediction of what is likely to occur as a result of a proposed Project, assuming a suite of proposed mitigation is implemented.

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3 The identification of significant adverse residual effects is a requirement of the Act. When
4 determining significance for each VC, consideration should be given to how each of the criteria
5 for characterizing residual effects informs the determination of significance. Significance may
6 be determined based on a quantitative or qualitative threshold that describes the point beyond
7 which a residual effect would be considered significant. In some instances, thresholds
8 established for some VCs by legislation, regulation, or regulatory standard are used.
9 Significance is critical for making an informed decision about proposed projects; as it is
10 important to understand the characteristics and significance of project-specific residual effects
11 in order to also understand the relative contribution of a project to cumulative effects.

12 Once the residual effect prediction has been described in terms of significance and likelihood, it
13 is important to explain the level of confidence in each prediction. The level of confidence,
14 typically based on expert judgement, characterizes the level of uncertainty associated with both
15 the significance and likelihood determinations. Specifying the level of confidence associated
16 with these determinations allows the decision-maker to better evaluate the risk associated with
17 TMJ. The assessment of confidence also informs the need for and scope of monitoring or other
18 follow-up programs, including adaptive management.

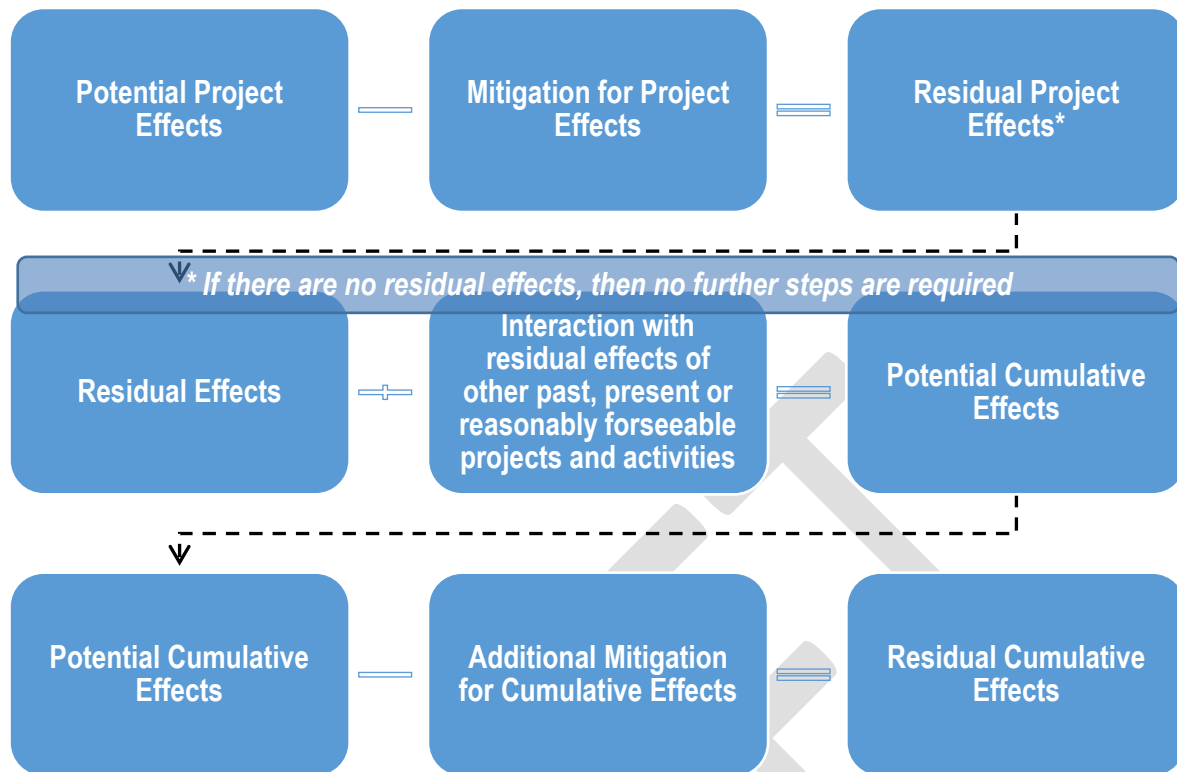
1 Significance was determined for the residual effects of TMJ on receptor VCs, as well as for the
2 cumulative effects. This is critical for making an informed decision about TMJ. It is important to
3 understand the characteristics and significance of the potential project-specific residual effects
4 in order to also understand the relative contribution of TMJ to cumulative effects. The
5 cumulative effects assessment is discussed further below.

6 **5 CUMULATIVE EFFECTS ASSESSMENT**

7 If the proposed project is expected to result in any residual adverse effects on the selected VC,
8 there is a need to consider cumulative effects. It is important to note that this consideration
9 must be made for all residual adverse effects, not only for those predicted to be significant.

10 Where there is a residual adverse effect, the assessment of cumulative effects for reviewable
11 projects should consider other past, present and reasonably foreseeable projects and activities,
12 which were identified in the AIR. Any cumulative effects that are likely to result from the
13 proposed project in combination with other physical activities that have been or will be carried
14 out were considered as part of the assessment, consistent with paragraph 19(1)(a) of CEEA
15 2012.

16 The general steps for a cumulative effects assessment are shown in Figure 23 below. The
17 likelihood of a cumulative interaction with other projects and activities, and TMJ's contribution
18 to the overall cumulative effect, should together inform the cumulative effects assessment
19 undertaken.



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Figure 23: Steps to Determine Residual Effects and Cumulative Effects

The EAO evaluated cumulative effects for TMJ by considering how residual effects associated with TMJ would be expected to interact with the residual effects of other past, present and reasonably foreseeable projects and/ or activities included in TJLP’s cumulative effects assessments, as described in [Section 3.5 of the Application](#) and [Section 2.5 of the MSA](#) report and Section 2.4 of the BVSA.. In addition, the EAO also considered other reasonably foreseeable projects, depending on the VC, that were not known at the time of preparing the AIR or TJLP’s EAC Application for TMJ. Projects and activities are discussed where relevant under the cumulative effects section for each VC in this Report.

1 **APPENDIX 3 – DREDGE DISPOSAL ALTERNATIVES**

2 **Table 34: Summary of dredge disposal alternatives, VC interactions and effects identified in the Alternatives Assessment Supplemental Report – Wespac Tilbury Marine Jetty Project.**

Dredge Disposal Alternative	Summary	VC Interactions and Potential Effects
<p>Alternative 1: Construction Material for Habitat Creation and Enhancement</p>	<p>Dredged materials would be preferentially re-used within the TMJ area for shoreline restoration purposes to the extent practicable and dependent on the geotechnical and chemical suitability of the material. Suitable dredge material would be used to build and contour shoreline restoration features to construct 1.2 ha of estuarine marsh and mudflat habitat.</p> <p>The use of dredge material for habitat creation and enhancement is preferred as it creates a beneficial end use (new habitat) for fish, vegetation and wildlife and is near the dredge location.</p>	<p>Water Quality</p> <ul style="list-style-type: none"> • Temporary release of sediment that may affect surface water quality, sediment quality and aquatic health. • Potential increase in total suspended solids (TSS) and turbidity. <p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> • No anticipated negative effects to fish and fish habitat. • Restoration and enhancement of 1.2 ha of estuarine marsh and mudflat habitat would have a net positive benefit to fish and fish habitat. <p>Marine Mammals</p> <ul style="list-style-type: none"> • No anticipated negative effects to marine mammals. • Restoration and enhancement of 1.2 ha of estuarine marsh and mudflat habitat would have a net positive benefit to fish and fish habitat which could have indirect positive effects to marine mammals. <p>Air Quality</p> <ul style="list-style-type: none"> • Potential increase in fugitive particulate emissions including wind erosion from temporary stockpiles and handling of dredged sediment if it dries out. • Potential increase in combustion emissions, including GHG emissions, from marine vessels and diesel-powered construction equipment to be used for habitat restoration. <p>Vegetation</p> <ul style="list-style-type: none"> • Positive effect on vegetation by creating estuarine marsh habitat. Restoration and enhancement of 1.2 ha of estuarine and mudflat habitat would have a net positive benefit to marine plants. <p>Wildlife and Wildlife Habitat</p> <ul style="list-style-type: none"> • Positive effect on wildlife and migratory birds by creating new habitat and enhancing existing riparian habitat. <p>Socio-Community</p> <ul style="list-style-type: none"> • No effects anticipated. <p>Land and Marine Resource Use</p> <ul style="list-style-type: none"> • Increase in marine vessel traffic for transport of dredged sediments could temporarily affect navigation, and area access and use by commercial and non-commercial marine vessels. • Changes in distribution and abundance of marine mammals and coastal birds may affect marine tourism. • Changes in distribution and abundance of fish species could affect commercial and recreational fish harvesting and guided sport fishing. <p>Current Use of Lands and Resources for Traditional Purposes</p> <ul style="list-style-type: none"> • Effects to the current use of lands and resources for traditional purposes by Indigenous Groups from use of dredged materials for habitat restoration are not expected.
<p>Alternative 2: Commercial Upland Use</p>	<p>Sediment sampling has indicated that a large proportion of the dredged material is similar to the dredged material that is routinely removed as part of the navigational dredging program in the Fraser River near the TMJ site. Dredged material from the lower Fraser River is regularly</p>	<p>Water Quality</p> <ul style="list-style-type: none"> • Temporary storage of dredged sediment on-site or at an off-site facility prior to transportation for upland use (i.e., for construction) could result in the release of sediments into the aquatic environment if unmitigated, potentially affecting surface water quality, sediment quality and aquatic health. • Upland onsite or offsite storage locations works would be isolated from the aquatic environment by a dike, and with erosion and sediment control mitigation measures appropriate to the site-specific conditions of the end-use site. Therefore, effects to water quality are not expected with the implementation of mitigation.

