



ENVIRONMENTAL ASSESSMENT OFFICE

THE NEW FRASER RIVER CROSSING PROJECT

ASSESSMENT REPORT

With Respect to:

Issuance of an Environmental Assessment Certificate Pursuant to
the *Environmental Assessment Act*, SBC 2002, c. 43

and

Fulfilment of the Requirements of a Screening Report Pursuant to
the *Canadian Environmental Assessment Act*, SC 1992, c. 37

**Prepared by
Environmental Assessment Office**

June 16, 2004

TABLE OF CONTENTS

Acronyms and Abbreviations	i
EXECUTIVE SUMMARY	iii

PART A INTRODUCTION

1. BACKGROUND	1
2. PURPOSE OF THIS REPORT	1
3. ENVIRONMENTAL ASSESSMENT PROCESS	2
3.1 PROVINCIAL PROCESS	2
3.2 FEDERAL PROCESS	2
3.3 FEDERAL/PROVINCIAL HARMONIZATION	3
3.4 OVERVIEW OF THE HARMONIZED REVIEW PROCESS	3
4. PROJECT INFORMATION	5
4.1 PROJECT PROPONENT	5
4.2 PROJECT DESCRIPTION	6
4.3 PROJECT JUSTIFICATION/BENEFITS	8
4.4 PROJECT ALTERNATIVES	9

PART B INFORMATION DISTRIBUTION AND CONSULTATION

5. ACCESS TO REVIEW DOCUMENTATION	11
6. PUBLIC CONSULTATION	11
6.1 MEASURES UNDERTAKEN BY THE PROPONENT	11
6.2 MEASURES UNDERTAKEN BY THE EAO	12
6.3 PUBLIC FEEDBACK	13
6.4 CONCLUSIONS	14
7. FIRST NATIONS CONSULTATION	15
7.1 MEASURES UNDERTAKEN BY THE PROPONENT	15
7.2 MEASURES UNDERTAKEN BY THE EAO	17
7.3 FIRST NATIONS FEEDBACK	18
7.4 CONCLUSIONS	18

PART C REVIEW OF THE APPLICATION

8. ENVIRONMENTAL EFFECTS	19
8.1 FISHERIES AND AQUATIC RESOURCES	19
8.2 VEGETATION, WILDLIFE HABITAT AND WILDLIFE	22
8.3 CONTAMINATED SITES	29
8.4 CONCLUSIONS	30

9.	ECONOMIC, SOCIAL, HERITAGE AND HEALTH EFFECTS.....	31
9.1	AGRICULTURAL RESOURCES.....	31
9.2	COMMUNITY AND SOCIO-ECONOMIC EFFECTS	36
9.2.1	Neighbourhoods.....	37
9.2.2	Transportation.....	40
9.2.3	Construction.....	41
9.2.4	Navigation.....	43
9.3	AIR QUALITY AND HEALTH	45
9.4	NOISE.....	49
9.5	ARCHAEOLOGICAL RESOURCES	52
9.6	CONCLUSIONS.....	54
10.	FIRST NATIONS INTERESTS.....	54
10.1	FISHING.....	55
10.2	HUNTING	61
10.3	GATHERING	63
10.4	CULTURAL HERITAGE SITES AND PRACTICES	64
10.5	PRIVACY	67
10.6	NOISE.....	68
10.7	AIR QUALITY AND HEALTH	71
10.8	OTHER COMMUNITY EFFECTS.....	74
10.9	CONCLUSIONS.....	76
11.	ENVIRONMENTAL MANAGEMENT.....	79
11.1	CONCLUSIONS.....	80
12.	FEDERAL <i>CEAA</i> REQUIREMENTS	80
12.1	ENVIRONMENTAL EFFECTS OF THE PROJECT.....	81
12.2	ACCIDENTS AND MALFUNCTIONS.....	81
12.3	EFFECTS OF THE ENVIRONMENT ON THE PROJECT	82
12.4	CURRENT FIRST NATIONS USE OF LAND AND RESOURCES	82
12.5	CUMULATIVE ENVIRONMENTAL EFFECTS.....	82
12.6	CONCLUSIONS.....	83
13.	PERMITS, LICENCES AND AUTHORIZATIONS	84

PART D CONCLUSIONS

14.	Conclusions.....	85
FIGURE 1.	NEW FRASER RIVER CROSSING PROJECT ROADWAYS	7
APPENDIX A	PROPONENT’S TABLE OF COMMITMENTS AND ASSURANCES	88