Dredge Disposal Alternative	Summary	VC Interactions and Potential Effects
<p>Temporarily stockpiling on-site for subsequent re-use and/ or re-sale off-site</p>	<p>used for fill and as pre-load for construction purposes. The ultimate use or disposal method for the dredged material would be influenced by the market demand for dredged materials during the time of capital and maintenance dredging.</p> <p>Efforts have been made to identify beneficial commercial uses for the dredge material near the TMJ area, although no specific commitments have been made at this time. Sand sold for commercial upland use would be transported up to 50 km from the TMJ site. Although there would be additional costs associated with transporting material off-site, selling or donating the material for use off-site reduces the potential for adverse environmental interactions as well as the complexity of obtaining environmental permits for ocean disposal.</p> <p>As the customer base for commercial use of the construction and maintenance dredge material has not been secured at the time of preparing the Alternatives Assessment, TMJ will continue to investigate the potential commercial markets for the dredge material. The ability to use the material offsite for commercial purposes would depend on regional projects occurring during TMJ construction and operational periods.</p>	<ul style="list-style-type: none"> • Temporary storage of dredged sediment prior to transportation for upland use could result in the release of sediments into the aquatic environment that may affect surface water quality, sediment quality and aquatic health. <p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> • No anticipated negative effects to fish and fish habitat in the Fraser River. • Upland onsite or offsite storage locations works would be isolated from the aquatic environment by a dike and would be undertaken in accordance with erosion and sediment control mitigation measures appropriate to the site-specific conditions of the end-use site. • Temporary storage of the dredge sediment on-site or at an off-site facility would be managed such that sediment laden runoff would not enter fish bearing habitat, consistent with the federal <i>Fisheries Act</i>. As such, no anticipated negative effects to fish and fish habitat in the Fraser River is expected from temporary material storage. <p>Marine Mammals</p> <ul style="list-style-type: none"> • No anticipated negative effects to marine mammals. <p>Air Quality</p> <ul style="list-style-type: none"> • Potential increase in combustion emissions, including GHG emissions, from marine vessels (tug assisted barges) transporting dredge material from the TMJ site to the storage/drying site, assumed to be within 10 km. • Potential increase in fugitive particulate emissions including wind erosion from temporary stockpiles and transportation of dredged sediment if it dries out. <p>Vegetation</p> <ul style="list-style-type: none"> • Fugitive dust from temporary stockpiling and transportation of dredged sediment could result in smothering effects to vegetation. • Introduction and proliferation of invasive plant species from vehicles associated with temporarily stockpiling and transporting dredged sediment for commercial upland use. • No anticipated interactions with marine plants. <p>Wildlife and Wildlife Habitat</p> <ul style="list-style-type: none"> • Dredged sediments would be temporarily stockpiled at either on-site or off-site locations such as sites established by Fraser River Pile and Dredge. Wildlife habitat at these sites has been modified as a result of previous stockpiling activities. Minor habitat alteration may occur due to the deposition of new dredge material; however, deposition of new dredge material is not predicted to change the characteristics of the stockpile area. • Activities associated with offsite stockpiling sediments have the potential to result in incremental disturbance to terrestrial habitat that could be used for foraging or nesting by migratory birds. However, offsite disposal sites, such as the Fraser River Pile and Dredge disposal site, are continually used for the purpose of stockpiling dredge material and are understood to be heavily modified. As such, the habitat is unlikely to provide highly suitable habitat for migratory birds and modification to terrestrial habitat at these locations is expected to negligibly effect migratory birds. • Activities associated with stockpiling sediments have the potential to result in incremental disturbance to terrestrial migratory birds recognizing the heavily modified conditions of the Fraser River Pile and Dredge disposal sites. • Noise and activity from the transportation of dredge material could result in sensory (auditory and visual) disturbance to aquatic birds, migratory birds and terrestrial wildlife. • Road transportation of dredge sediments could result in strikes with terrestrial wildlife, including migratory birds. <p>Socio-Community</p> <ul style="list-style-type: none"> • Increased traffic from road transportation of dredged sediments could temporarily affect access and use of local roads and road capacity. <p>Land and Marine Resource Use</p> <ul style="list-style-type: none"> • Increased traffic from road transportation of dredged sediments could temporarily affect access and use of roads and road capacity for commercial and non-commercial vehicles. <p>Current Use of Lands and Resources for Traditional Purposes</p> <ul style="list-style-type: none"> • Effects to the current use of lands and resources for traditional purposes by Indigenous Groups from the upland use of the dredged material is not expected.

Dredge Disposal Alternative	Summary	VC Interactions and Potential Effects
<p>Alternative 3: Land-based Disposal</p>	<p>Material that cannot be sold or otherwise used for beneficial purposes or contains contaminants or materials not suitable for alternative disposal, may be disposed of at a landfill. Receiving facilities have yet to be identified and could vary depending on the volumes and chemistry of material being sent.</p> <p>Similar to disposing at a commercial location, dredge materials to be disposed of at a landfill would be stored temporarily at a location designated for this purpose along the Fraser River. Materials potentially containing contamination would be separated and isolated from surrounding materials.</p>	<p>Water Quality</p> <ul style="list-style-type: none"> • Temporary storage of dredged sediment on-site or at an off-site facility prior to transportation for upland use (i.e., for construction) could result in the release of sediments into the aquatic environment if unmitigated, potentially affecting surface water quality, sediment quality and aquatic health. • Upland onsite or offsite storage locations would be isolated from the aquatic environment by a dike, and with erosion and sediment control mitigation measures appropriate to the site-specific conditions of the end-use site. Therefore, effects to water quality are not expected with the implementation of mitigation. • Upland works would be isolated from the aquatic environment by a dike, and erosion and sediment control management; therefore, effects to water quality are not expected. • Temporary storage of dredged sediments prior to transportation could potentially result in the release of sediments into the aquatic environment that may affect surface water quality, sediment quality and aquatic health. • Once the dredged material is accepted into the landfill, it would be subject to regulation under the landfill’s existing permit, and erosion and sediment control measures would mitigate potential effects to water quality. <p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> • No anticipated negative effects to fish and fish habitat in the Fraser River. • Once the dredged material is accepted into the landfill, it would be subject to regulation under the landfill’s existing permit, and erosion and sediment control measures would mitigate potential effects to fish and fish habitat. <p>Marine Mammals</p> <ul style="list-style-type: none"> • No anticipated negative effects to marine mammals associated with upland disposal to a landfill. <p>Air Quality</p> <ul style="list-style-type: none"> • Potential increase in combustion emissions, including GHG emissions, from marine vessels (tug assisted barges) transporting dredge material from the TMJ site to the storage/drying site, assumed to be within 10 km. • Potential increase in fugitive particulate emissions including wind erosion from temporary stockpiles and transportation of dredged sediment if it dries out. • Potential increase in combustion emissions, including GHG emissions, from haul trucks transporting dredge material to the disposal location within 100 km. <p>Vegetation</p> <ul style="list-style-type: none"> • Fugitive dust from temporary stockpiling and transportation of dredged sediment could result in smothering effects to vegetation. • Introduction and proliferation of invasive plant species from vehicles associated with temporarily stockpiling and transporting dredged sediment to a landfill. • No anticipated interactions with marine plants. <p>Wildlife and Wildlife Habitat</p> <ul style="list-style-type: none"> • Dredged sediments would be temporarily stockpiled at either on-site or off-site locations such as sites established by Fraser River Pile and Dredge. Wildlife habitat at these sites has been modified as a result of previous stockpiling activities. Minor habitat alteration may occur due to the deposition of new dredge material; however, deposition of new dredge material is not predicted to change the habitat characteristics of the stockpile area. • Activities associated with offsite stockpiling sediments have the potential to result in incremental disturbance to terrestrial habitat that could be used for foraging or nesting by migratory birds. However, offsite disposal sites, such as the Fraser River Pile and Dredge disposal site, are continually used for the purpose of stockpiling dredge material and are understood to be heavily modified. As such, the habitat is unlikely to provide highly suitable habitat for migratory birds and modification to terrestrial habitat at these locations is expected to negligibly effect migratory birds. • Activities associated with stockpiling sediments have the potential to result in incremental disturbance to terrestrial migratory birds recognizing the heavily modified conditions of the Fraser River Pile and Dredge disposal sites. • Noise and activity from the transportation of dredge material could result in sensory (auditory and visual) disturbance to aquatic birds, migratory birds and terrestrial wildlife. • Road transportation of dredge sediments could result in strikes with terrestrial wildlife, including migratory birds. <p>Socio-Community</p> <ul style="list-style-type: none"> • Increased traffic from road transportation of dredged sediments could temporarily affect access and use of local roads and road capacity.

Dredge Disposal Alternative	Summary	VC Interactions and Potential Effects
		<ul style="list-style-type: none"> Capacity constraints for selected local landfill sites to accept the dredge material would be mitigated through the selection of landfill sites that are licenced to accept the volume of material being sent. <p>Land and Marine Resource Use</p> <ul style="list-style-type: none"> Increased traffic from road transportation of dredged sediments could temporarily affect access and use of roads and road capacity for commercial and non-commercial vehicles. <p>Current Use of Lands and Resources for Traditional Purposes</p> <ul style="list-style-type: none"> Land-based disposal of dredged material, including transportation of dredged material to a licensed landfill is not expected to affect the current use of lands and resources for traditional purposes by Indigenous Groups.
<p>Alternative 4: Marine-based Disposal at Sand Heads</p>	<p>If beneficial commercial uses for the dredge material cannot be identified, or disposal at a landfill is not possible, material may need to be disposed of at sea to an applicable location as determined by ECCC requirements for the DAS Regulations permitting process.</p> <p>Sediment sampling conducted during the baseline study to support the Water Quality VC (Section 4.2 of the Application) was designed to meet the ECCC requirements for DAS permitting. These results are presented as Appendix 5.6-2 of the Application and show that a majority of the dredge material would be suitable for disposal at sea.</p> <p>Sand Heads DAS site is the closest marine disposal site near TMJ and was therefore initially selected as an ocean disposal location for the purposes of the EAC Application. However, ECCC has confirmed that Sand Heads disposal site, which is located within SRKW Critical Habitat, is only used for the disposal of sand from the lower reaches of Fraser River navigation channel maintenance. Therefore, material generated by TMJ is not eligible for disposal at Sand Heads. Point Grey (Alternative 5) was added as an alternative ocean disposal site and is considered to be the preferred disposal site.</p>	<p>Water Quality</p> <ul style="list-style-type: none"> Release of dredged sediments to the Sand Heads Disposal Site may temporarily change water quality at the site by increasing TSS and turbidity in the water column through the introduction and re-suspension of sediments. The Sand Heads Disposal Site is affected by marine disposal activities on an ongoing basis as it is a designated DAS site which routinely receives dredged sediment from the Fraser River navigational dredge program. Water quality may also change due to the release of contaminants to the water column from the dredged material. A DAS permit for the Sands Heads Disposal Site would require the material to be tested and meet concentration limits for specified parameters, and the requirements for disposal at Sand Heads are more stringent than for other disposal sites because it is located within SRKW critical habitat. Increase in suspended sediment or contaminant concentrations may affect aquatic health at the disposal site. <p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> Potential increase in TSS and turbidity (see Water Quality bullets listed above). Potential mortality to fish and benthic invertebrates. Potential disturbance or loss of fish habitat. <p>Marine Mammals</p> <ul style="list-style-type: none"> Potential injury or mortality due to vessel strikes with the dredge vessel and tug-assisted barges during transport of dredge material from the TMJ area to the Sand Heads Disposal Site (a distance of approximately 23.4 km). Potential behavioral disturbance and/ or acoustic masking due to underwater noise from the dredging vessel, including areas within SRKW critical habitat. Potential for contaminant uptake (see Water Quality bullets listed above). <p>Air Quality</p> <p>Potential increase in combustion emissions, including GHG emissions, from marine vessels (tug-assisted barges) transporting dredge material from the TMJ site to the Sand Heads Disposal Site.</p> <p>Vegetation</p> <ul style="list-style-type: none"> No anticipated negative effects to vegetation including marine plants. There are no known occurrences of marine plants at risk at the Sand Heads Disposal Site and the site is continuously disturbed by marine disposal activities thereby reducing the potential for plant growth and proliferation. <p>Wildlife and Wildlife Habitat</p> <ul style="list-style-type: none"> Deposition of dredge material at the Sands Heads Disposal Site may result in periodic disturbance to aquatic birds, including aquatic migratory birds. <p>Socio-Community</p> <ul style="list-style-type: none"> No effects anticipated. <p>Land and Marine Resource Use</p>

Dredge Disposal Alternative	Summary	VC Interactions and Potential Effects
		<ul style="list-style-type: none"> Marine vessel movements for transport of dredged sediments from the TMJ area to Sand Heads Disposal Site could temporarily affect navigation, area access and area use by commercial and non-commercial marine vessels. Change in distribution and abundance of marine mammals and coastal birds may affect marine tourism. Changes in distribution and abundance of harvestable fish and seafood species could affect commercial and recreational fish harvesting and guided sport fishing. <p>Current Use of Lands and Resources for Traditional Purposes</p> <ul style="list-style-type: none"> Marine vessel movements for transport of dredged sediments from the TMJ area to the Sand Heads Disposal Site could temporarily affect navigation of Indigenous fisheries vessels and some preferred locations for fishing. Musqueam Indian Band has reported disposal at sea affects crabbing. Effects on air quality, atmospheric noise and visual quality during transport of dredge material for disposal could temporarily affect quality of use experience. Effects to fish species could affect Indigenous Groups harvesting fish for food, social and ceremonial (FSC) purposes or domestic purposes.
<p>Alternative 5: Marine-based Disposal at Point Grey</p>	<p>Disposal of dredge material at the Point Grey DAS site has been identified as the <u>preferred</u> ocean disposal site.</p> <p>Point Grey was added as an alternative ocean disposal location to address concerns raised Application review regarding potential effects to SRWK critical habitat at the Sand Heads DAS site.</p> <p>The Point Grey DAS site has been used for DAS since the 1930s and receives woodwaster and river silt from the Port of Vancouver and the Fraser River.</p>	<p>Water Quality</p> <ul style="list-style-type: none"> Release of dredged sediments to the Point Grey Disposal Site may change water quality at the site by increasing TSS and turbidity in the water column through the introduction and re-suspension of sediments. The Point Grey disposal site is affected by marine disposal activities on a regular basis as it is a designated DAS site. Water quality may also change due to the release of contaminants to the water column from the dredged material. A DAS permit requires the material to be tested and meet concentration limits for specified parameters. Increase in suspended sediment or contaminant concentrations may affect aquatic health at the disposal site. The Point Grey Disposal Site is located outside of SRKW critical habitat. <p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> Potential increase in TSS and turbidity (see Water Quality bullets listed above). Potential mortality to fish and benthic invertebrates. Potential disturbance or loss of fish habitat. <p>Marine Mammals</p> <ul style="list-style-type: none"> Potential injury or mortality due to vessel strikes with the dredge vessel and tug-assisted barges during transport of dredge material from the TMJ area to the Point Grey Disposal Site (a distance of approximately 40.5 km). Potential behavioral disturbance and/ or acoustic masking due to underwater noise from the dredging vessel, including areas within SRKW habitat. Potential for contaminant uptake (see Water Quality). <p>Air Quality</p> <ul style="list-style-type: none"> Potential increase in combustion emissions, including GHG emissions, from marine vessels (tug-assisted barges) transporting dredge material from the TMJ site to the Point Grey Disposal Site. <p>Vegetation</p> <ul style="list-style-type: none"> No anticipated negative effects to vegetation including marine plants. There are no known occurrences of marine plants at risk at the Point Grey Disposal Site and the site is continuously disturbed by marine disposal activities thereby reducing the potential for plant growth and proliferation. <p>Wildlife and Wildlife Habitat</p> <ul style="list-style-type: none"> Deposition of dredge material at the Point Grey Disposal Site may result in periodic disturbance to aquatic birds, including aquatic migratory birds. <p>Socio-Community</p> <p>No effects anticipated.</p> <p>Land and Marine Resource Use</p>

Dredge Disposal Alternative	Summary	VC Interactions and Potential Effects
		<ul style="list-style-type: none"> • Marine vessel movements for transport of dredged sediments from the TMJ area to the Point Grey Disposal Site could temporarily affect navigation, area access and area use by commercial and non-commercial marine vessels. • Change in distribution and abundance of marine mammals and coastal birds may affect marine tourism. • Changes in distribution and abundance of harvestable fish and seafood species could affect commercial and recreational fish harvesting and guided sport fishing. <p>Current Use of Lands and Resources for Traditional Purposes</p> <ul style="list-style-type: none"> • Marine vessel movements for transport of dredged sediments from the TMJ area to the Point Grey Disposal Site could temporarily affect navigation of Indigenous fisheries vessels and some preferred locations for fishing. • Effects on air quality, atmospheric noise and visual quality during transport of dredge material for disposal could temporarily affect quality of use experience. • Effects to fish species could affect Indigenous Groups harvesting fish for FSC or domestic purposes.

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1 APPENDIX 4 – LIST OF WORKING GROUP MEMBERS

2 PROVINCIAL GOVERNMENT

BC Oil and Gas Commission
 Fraser Health Authority
 Ministry of Energy, Mines and Petroleum Resources
 Ministry of Environment and Climate Change Strategy
 Ministry of Forests, Lands, Natural Resource Operations and Rural
 Development
 Ministry of Indigenous Relations and Reconciliation
 Ministry of Municipal Affairs and Housing

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4 FEDERAL GOVERNMENT

Environment and Climate Change Canada	5
Fisheries and Oceans Canada	6
Fisheries and Oceans Canada - Coast Guard	7
Fisheries and Oceans Canada, Pacific Region	8
Health Canada	9
Natural Resources Canada	10
Port of Vancouver	
Transport Canada	

11 LOCAL GOVERNMENT

City of Richmond
 City of Delta
 Metro Vancouver

12 INDIGENOUS GROUPS

Cowichan Tribes
 Ditidaht First Nation
 Esquimalt Nation
 Halalt First Nation
 Kwantlen First Nation
 Lyackson First Nation
 Maa-nulth First Nations (Treaty):

- Huu-ay-aht First Nations
- Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations
- Toquaht Nation
- Uchucklesaht Tribe

- Ucluelet First Nation (Yuuʔuʔiʔath First Nation)

Malahat First Nation

Musqueam Indian Band

Pacheedaht First Nation

Pauquachin First Nation;

Penelakut Tribes

Scia'new (Beecher Bay) First Nation

Semiahmoo First Nation

Snuneymuxw First Nation

Songhees Nation

Squamish Nation

Stz'uminus First Nation

T'Sou-ke (Sooke) First Nation

Ts'uubaa-asatx Nation (formerly Lake Cowichan First Nation)

Tsartlip First Nation

Tsawout First Nation

Tsawwassen First Nation (Treaty)