Acronyms and Abbreviations

The following acronyms and abbreviations are used in this Assessment Report:

Act or <i>BC EA Act</i>	<i>B.C. Environmental Assessment Act</i>
ALC	Agricultural Land Commission
ALR	Agricultural Land Reserve
Application	Application for an Environmental Assessment Certificate (including both the New Fraser River Crossing and Abernethy Connector components, unless otherwise stated)
AQMP	Air Quality Management/Monitoring Plan
BMPs	Best Management Practices
CAAR report	<i>New Fraser River Crossing Project: Comparative Assessment: Archaeological Resources</i> (March 2003)
CACs	criteria air contaminants
<i>CEAA</i>	<i>Canadian Environmental Assessment Act</i>
CEA Agency	Canadian Environmental Assessment Agency
CO	carbon monoxide
Connector	Abernethy Connector
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CTA	Canadian Transportation Agency
CWS	Canadian Wildlife Service
dBA	decibels
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EAO	Environmental Assessment Office
EC	Environment Canada
EMP(s)	Environmental Management Plan(s)
EMS	Environmental Management System
FHA	Fraser Health Authority
FHWA	U.S. Federal Highway Administration
FRPA	Fraser River Port Authority
GHG	greenhouse gases
GSC	Geodetic Survey of Canada
GVRD	Greater Vancouver Regional District
GVTA	Greater Vancouver Transportation Authority (or TransLink)
ha	hectare
HC	Health Canada
km	Kilometre(s)
KUS	<i>Katzie Land Use, Occupancy and Impact Assessment Study</i>
L_{eq}	equivalent sound level
LWBC	Land and Water BC
m	Metre(s)
MAFF	Ministry of Agriculture, Food and Fisheries
MSBED	Ministry of Small Business and Economic Development

MoT	Ministry of Transportation
MWLAP	Ministry of Water, Land and Air Protection
MSRM	Ministry of Sustainable Resource Management, Archaeology and Registry Services Branch
NAC	U.S. Federal Noise Abatement Criteria
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NWPD	Navigable Waters Protection Division, Transport Canada
PM	total particulate matter
PM ₁₀	inhalable particulate matter
PM ₂₅	fine particulate matter
Project	New Fraser River Crossing and Abernethy Connector
Proponent	Greater Vancouver Transportation Authority (TransLink) / Fraser Bridge Project Ltd.
PWS	Pacific water shrew
RoW	Right-of-Way
SO ₂	sulphur dioxide
SFPH	South Fraser Perimeter Highway
Supplement	Application Supplement, including assessment of the Abernethy Connector
TC	Transport Canada
TDM	transportation demand management
ToR	Terms of Reference for the Proponent's Application
VOCs	volatile organic compounds

EXECUTIVE SUMMARY

Background

On August 1, 2003, the Greater Vancouver Transportation Authority (the Proponent), also known as TransLink, submitted an application to the Environmental Assessment Office (EAO) for an Environmental Assessment Certificate for the New Fraser River Crossing Project (Project), pursuant to the *Environmental Assessment Act*. The Application was screened for completeness by government agencies, and based on feedback, was modified by the Proponent. In its finalized form, dated September 15, 2003, it was made publicly available. Subsequently, on November 27, 2003, the Proponent submitted a Supplement to the main Application which provided additional information on the Project, and in particular, additional information on the Abernethy Connector. Following a screening, the Application Supplement (dated December 1, 2003 in its final form) was also made publicly available. The Project also triggered a federal Screening under the *Canadian Environmental Assessment Act*. On February 13, 2004 the Proponent created a wholly owned subsidiary, the Fraser Bridge Project Ltd., to be responsible for the construction and operation of the Project, and requested that, if an EA Certificate is granted, it be issued to that new entity.

Description of the Project

The Project entails approximately 13.4 kilometers of new roadway, and includes the construction of a new six-lane tolled bridge crossing the Fraser River, new controlled access four-lane arterial roads on both sides of the River, overpasses crossing the Canadian National and Canadian Pacific Railway lines and Terasen pipeline right-of-way, as well as road upgrades to improve traffic flows and facilitate the integration of the new crossing into the existing road network. The crossing is located east of the Port Mann Bridge, and connects the Districts of Maple Ridge and Pitt Meadows on the north shore with the City of Surrey and the Township of Langley on the south shore. The Project includes the Abernethy Connector, which will run north from the Lougheed Highway interchange along the Pitt Meadows-Maple Ridge municipal boundary, then turn east into the District of Maple Ridge. Construction is anticipated to begin in late 2004 with completion in 2007.