Tseycum Indian Band

Tsleil-Waututh Nation

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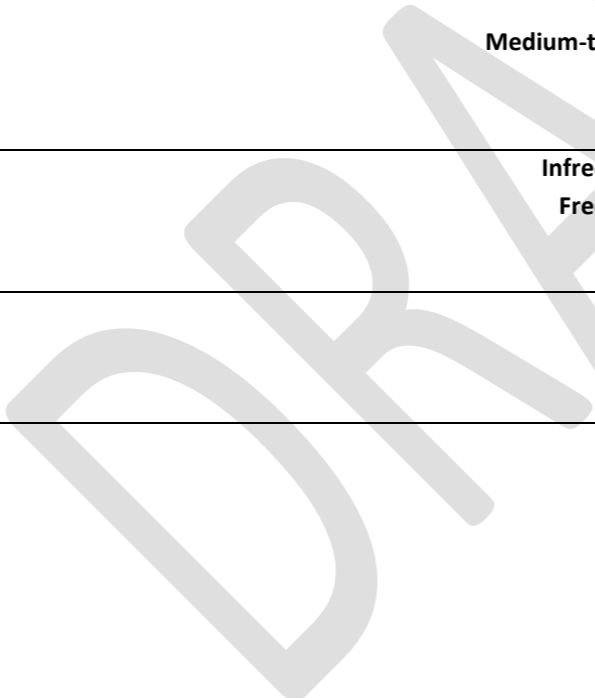
1 APPENDIX 5 – RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS

2 Table 35: Residual Effects Characterization Definitions for the Original Application Area (Jetty to Sand Heads)

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (JETTY TO SAND HEADS)					
Characterization	General Description	Assessment Report Chapters			
		River Processes	Fish and Fish Habitat	Marine Mammals	Air Quality
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.	<p>Low – The indicator has low resiliency or is acutely sensitive to existing conditions</p> <p>Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions</p> <p>High – The indicator has high resiliency or is generally not sensitive to existing conditions</p>			
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	<p>Negligible—effects which are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of the PC or a subcomponent.</p> <p>Low—effect cannot be distinguished from baseline case conditions; magnitude of effect is less than the typical variation of the baseline conditions.</p> <p>Moderate—effect would result in demonstrable change but remains within historical norms; magnitude of effect is of the same order of the typical variation of the baseline conditions.</p> <p>High—effect results in changes that are beyond</p>	<p>Negligible: Project would likely have no measurable effect on fish populations or the function of fish habitat</p> <p>Low: Residual effect would result in small measurable changes in abundance of fish, or result in the loss of low quality, non-essential fish habitat</p> <p>Moderate: Residual effect would likely result in fish mortality with measurable changes in abundance of fish populations, or permanent loss of moderate or high-quality fish habitat.</p> <p>High: Residual effect would likely result in large effects on fish abundance occurring at a population level, or measurable effects, including mortality, on provincially listed or SARA-listed fish species, or loss of limiting or critical habitat for</p>	<p>Negligible—effects which are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of marine mammal populations.</p> <p>Low—Project is likely to result in changes in habitat quality that can be monitored and measured above background conditions, but are within the scope of the natural variability, do not exceed established criteria or scientific threshold levels, and do not meet any of the “moderate” or “high” magnitude definitions.</p> <p>Moderate—Project is likely to result in one or more of the following:</p> <ul style="list-style-type: none"> ▪ Localized alteration of habitat including exceedances of underwater noise behavioural or injury thresholds, water or sediment quality standards, guidelines or baseline conditions – less than 10 times ▪ ≥1 death or injury of a subcomponent ▪ Occasional or temporary disruption of critical activities (e.g., breeding, nursing) and/or localized damage to sensitive or critical habitats <p>High—Project is likely to result in one or more of the following:</p> <ul style="list-style-type: none"> ▪ Widespread degradation of habitat in excess of 	<p>Negligible:</p> <ul style="list-style-type: none"> ▪ The predicted change in maximum concentration is less than or equal to 1% of the Ambient Air Quality Objective. <p>Low:</p> <ul style="list-style-type: none"> ▪ The predicted change in the maximum concentration is between >1% and 10% of the Ambient Air Quality Objective and the Application Case maximum concentration is still below the Ambient Air Quality Objective; or ▪ The predicted change in the maximum concentration is between >1% and 10% of the Ambient Air Quality Objective and the Baseline Case maximum concentration already exceeds the Ambient Air Quality Objective. <p>Moderate:</p> <ul style="list-style-type: none"> ▪ The predicted change in the maximum concentration is larger than 10% of the Ambient Air Quality Objective and the Application Case maximum concentration is still below the Ambient Air Quality Objective; or ▪ The predicted change in the maximum concentration is between >10% and 50% of the Ambient Air Quality Objective and the Baseline Case maximum concentration already exceeds the ambient air quality objective. <p>High:</p> <ul style="list-style-type: none"> ▪ The predicted change in the maximum concentration is larger than 1% of the Ambient Air Quality Objective and the Application Case maximum concentration exceeds the Ambient Air Quality Objective while the Baseline Case maximum concentration does not; or ▪ The predicted change in the maximum concentration is larger than 50% of the

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (JETTY TO SAND HEADS)

Characterization	General Description	Assessment Report Chapters			
		River Processes	Fish and Fish Habitat	Marine Mammals	Air Quality
		historical norms; magnitude of effect is greater than the typical variation of the baseline conditions.	provincially-listed or SARA-listed fish species	underwater noise behavioural or injury thresholds, water or sediment quality standards, guidelines or baseline conditions – more than 10 times <ul style="list-style-type: none"> ▪ ≥1 death or injury of a SARA, blue- or red-listed subcomponent ▪ Extensive disruption of critical activities (e.g., foraging, breeding or nursing grounds) or damage to sensitive or critical habitats 	Ambient Air Quality Objective and the maximum concentration in both the Baseline Case already exceeds the Ambient Air Quality Objective.
Extent	The spatial scale over which the residual effect is expected to occur.	<p>Site-specific – Residual effect is restricted to the Project area or a specific area of the LAA</p> <p>Local – Residual effect is restricted to the LAA</p> <p>Regional – Residual effect is restricted to the RAA</p> <p>Beyond Regional – Residual effect extends beyond the RAA</p>			
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	<p>Short-term – Residual effect is present for less than one year.</p> <p>Medium-term - Residual effect present during construction or decommissioning phases</p> <p>Long-term – Residual effect present for the life of the Project</p> <p>Permanent – Residual effect is present indefinitely</p>			
Frequency	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	<p>Infrequent – Residual effect occurs once or rarely over the specified duration</p> <p>Frequent/ Regular – Residual effect occurs frequently, at regular intervals</p> <p>Continuous – Residual effect occurs continuously</p>			
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	<p>Reversible – Residual effect is reversible</p> <p>Partially reversible – Residual effect can be reversed partially</p> <p>Irreversible – Residual effect is permanent</p>			



RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (that is, JETTY TO SAND HEADS)					
Characterization	General Description	Assessment Report Chapters			
		GHG Management	Noise	Water Quality	Vegetation*
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.	<p>Low – The indicator has low resiliency or is acutely sensitive to existing conditions</p> <p>Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions</p> <p>High – The indicator has high resiliency or is generally not sensitive to existing conditions</p>			
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	<p>Low— No measurable change in provincial, national and global GHG emissions</p> <p>Moderate— Although, measurable, based on CEEA guidance (2003), professional judgement, and the industry profile, relatively small changes would be expected in provincial, national, and global GHG emissions.</p> <p>High— Based on CEEA guidance (2003), professional judgement, and the industry profile, a relatively high change would be expected in provincial emissions and a notable change in national emissions while change to global emissions would be small.</p>	<p>Negligible—effects which are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of Noise</p> <ul style="list-style-type: none"> • Application noise levels are ≤ 3 dB change from baseline noise levels • Change in %HA of $\leq 6.5\%$ • For speech comprehension, daytime application noise levels ≤ 55 dBA or exceed daytime baseline noise levels by ≤ 3 dB; and • For sleep disturbance, nighttime application noise levels are ≤ 45 dBA or exceed nighttime baseline noise levels by ≤ 3 dB. <p>Low:</p> <ul style="list-style-type: none"> • Application noise levels \leqPSL • Change in %HA of $\leq 6.5\%$ • For speech comprehension, daytime application noise levels exceed 55 dBA by ≤ 3 dB or exceed daytime baseline noise levels by ≤ 5 dB; or • For sleep disturbance, nighttime application noise levels exceed 45 dBA by ≤ 3 dB or exceed nighttime baseline noise levels by ≤ 5 dB. <p>Moderate:</p> <ul style="list-style-type: none"> • Application noise levels exceed the PSL by ≤ 5 dB • Change in %HA of $\leq 10\%$ • For speech comprehension, daytime application noise levels exceed 55 dBA by ≤ 5 dB or exceed daytime baseline noise levels by ≤ 10 dB; or • For sleep disturbance, nighttime application noise levels exceed 45 dBA by ≤ 5 dB or exceed nighttime baseline noise levels by ≤ 10 dB. <p>High:</p> <ul style="list-style-type: none"> • Application noise levels exceed the PSL by > 5 dB • Change in %HA of $> 10\%$ • For speech comprehension, daytime application noise levels exceed 55 dBA by > 5 dB or exceed daytime baseline noise levels by > 10 dB; or 	<p>Negligible—a change in water quality due to the Project that is so small it is neither detectable nor measurable and is not anticipated to influence the short- or long-term viability of water quality, sediment quality, or aquatic health.</p> <p>Low—a detectable change in water quality due to the Project that is within variability documented for the assessment area. The change cannot be distinguished from existing conditions accounting for inherent variability due to tidal cycles and river discharge. Peak concentrations may extend above FRWQOs or applicable water quality guidelines.</p> <p>Moderate—a detectable change in water quality due to the Project that is outside of the variability documented for the assessment area. Peak concentrations are expected to extend above FRWQOs or applicable water quality guidelines and suggest the potential for effects on the most sensitive indicators that reside in the receiving environment.</p> <p>High—a detectable change in water quality due to the Project that is outside of the variability documented for the assessment area. Peak concentrations are expected to</p>	<p>Negligible—effects which are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of the VC subcomponent.</p> <p>Low—measurable change to the VC subcomponent, reproductive capacity, survival, or extent of suitable habitat; regional population or extent sufficient to sustain the subcomponent without active management.</p> <p>Moderate—measurable change to reproductive capacity, survival or extent of suitable habitat for the VC subcomponent over the short or medium term; regional recovery to pre-project conditions expected with management.</p> <p>High—measurable change to reproductive capacity, survival, or extent of suitable habitat for the VC subcomponent resulting in a net loss of wetland</p>

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (that is, JETTY TO SAND HEADS)					
Characterization	General Description	Assessment Report Chapters			
		GHG Management	Noise	Water Quality	Vegetation*
			<ul style="list-style-type: none"> For sleep disturbance, nighttime application noise levels exceed 45 dBA by >5 dB or exceed nighttime baseline noise levels by >10 dB. 	extend above FRWQOs and applicable guidelines and suggest potential for effects on a wider range of indicators in the receiving environment.	functions or a greater than 10% loss of ecosystems or plant species of management concern in the RAA.
Extent	The spatial scale over which the residual effect is expected to occur.	Site-specific – Residual effect is restricted to the Project area or a specific area of the LAA Local – Residual effect is restricted to the LAA Regional – Residual effect is restricted to the RAA Beyond Regional – Residual effect extends beyond the RAA			
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	Short-term – Residual effect is present for less than one year. Medium-term – Residual effect present during construction or decommissioning phases Long-term – Residual effect present for the life of the Project Permanent – Residual effect is present indefinitely			
Frequency	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	Infrequent – Residual effect occurs once or rarely over the specified duration Frequent/ Regular – Residual effect occurs frequently, at regular intervals Continuous – Residual effect occurs continuously			
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	Reversible – Residual effect is reversible Partially reversible – Residual effect can be reversed partially Irreversible – Residual effect is permanent			

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RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (that is, JETTY TO SAND HEADS)			
Characterization	General Description	Assessment Report Chapters	
		Wildlife and Wildlife Habitat and Marine Birds**	Land and Marine Resource Use
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.	Low – The indicator has low resiliency or is acutely sensitive to existing conditions Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions High – The indicator has high resiliency or is generally not sensitive to existing conditions	

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (that is, JETTY TO SAND HEADS)				
Characterization	General Description	Assessment Report Chapters		
		Wildlife and Wildlife Habitat and Marine Birds**	Land and Marine Resource Use	Current Use of Lands and Resources for Traditional Purposes
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	<p>Negligible—effects that are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of a subcomponent or focal species.</p> <p>Low—the incremental change in the indicator will result in no measurable effect on the subcomponent or result in a minor measurable effect on the subcomponent or focal species.</p> <p>Moderate—the incremental change in the indicator will result in a clearly defined change to the subcomponent or focal species but remains below a level of effect that could exceed the resilience and adaptability limits of the population.</p> <p>High—the incremental change in the indicator is sufficiently large that it approaches or falls within the range of effects that could exceed the resilience and adaptability of the subcomponent or focal species.</p>	<p>Negligible—a change that is small such that it is not detectable nor measurable and would not noticeably affect the VC or a Subcomponent.</p> <p>Low—a small but detectable change from baseline conditions that is within historic norms and within the system’s capacity to respond.</p> <p>Moderate—a demonstrable change from baseline conditions that is within historic norms and within the system’s capacity to respond.</p> <p>High—a demonstrable change from baseline conditions that is beyond historic norms and beyond the system’s capacity for effective response</p>	<p>Negligible—a change that is small such that it is not detectable nor measurable and would not noticeably affect the VC or a Subcomponent.</p> <p>Low—a small but detectable change from baseline conditions that is within historic norms and within the system’s capacity to respond.</p> <p>Moderate—a demonstrable change from baseline conditions that is within historic norms and within the system’s capacity to respond.</p> <p>High—a demonstrable change from baseline conditions that is beyond historic norms and beyond the system’s capacity for effective response.</p>
Extent	The spatial scale over which the residual effect is expected to occur.	<p>Site-specific – Residual effect is restricted to the Project area or a specific area of the LAA</p> <p>Local – Residual effect is restricted to the LAA</p> <p>Regional – Residual effect is restricted to the RAA</p> <p>Beyond Regional – Residual effect extends beyond the RAA</p>	<p>Site-specific – Residual effect is restricted to the Project area or a specific area of the LAA</p> <p>Local – Residual effect is restricted to the LAA</p> <p>Regional – Residual effect is restricted to the RAA</p>	
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	<p>Short-term – Residual effect is present for less than one year.</p> <p>Medium-term - Residual effect present during construction or decommissioning phases</p> <p>Long-term – Residual effect present for the life of the Project</p> <p>Permanent – Residual effect is present indefinitely</p>		
Frequency	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	<p>Infrequent – Residual effect occurs once or rarely over the specified duration</p> <p>Frequent/ Regular – Residual effect occurs frequently, at regular intervals</p> <p>Continuous – Residual effect occurs continuously</p>		
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	<p>Reversible – Residual effect is reversible</p> <p>Partially reversible – Residual effect can be reversed partially</p> <p>Irreversible – Residual effect is permanent</p>		

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (JETTY TO SAND HEADS)			
Characterization	General Description	Assessment Report Chapters	
		Visual Quality Effects	Human Health
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the impact of natural and human-caused trends in the condition of the VC.	<p>Low – The indicator has low resiliency or is acutely sensitive to existing conditions</p> <p>Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions</p> <p>High – The indicator has high resiliency or is generally not sensitive to existing conditions</p>	
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	<p>Negligible—change in existing visual quality not perceptible from existing conditions within the LAA.</p> <p>Low—there is a small change to existing visual quality that is not uncharacteristic with the existing visual character within the LAA.</p> <p>Moderate—there is a noticeable and distinct change to existing visual quality that may not be considered uncharacteristic with the existing visual character within the LAA.</p> <p>High—there is evident and extensive change to existing visual quality that is uncharacteristic with the existing visual character within the LAA.</p>	<p>These are identified based on calculated hazard quotients (HQ) and incremental lifetime cancer risks (ILCR).</p> <p>Negligible – Health risk is not affected or slightly affected but exposure ratios for Project-related exposures are below the benchmarks established by a recognized health organization. (i.e. $HQ < 1.0$ or $ILCR < 10^{-5}$)</p> <p>Low - Project-related environmental exposures marginally exceed the benchmarks established by a recognized health organization. (i.e. $1.0 < HQ \leq 2.0$ or $1 \times 10^{-5} < ILCR \leq 10^{-4}$)</p> <p>Moderate – Project-related environmental exposures are predicted to exceed the benchmarks by a recognized health organization. (i.e. $2.0 < HQ \leq 10.0$ or $1 \times 10^{-4} < ILCR \leq 10^{-3}$)</p> <p>High – Project-related environmental exposures are predicted to substantially exceed the benchmarks established by a recognized health organization. (i.e. $HQ > 10.0$ or $ILCR > 10^{-3}$)</p> <p>Hazard Quotient for the Human Health Effects Assessment represents the ratio of the predicted air concentrations relative to its health-based air threshold. For inhalation risk assessments, concentrations in air are compared to thresholds specific to the inhalation pathway for the purpose of calculating a hazard quotient, and no apportionment is required to account for intake from other media.</p>
Extent	The spatial scale over which the residual effect is expected to occur.	<p>Site-specific – Residual effect is restricted to the Project area or a specific area of the LAA</p> <p>Local – Residual effect is restricted to the LAA</p> <p>Regional – Residual effect is restricted to the RAA</p>	Receptor locations were identified within the LAA and RAA. Therefore, the geographic locations were set, and risk estimates were calculated for each of these locations. As a result, geographic extent was fixed in the HHRA and is not used to determine significance of residual effect for the Human Health assessment.
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	<p>Short-term – Residual effect is present for less than one year.</p> <p>Medium-term - Residual effect present during construction or decommissioning phases</p> <p>Long-term – Residual effect present for the life of the Project</p> <p>Permanent – Residual effect is present indefinitely</p>	Exposure duration is not an independent variable in the HHRA because it was necessary to assume an exposure duration to calculate a daily exposure dose resulting from chronic exposure to a COPC. As a result, duration is not used to determine residual effects or their duration for the Human Health assessment.