The capital cost of the Project is estimated to be \$600 million, and the Project will generate an estimated 6,500 person years of construction employment.

Project Rationale

Since 1993, regional transportation plans have recognized the need for added north-south capacity to address the anticipated growth in travel demand, and to improve the connectivity of the regional transportation network.

The Project will provide significant time saving benefits for those local travelers who currently drive between Maple Ridge/Pitt Meadows and Surrey/Langley. Current average peak-hour trip times are estimated to be between 60 and 75 minutes. The New Fraser River Crossing will offer significantly shorter trip times between the municipal centres, with an

estimated peak-hour time saving in the 20-to-30-minute range. The more direct link will also improve public transit linkages across the river, as well as the response time for emergency services, and enable the adjacent municipalities on opposite sides of the river to more efficiently utilize their emergency services resources.

Public Consultation

The Proponent engaged in a comprehensive program of public notification and consultation. Proponent consultations with the public began in December 2001. In the early phases of Project design, meetings were held to gauge public attitudes towards, and support for, the proposed Project, and to provide people with an opportunity to provide feedback. In an April 2002 summary report, the Proponent concluded that there was strong public support for the proposed tolled river crossing. These initial meetings also served to identify issues to be addressed in further studies of alignment options, which were completed during 2002.

In January 2003, the Proponent implemented a comprehensive public communication and consultation process on the results of the comparative studies of two river crossing options - a bridge crossing option and a bridge/tunnel option - and the proposed road alignment. Communications were comprised of: open houses; public meetings; a Project information line to answer questions and record feedback from the public; a web page on the GVTA web site, including Project information and feedback questionnaire that could be faxed or mailed back; meetings with community groups on specific alignment issues; and distribution of information via letters and brochures to a comprehensive list of stakeholders.

In September 2003, the EAO established a sixty-day public comment period on the EA Application, and in November 2003, a thirty-four day public comment period on the Application Supplement, which included the Abernethy Connector. The EAO received 37 submissions from the public commenting on the Project. Comments principally focussed on the potential impacts on property owners related to property values, noise, and access.

The Proponent responded individually to all public comments on the Project and continues to maintain a proactive communications program to keep communities informed and to address Project related issues.

First Nations Consultation

The Proponent engaged in an extensive First Nations notification and consultation program. The Proponent consulted with all potentially affected First Nations, starting in December 2000, and shared preliminary feasibility studies.

Regular meetings were held with those First Nations who expressed an interest in ongoing involvement with the Project (the Katzie, Semiahmoo and Kwantlen First Nations), to allow them to comment on planning and development. Regular written communication was also provided, updating all First Nations on all aspects of the Project.

Following submission of the Application, the Katzie First Nation participated in the Socio-economic/Community and Biophysical/Technical Working Groups that reviewed the Project, and provided comments. The Proponent funded a Katzie Traditional Use Study, and a consultation MOU that included resources for the Katzie to retain a technical advisor to assist in the environmental assessment. The Proponent and the EAO jointly funded technical assistance for the Katzie First Nation in reviewing the Application Supplement, which included the assessment of the Abernethy Connector.

Summary of Findings of the Environmental Assessment

The following summarizes the key issues and findings from the EA review of the Project.

Environmental Effects

- *Fisheries and Aquatic Resources:* The Project will adversely affect fish habitat of several watercourses, and this will require authorizations under the federal *Fisheries Act*. Options for habitat compensation have been identified that are feasible/achievable. Final compensation requirements and details will be determined prior to authorizations being issued by Fisheries and Oceans Canada for Project construction.
- *Vegetation, Wildlife Habitat and Wildlife:* Most ecosystems in the Project area have previously been altered through past and ongoing land development/uses. Taking into account proposed mitigation and compensation, potential effects from the Project on vegetation, wildlife habitat and wildlife species (including the Pacific Water Shrew, which is a species of concern) are not considered to be significant. Options for compensation of wildlife habitat have been identified that are feasible/ achievable, and details will be finalized prior to start of Project construction.

Economic, Social, Heritage and Health Effects

As with any significant development in a built-up area, there will be localized effects from the Project which will likely have negative impacts on specific properties and their owners or occupiers, even taking into account proposed mitigation measures. However, the alignment and design of the Project minimizes the number of properties that would be subject to economic and social effects, and the overall numbers are low. The proposed approaches to construction and operation of the Project, and the impact management and mitigation measures identified, are expected to minimize the magnitude, duration, extent and frequency of any adverse effects.