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE ORIGINAL APPLICATION AREA (JETTY TO SAND HEADS)			
Characterization	General Description	Assessment Report Chapters	
		Visual Quality Effects	Human Health
Frequency*	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	<p>Infrequent – Residual effect occurs once or rarely over the specified duration</p> <p>Frequent/ Regular – Residual effect occurs frequently, at regular intervals</p> <p>Continuous – Residual effect occurs continuously</p>	For the HHRA, the frequency of exposure is not an independent variable because it was necessary to assume a particular exposure frequency to calculate an estimate of a daily exposure dose in accordance with risk assessment guidance that would result from chronic exposure to a COPC. As a result, frequency is not used to determine residual effect or significance for the Human Health assessment. Probability was used to quantitatively evaluate the likelihood of a residual effect occurring. * Frequency includes Probability for the Human Health VC.
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	<p>Reversible – Residual effect is reversible</p> <p>Partially reversible – Residual effect can be reversed partially</p> <p>Irreversible – Residual effect is permanent</p>	

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2 **Table 36: Residual Effects Characterization Definitions for the Marine Shipping Assessment**

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT			
Characterization	General Description	Assessment Report Chapters	
		Fish and Fish Habitat	Marine Mammals
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.	<p>Low – The indicator has low resiliency or is acutely sensitive to existing conditions</p> <p>Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions</p> <p>High – The indicator has high resiliency or is generally not sensitive to existing conditions</p>	
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	<p>Negligible: Project would likely have no measurable effect on fish populations or the function of fish habitat</p> <p>Low: Residual effect would result in small measurable changes in abundance of fish, or result in the loss of low quality, non-essential fish habitat</p> <p>Moderate: Residual effect would likely result in fish mortality with measurable changes in abundance of fish populations, or permanent loss of moderate or high-quality fish habitat.</p> <p>High: Residual effect would likely result in large effects on fish abundance occurring at a population level, or measurable effects, including mortality, on provincially listed or SARA-listed fish species, or loss of limiting or critical habitat for provincially-listed or SARA-listed fish species</p>	<p>Negligible – effects which are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of the VC or a Subcomponent.</p> <p>Low—Project is likely to result in changes in habitat quality that can be monitored and measured above background conditions, but are within the scope of the natural variability, do not exceed established criteria or scientific threshold levels, and do not meet any of the “moderate” or “high” magnitude definitions.</p> <p>Moderate—Project is likely to result in one or more of the following:</p> <ul style="list-style-type: none"> Localized alteration of habitat including exceedances of underwater sound behavioural thresholds. <ul style="list-style-type: none"> ≥1 death or injury of a subcomponent not listed as Threatened or Endangered under SARA Occasional or temporary disruption of critical activities (e.g., foraging, breeding, nursing) and/ or localized damage to sensitive or critical habitats. <p>High—Project is likely to result in one or more of the following:</p> <ul style="list-style-type: none"> Widespread degradation of habitat in excess of underwater sound behavioural thresholds ≥1 death or injury of a subcomponent listed as Threatened or Endangered under SARA

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT

Characterization	General Description	Assessment Report Chapters	
		Fish and Fish Habitat	Marine Mammals
			<ul style="list-style-type: none"> • Extensive disruption of critical activities (e.g., foraging, breeding or nursing grounds) or damage to sensitive or critical habitats.
Extent	The spatial scale over which the residual effect is expected to occur.	Site Specific – Residual effect is within the immediate vicinity of transiting vessels Fish MSA Area – Residual effect is limited to the Fish MSA Area Beyond the Fish MSA Area – Residual effect extends beyond the Fish SMA Area	Site Specific –Residual effects limited to the Inbound/ outbound shipping lanes Marine Mammal MSA Area – Residual effects limited to the MSA LAA/ RAA Beyond Marine Mammal MSA Area - Residual effects extend to areas beyond the MSA LAA/ RAA
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	Short-term – Residual effect is present for less than one year. Medium-term - Residual effect present during construction or decommissioning phases Long-term – Residual effect present for the life of the Project Permanent – Residual effect is present indefinitely	
Frequency	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	Infrequent – Residual effect occurs once or rarely over the specified duration Frequent/ Regular – Residual effect occurs repeatedly over the specified duration Continuous – Residual effect occurs continuously	
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	Reversible – Residual effect is reversible Partially reversible – Residual effect can be reversed partially Irreversible – Residual effect is permanent	

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RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT

Characterization	General Description	Assessment Report Chapters			
		Air Quality	GHG Management	Wildlife and Wildlife Habitat and Marine Birds	Land and Marine Resource Use
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.	Low – The indicator has low resiliency or is acutely sensitive to existing conditions Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions High – The indicator has high resiliency or is generally not sensitive to existing conditions			

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT

Characterization	General Description	Assessment Report Chapters			
		Air Quality	GHG Management	Wildlife and Wildlife Habitat and Marine Birds	Land and Marine Resource Use
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	<p>Negligible:</p> <ul style="list-style-type: none"> The predicted change in maximum concentration is less than or equal to 1% of the Ambient Air Quality Objective. <p>Low:</p> <ul style="list-style-type: none"> The predicted change in the maximum concentration is between >1% and 10% of the Ambient Air Quality Objective and the Application Case maximum concentration is still below the Ambient Air Quality Objective; or The predicted change in the maximum concentration is between >1% and 10% of the Ambient Air Quality Objective and the Baseline Case maximum concentration already exceeds the Ambient Air Quality Objective. <p>Moderate:</p> <ul style="list-style-type: none"> The predicted change in the maximum concentration is larger than 10% of the Ambient Air Quality Objective and the Application Case maximum concentration is still below the Ambient Air Quality Objective; or The predicted change in the maximum concentration is between >10% and 50% of the Ambient Air Quality Objective and the Baseline Case maximum concentration already exceeds the Ambient Air Quality Objective. <p>High:</p> <ul style="list-style-type: none"> The predicted change in the maximum concentration is larger than 10% of the Ambient Air Quality Objective and the Application Case maximum concentration exceeds the Ambient Air Quality Objective while the Baseline Case maximum concentration does not; or The predicted change in the maximum concentration is larger than 50% of the Ambient Air Quality Objective and the maximum concentration in both the Baseline Case already exceeds the Ambient Air Quality Objective. 	<p>Negligible—effects which are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of the VC or a subcomponent.</p> <p>Low—>0.1% but <1% of the provincial emission levels, or >2% but <16% of national sector emission levels, or >0.01% but <0.1% of the federal emission levels.</p> <p>Moderate—>1% of the provincial emission levels, or >16% of national sector emission levels, or >0.1% of the federal emission levels.</p> <p>High—>5% of the provincial emission levels, or >75% of national sector emission levels, or >0.5% of the federal emission levels.</p>	<p>Negligible—effects that are so small that they are neither detectable nor measurable and are not anticipated to influence the short- or long-term viability of a subcomponent or focal species.</p> <p>Low—the incremental change in the indicator will result in no measurable effect on the subcomponent or result in a minor measurable effect on the subcomponent or focal species.</p> <p>Moderate—the incremental change in the indicator will result in a clearly defined change to the subcomponent or focal species but remains below a level of effect that could exceed the resilience and adaptability limits of the population.</p> <p>High—the incremental change in the indicator is sufficiently large that it approaches or falls within the range of effects that could exceed the resilience and adaptability of the subcomponent or focal species.</p>	<p>Negligible—a change that is small, such that it is not detectable nor measurable and would not noticeably affect the VC or a Subcomponent.</p> <p>Low—a small but detectable change from baseline conditions that is within historic norms and within the system’s capacity to respond.</p> <p>Moderate—a demonstrable change from baseline conditions that is within historic norms and within the system’s capacity to respond.</p> <p>High—a demonstrable change from baseline conditions that is beyond historic norms and beyond the system’s capacity for effective response.</p>
Extent	The spatial scale over which the residual effect is expected to occur.	The receptor locations were identified within the LAA and RAA. Therefore, the geographic locations were set, and the predicted receptor concentrations were predicted at each of these locations. As a result, geographic extent was fixed in the air assessment and is not used to	<p>Site Specific –Residual effects limited to the Project Site</p> <p>LAA – Residual effects limited to the LAA</p> <p>RAA - Residual effects limited to the RAA</p> <p>Beyond the RAA - Residual effects extend to areas beyond the RAA</p>	<p>Site Specific –Residual effects limited to the Inbound/ outbound shipping lanes</p> <p>Marine Bird MSA Area – Residual effects limited to the MSA LAA/ RAA</p> <p>Beyond Marine Bird MSA Area - Residual effects extend to areas beyond the MSA LAA/ RAA</p>	<p>Site Specific –Residual effects limited to a specific location of a transiting vessel</p> <p>LAA – Residual effects limited to the LAA</p> <p>MAA - Residual effects limited to the MAA</p>

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT

Characterization	General Description	Assessment Report Chapters			
		Air Quality	GHG Management	Wildlife and Wildlife Habitat and Marine Birds	Land and Marine Resource Use
		determine significance of residual effect for the MSA air quality subcomponent.			
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	Short-term – Residual effect is present for less than one year. Medium-term - Residual effect present during construction or decommissioning phases Long-term – Residual effect present for the life of the Project Permanent – Residual effect is present indefinitely			
Frequency	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	Infrequent – Residual effect occurs once or rarely over the specified duration Frequent/ Regular – Residual effect occurs repeatedly over the specified duration Continuous – Residual effect occurs continuously			
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	Reversible – Residual effect is reversible Partially reversible – Residual effect can be reversed partially Irreversible – Residual effect is permanent			

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RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT

Characterization	General Description	Assessment Report Chapters		
		Current Use of Lands and Resources for Traditional Purposes	Visual Quality Effects	Human Health
Context	The current and future sensitivity and resilience of the VC to change caused by the project. Context draws on the descriptions of the existing conditions for the VC, which reflect cumulative effects of other projects and activities that have been carried out, and especially information about the effects of natural and human-caused trends in the condition of the VC.	Low – The indicator has low resiliency or is acutely sensitive to existing conditions Moderate – The indicator has moderate resiliency or is mildly sensitive to existing conditions High – The indicator has high resiliency or is generally not sensitive to existing conditions		
Magnitude	The expected size or severity of the residual effect. Considers the proportion of the VC affected within the spatial boundaries and the relative effect (e.g., relative to natural annual variation in the magnitude of the VC or other relevant characteristics).	Negligible —a change that is small, such that it is not detectable nor measurable and would not noticeably affect the VC or a Subcomponent. Low —a small but detectable change from baseline conditions that is within historic norms and within the system’s capacity to respond. Moderate —a demonstrable change from baseline conditions that is within historic norms and within the system’s capacity to respond.	Negligible —a change in visual quality that is not readily perceptible from existing conditions and is consistent with the existing visual character of the LAA. Low —a discernible change to existing visual quality that remains consistent with the existing visual character of the LAA. Moderate —a noticeable and distinct change to the existing visual quality that remains consistent with the existing visual character of the LAA.	These are identified based on calculated hazard quotients (HQ) and incremental lifetime cancer risks (ILCR). Negligible – Health risk is not affected or slightly affected but exposure ratios for Project-related exposures are below the benchmarks established by a recognized health organization. (i.e., HQ<1.0 or ILCR<1x10 ⁻⁵) Low – Project-related environmental exposures marginally exceed the benchmarks established by a recognized health organization. (i.e., 1.0<HQ≤2.0 or 1x10 ⁻⁵ <ILCR≤10 ⁻⁴)

RESIDUAL EFFECTS CHARACTERIZATION DEFINITIONS FOR THE MARINE SHIPPING ASSESSMENT

Characterization	General Description	Assessment Report Chapters		
		Current Use of Lands and Resources for Traditional Purposes	Visual Quality Effects	Human Health
		<p>High—a demonstrable change from baseline conditions that is beyond historic norms and beyond the system’s capacity for effective response.</p>	<p>High—evident and extensive change to existing visual quality that is inconsistent with the existing visual character within the LAA.</p>	<p>Moderate – Project-related environmental exposures are predicted to exceed the benchmarks by a recognized health organization. (i.e., $2.0 < HQ \leq 10.0$ or $1 \times 10^{-4} < ILCR \leq 10^{-3}$)</p> <p>High – Project-related environmental exposures are predicted to substantially exceed the benchmarks established by a recognized health organization. (i.e., $HQ > 10.0$ or $ILCR > 10^{-3}$)</p> <p>Hazard Quotient for the Human Health Effects Assessment represents the ratio of the predicted air concentrations relative to its health-based air threshold. For inhalation risk assessments, concentrations in air are compared to thresholds specific to the inhalation pathway for the purpose of calculating a hazard quotient, and no apportionment is required to account for intake from other media.</p>
Extent	The spatial scale over which the residual effect is expected to occur.	<p>Site Specific –Residual effects limited to a specific location of a transiting vessel LAA – Residual effects limited to the LAA MAA - Residual effects limited to the MAA</p>	<p>Site Specific –Residual effects limited to a specific viewing location of a transiting vessel LAA – Residual effects limited to the LAA MAA - Residual effects extend to the RAA</p>	Receptor locations were identified within the LAA and RAA. Therefore, the geographic locations were set, and risk estimates were calculated for each of these locations. As a result, geographic extent was fixed in the HHRA and is not used to determine significance of residual effect for the Human Health assessment.
Duration	The length of time the residual effect persists (which may be longer than the duration of the physical work or activity that gave rise to the residual effect).	<p>Short-term – Residual effect is present for less than one year. Medium-term - Residual effect present during construction or decommissioning phases Long-term – Residual effect present for the life of the Project Permanent – Residual effect is present indefinitely</p>		Exposure duration is not an independent variable in the HHRA because it was necessary to assume an exposure duration to calculate an exposure to a COPC. The HHRA focused on acute short-term exposure durations of 1-hour and 24-hours. As a result, duration is not used to determine residual effects or their duration for the Human Health assessment.
Frequency	How often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect.	<p>Infrequent – Residual effect occurs once or rarely over the specified duration Frequent/ Regular – Residual effect occurs repeatedly over the specified duration Continuous – Residual effect occurs continuously</p>		For Human Health, the frequency of exposure is not an independent variable because the predicted air concentrations were based on the worst-case concentration and frequency of exceedances could not be estimated. As a result, frequency is not used to determine residual effect or significance for the Human Health assessment.
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or the activity causing the disturbance ceases.	<p>Reversible – Residual effect is reversible Partially reversible – Residual effect can be reversed partially Irreversible – Residual effect is permanent</p>		The HHRA did not include an assessment of reversibility of potential health effects, which cannot be determined for people.

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1 APPENDIX 6 – RATIONALE FOR SPECIES AT RISK CONSIDERED IN THE ASSESSMENT

2 **Table 37: Federally-listed Wildlife with Potential to occur in the TMJ Area (original Application area)²⁵²**

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Species	Conservation Status		Subcomponent	Focal Species	Rationale for substitution or not selecting as focal species
	B.C.: Conservation Data Centre Ranking ²⁵³	Federal: COSEWIC or SARA Ranking ²⁵⁴			
Birds					
Band-tailed pigeon	Blue	Special Concern	-	-	No suitable habitat in the LAA; therefore band-tailed pigeons are not expected to nest in the LAA.
Bank swallow	Yellow	Threatened	-	-	Suitable nesting habitat not been recorded in LAA.
Barn owl (western population)	Red	Threatened	Barn owl		n/a
Barn swallow	Blue	Threatened	Little brown myotis (effects to foraging habitat only)		Barn swallows were not recorded during 2015 field studies in the LAA. Barn swallow may forage over aquatic areas in the LAA. Potential effects to foraging habitat for insectivorous species is discussed in the little brown myotis assessment.
Black swift	Blue	Endangered	Little brown myotis (effects to foraging habitat only)		No suitable nesting habitat occurs in LAA, and black swifts are not expected to nest in the LAA. Black swifts may occasionally forage on insects above the LAA. Potential effects to foraging habitat for insectivorous species is discussed the little brown myotis assessment.
Common nighthawk	Yellow	Threatened	Little brown myotis (effects to foraging habitat only)		Common nighthawk was not recorded during 2015 field studies in the LAA. Common nighthawk may forage on insects about the LAA. Potential effects to foraging habitat for insectivorous species is discussed in the little brown myotis assessment.
Great blue heron (<i>fannini</i> subspecies)	Blue	Special Concern	Waterbirds	Great blue heron (<i>fannini</i> Subspecies)	n/a
Horned grebe	Yellow	Special Concern	Waterbirds	Double-crested cormorant	Horned grebes may occur in LAA outside of the breeding season in aquatic habitat.
Olive-sided flycatcher	Blue	Threatened	-	-	The LAA does not contain suitable habitat for olive-sided flycatcher breeding. Olive-sided flycatchers are not expected to nest in the LAA.
Red knot	Red	Endangered	Waterbirds	Great blue heron (<i>fannini</i> Subspecies)	Although unlikely to occur in the LAA, stopover habitat potentially used by red knots during migration can be represented by foraging habitat for great blue herons.
Western grebe	Red	Special Concern	Waterbirds	Double-crested cormorant	Western grebes forage by diving in shallow water. Double-crested cormorant is considered suitable to addressed potential effects to western grebe foraging habitat.
Evening Grosbeak	Yellow	Special Concern	-	-	The LAA does not provide suitable nesting habitat.
Short-eared owl	Blue	Special Concern	-	-	The LAA does not provide suitable habitat.
Western screech owl	Blue	Threatened	-	-	The LAA does not provide suitable breeding habitat; therefore, are not expected to nest in the LAA.

²⁵² SARA-listed or COSEWIC-listed species provided to the EAO by Canadian Wildlife Service, which have been identified as being present, or potentially occurring with the TMJ Project Area.

²⁵³ BC Conservation data centre list definitions: **Yellow** = Any species or ecosystem that is at the least risk of being lost; **Blue** = Any species or ecosystem that is of special concern; **Red** = Any species or ecosystem that is at risk of being lost (extirpated, endangered or threatened);

²⁵⁴ COSEWIC ranking included if no SARA ranking. SARA definitions: **Special concern** = a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats; **Threatened** = a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction; **Endangered** = a wildlife species that is facing imminent extirpation or extinction.

Species	Conservation Status		Subcomponent	Focal Species	Rationale for substitution or not selecting as focal species
	B.C.: Conservation Data Centre Ranking ²⁵³	Federal: COSEWIC or SARA Ranking ²⁵⁴			
Other Terrestrial Vertebrates					
Western painted turtle (Pacific coast populations)	Red	Endangered	-	-	The LAA does not contain suitable habitat, and western painted turtles have not been reported near the LAA.
Little brown myotis	Yellow	Endangered	Little brown myotis		n/a
Northern red-legged frog	Blue	Special Concern	Amphibians	Pacific chorus frog	Pacific chorus frog breed in a variety of habitats and forage on a variety of crawling and flying insects and are considered a suitable surrogate species
Pacific water shrew	Red	Endangered	-	-	Riparian habitat along the Fraser River is not considered suitable, and the upland area is predominantly concrete and not considered suitable habitat.
Invertebrates					
Dun skipper	Red	Threatened	-	-	Suitable habitat for dun skipper in the LAA is not expected, although the transition area between the marsh and riparian zones in the LAA, as well as along unmanaged ditches and Tilbury Slough outside of the LAA could support host plants. Dun skipper has not been observed within the LAA; however, it was recorded in Burns Bog in 2004. Potential effects to dun skipper resulting from changes in available sedges and grasses is considered in the assessment of potential effects to great-blue heron and wetland extent.

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1 APPENDIX 7 – ENVIRONMENTAL EFFECTS OF POTENTIAL ACCIDENTS AND

2 MALFUNCTIONS

3 **Table 38: Environmental Effects of Potential Accidents and Malfunctions**

Accident and Malfunction	Valued Component	Environmental Effects
Hazardous Material Spills	Air Quality	Effects are expected to be negligible and not result in any material increase in TMJ emissions since Volatile Organic Compound (VOC) components from spilled materials would volatilize.
	Vegetation	Effects would be localized and reversible for spills in the vicinity of vegetation for both onshore and offshore spill scenarios.
	Wildlife & Wildlife Habitat	Effects would be localized and reversible for both onshore and offshore scenarios in the immediate vicinity of wildlife.
	Marine Mammals	Effects would be localized as the spill is expected to be boomed and quickly contained to the immediate area around TMJ, refer to Chapter 5.8 – Marine Mammals for further information.
	Water Quality, Fish and Fish Habitat	Onshore spills are expected to have negligible effects. A spill migrating to the estuarine environment would affect water quality; however, as large-scale spills are not expected to occur, effects would be localized and reversible. Fish mortality may occur in immediate vicinity of facility but would not have population effect.
Loss of LNG Containment	Air Quality	Vapour cloud (methane) would be immaterial in terms of context of Air Quality, with rapid dispersion.
	Vegetation and Wildlife & Wildlife Habitat	Potentially affected in immediate vicinity of the spill; however, population-level effects are not expected.
	Marine Mammals	Potential injury or asphyxiation in immediate vicinity at surface of water; spills are expected to be contained to the immediate area of the spill.
	Fish and Fish Habitat	Potentially affected near surface in immediate vicinity of spill; however, population-level effects are not expected as LNG would rapidly dissipate and is not a persistent pollutant.
	Human Health	Limited to TJLP personnel in immediate vicinity of the spill who are trained and equipped with personal protective equipment.
Fire or Explosion	Air Quality and Visual Quality	Effects would occur from combustion emissions and are expected to be localized and short term (<1 hour).
	Vegetation and Wildlife and Wildlife Habitat	Depending on location of fire, brush fire could occur affecting riparian vegetation and wildlife in the vicinity; however, population-level effects are not expected, and vegetation would be rehabilitated.
	Marine Mammals	Potential injury or asphyxiation in immediate vicinity at surface of water as a fire would be expected to be contained to the immediate area.
	Fish and Fish Habitat	Potentially affected in vicinity of fire; however, localized effects without population-level effects are expected.
	Economy and Land and Marine Resource Use	Variable effect to TMJ operations; non-TMJ-related economic activities would be limited.
	Socio-community	Potential strain on local emergency services in the event of a fire of explosion; however, limited and short-lived.
	Human Health ²⁵⁵	Effects due to emissions would be negligible as combustion emission would quickly disperse.
Unplanned Disturbance of Ecologically Sensitive Areas	Water Quality	Potential increase in sedimentation and would be localized and short-term.
	Vegetation	Potential for accidental removal, if so, area will be revegetated.

²⁵⁵ This table summarizes the environmental effects of potential accidents and malfunctions. The Human Health effect captured in this table is related to chemical pathways to Human Health.

Accident and Malfunction	Valued Component	Environmental Effects
by Equipment Operations	Fish & Fish Habitat and Wildlife & Wildlife Habitat	Potential habitat loss which could be reversible. Potential injury/ death for fish and wildlife; however, effects without population-level effects are expected.
Failure of Sediment Containment	Water Quality	Potential increase in sedimentation in riparian area and estuarine environment; however, low magnitude and would only occur along a small stretch of riparian area.
	Vegetation, Fish & Fish Habitat, Wildlife & Wildlife Habitat	Effects would be limited to the affected habitat and be reversible with restoration.
Release of non-LNG Fuel	Air Quality, Greenhouse Gas Emissions, Visual Quality	Air quality affected in immediate vicinity of fuel spill as VOC components of fuel volatilize; however, effects would be local and reversible. Relatively negligible to negligible effects on visual quality and GHG emissions.
	Vegetation	Varies based on location and volume of fuel spill and current and climatic conditions. Potential requirement to remove vegetation to facilitate clean-up. Major spills of heavy fuel oil could spread beyond immediate vicinity even with immediate response and clean-up. Any removed vegetation would be replaced after clean-up.
	Water Quality	Surface water quality affected. Heavy fuel oil not recovered during spill response may travel long distances (kilometers) and become a source of sustained release of polycyclic aromatic hydrocarbons. Minimal to moderate and reversible long-term effects.
	Fish & Fish Habitat	Mortality in immediate vicinity of spill and risk of long-term toxicity to developing fish embryos. At-risk fish species in South Arm may be affected. However, effects to fish populations expected to be reversible within a few years. Effects to marine fish would vary based on volume of spill, location and tidal/ weather conditions. However, expected to have medium-term, reversible effects.
	Wildlife & Wildlife Habitat	Potential mortality for wildlife in direct contact with spill and those surviving could have chronic effects and lower reproductive rates. Effects expected to be reversible within a few years.
	Marine Birds	Potential mortality in direct contact with spill and those surviving could have chronic effects and lower reproductive rates. Magnitude would depend on spill extent, bird species, as well as season and location. Effects expected to be reversible within a few years. However, marine bird populations within the MSA area are considered sensitive to release of diesel fuel into marine environment with long-term effects.
	Marine Mammals	Uncertain. Potential effects of spills could be direct or indirect and vary based on number of individuals coming into contact, duration of contact and degree of weathering of the spill. Marine mammals exposed to spill are likely to experience temporary, nonlethal effects. Inhalation of some substances may cause toxic effects in marine mammals; however, the risk of exposure is considered short-term as these substances generally dissipate within a few days thereby removing the potential risk of inhalation. All effects are initially manifested at the individual level with the potential to affect population-level based on population size (e.g., SRKW population). Major spills of heavy fuel oil could result in portions spreading beyond immediate vicinity even with immediate response and clean-up, resulting in adverse toxic effects to marine mammals.
	Economy, Land & Marine Resource Use, Current Use of Land & Resources for Traditional Purposes	May restrict navigation along Fraser River, leading to substantial effect on movement of other Fraser River vessel traffic (days to weeks). A large bunker oil spill could also have substantial economic effects to CRA fisheries depending on location, time of year and extent of the spill. In addition, there would be potential effects causing displacement of marine area access and area use (medium – months), presence and availability of fish and seafood for commercial and recreational harvesting (medium – months to few years), potential vessel, gear and property damage (medium – months), presence of marine mammals for marine tourism whale watching (potential for long-term – irreversible), change to recreational environmental setting (moderate to long-term), access to preferred current use locations (medium-term – months), damage to current use vessels, equipment, cultural sites and features (medium to long-term – multi-year), availability and quality of preferred current use resources (medium to long-term), quality of current use experience (long-term)
	Socio-Community	A fuel spill due to vessel grounding or collision is likely to require external emergency response services such as CCG and Transport Canada. However, emergency response to a fuel spill on the Fraser River would place no to minimal strain to local firefighting and medical services.
	Heritage Resources	Preservation of archaeological and heritage resource, if present in the spill area, could be adversely affected. Highly unlikely to result in these effects along Fraser River shoreline as well as unlikely to result in Boundary Passage or Haro Strait.
Human Health ²⁵⁶	Potentially affected from exposure to contaminated fish. However, following a spill warning would immediately be issued to not consume fish until determined to be safe. Therefore, exposure considered negligible.	

²⁵⁶ This table summarizes the environmental effects of potential accidents and malfunctions. The Human Health effect captured in this table is related to chemical pathways to Human Health.

Accident and Malfunction	Valued Component	Environmental Effects
Vessel LNG Release	Air Quality, Greenhouse Gas Emissions and Visual Quality	Without ignition, the LNG would quickly disperse and have negligible effects on air quality. There would be a water vapour cloud formation causing poor visibility. With ignition, the resulting fire would release combustion emissions, affecting air and visual quality. However, effect would be local and short-term (hours to days).
	Vegetation	LNG is not persistent in the environment and is expected to dissipate. Plants may be affected by LNG (freezing) and fire but expected to regrow and recover within a few years.
	Wildlife and Wildlife Habitat	Wildlife in close proximity could be killed or injured; however, unlikely to have to population effects.
	Water Quality	Surface water within a few hundred metres of the spill may freeze or result in a subsequent pool fire, being considered moderate (short-term) effects due to temperature changes; however, as ice melts effects on water quality would be negligible (LNG would volatilize)
	Fish and Fish Habitat	Fish in immediate vicinity may freeze and also be killed or injured by heat from fire; however, this is not expected to lead to population-level effects.
	Marine Mammals	Potential injury or asphyxiation in immediate vicinity at surface of water; however, considered infrequent and fully reversible for all marine mammal populations with the exception of the SRKW.
	Marine Birds	Those in close proximity could be killed or injured from freezing if in contact with water or asphyxiation if flying through the evaporating LNG vapour; however, unlikely to have to population effects.
	Economy, Land and Marine Resource Use and Current Use of Land and Resources for Traditional Purposes	Potential damage to infrastructure and facilities in vicinity of LNG release may affect goods movement and transportation; however, should be short (hours to days). Potential restriction of marine/ fishing area access and use, (short – hours to days), potential vessel, gear, property damage and damage to cultural sites and features (medium – year to few years), presence and availability of fish and seafood for commercial and recreational harvesting (short), availability and quality of preferred current use resources (high) guided sport fishing, presence and availability of marine mammals for tourism (whale watching; long-term), quality of current use experience (high), and effects to the recreational marine environmental setting.
	Socio-community	Potential strain on local emergency services in the event of a fire or explosion; however, limited and short-lived.
	Heritage Resources	Archaeological and heritage resources in the immediate vicinity of LNG spill and fire could be adversely affected. Residual effects along the Fraser River shoreline are highly unlikely; however, there is potential for adverse effects due to grounding near Discovery and Chatham Island.
	Human Health ²⁵⁷	Effects due to air quality would be negligible, as any methane or combustion emissions would be rapidly dispersed.
Vessel Collision with Smaller Vessels	Marine Resource Use	Potential to range from minor damage to small vessels to vessel replacement. Compensation would be provided by insurance carried by affected vessel owners. Potential for high magnitude of effect based on business revenue reductions incurred for commercial vessels and higher magnitude for related to an Indigenous person or community.
	Current Use of Land and Resources for Traditional Purposes	Potential damage to or loss of vessel or gear engaged in current use activities. Potential temporary interruption to access to preferred current use location and resources. Depending on vessel and capacity of Indigenous group the effect for current use could be of high magnitude and potentially medium to long-term.

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²⁵⁷ This table summarizes the environmental effects of potential accidents and malfunctions. The Human Health effect captured in this table is related to chemical pathways to Human Health.