- *Agricultural Resources:* Approximately 46 hectares of land in the Agricultural Land Reserve will be affected by the Project, of which approximately 24 hectares will be permanently lost as a result of the footprint of the Project. The Project will impact several existing commercial farms within the Agricultural Land Reserve, and will pose concerns for some individual farmers. These impacts are expected to be resolved through property transactions, mitigation measures and/or other agreements made between the Proponent and the owners/operators, subject to the oversight of the Agricultural Land Commission.

- *Community and Socio-Economic Effects:*
 - *Neighbourhoods/Property Owners:* With mitigation measures, visual, shadow and privacy impacts from the Project will still be experienced by some property owners.
 - *Property Acquisition* - As a result of the alignment of the Project, approximately 133 properties will be impacted, either through partial or outright property purchases. Of these, 91 properties are commercial, industrial or agricultural, while 42 are residential (it will be necessary to demolish 11 houses). The compensation provisions associated with TransLink's powers of expropriation set the legal framework for the property acquisition process.
 - *Transportation:* Some local property owners/occupiers and businesses will experience access changes arising from the closure and realignment of roads needed to accommodate the Project. Final details of the configuration of the couplet system accessing the south side of the bridge need to be discussed further with the Township of Langley.
 - *Construction:* Periodic, temporary road closures and disturbance during construction activities, such as noise and dust, may result in local public concerns being voiced, varying from sporadic to widespread complaints by affected individuals to concerted action by community organizations. The intent is to mitigate and manage these effects through the implementation of various environmental management plans and measures, and monitoring.
- *Navigation:* The final bridge design, including vertical and horizontal bridge clearances, will be required to meet Transport Canada navigational requirements to satisfy the majority of Fraser River marine users/traffic and minimize impacts to navigation.
- *Air Quality and Health:* Once the Project is in operation, all air quality parameters are predicted to meet air quality standards within a short distance from Project roadways.
- *Noise:* The Ministry of Transportation's policy for mitigating the effects of traffic noise will be applied to the Project, and mitigation measures have been identified that are feasible/achievable. It is predicted that, as a result of the Project, by years 2016/2017 approximately 95 more residences in the Project area will experience some increased noise from traffic that will exceed the limits which Health Canada recommended for the noise impacts of this Project. As per the requirements of the MoT Revised Noise Policy (1993), follow-up noise monitoring will be conducted within one year following project completion in order to verify the accuracy of traffic noise projections and to assess the effectiveness of all mitigation measures.
- *Archaeological Resources:* A large, significant archaeological site has been avoided through the realignment of a Project roadway, and the site will be protected from disturbance during construction. Mitigation will be conducted on three smaller archaeological sites that cannot be fully avoided by the Project, in compliance with the *Heritage Conservation Act* and in consultation with First Nations.

First Nations Interests

The Project is located in the core area of the Katzie First Nation's claimed traditional territory, and is close to all three of their reserves, especially I.R. #1 which is where most on-

reserve members live. At its closest point, I.R. #1 is approximately 80 m from the Project corridor.

The Katzie identified a broad range of potential adverse heritage, economic, social, health and environmental effects that could result from the Project, and some of these have not been resolved to their entire satisfaction, inasmuch as they cannot be entirely eliminated. These include: potential disruption of their asserted traditional Fraser River drift-net salmon fishery and their hunting activities on Barnston Island; and noise, air quality, privacy and visual effects on their reserves. Government agencies are satisfied that the Proponent has considered all reasonable measures to avoid or minimize effects through relocation, redesign and other impact management measures.

Recognizing that it would be difficult to completely eliminate all of the residual effects from development of the Project, and that the extent of these will not be known until the final design of the Project or its construction has been completed, the Proponent and the Katzie have been negotiating an economic benefits agreement - negotiations are currently ongoing.

In addition, the Proponent is committed to continuing to work on an ongoing basis with the Katzie First Nation to address its aboriginal interests and concerns relating to the Project. These include providing opportunities for Katzie input prior to decisions about the final configuration of the bridge, and the securing of employment, training and contracting opportunities and other economic benefits from the Project.

Conclusions

The Districts of Maple Ridge and Pitt Meadows, the Township of Langley, and the City of Surrey have accepted the alignment of the Project, with the exception of the potential for a minor variation of the Couplet connecting to the south end of the bridge in Langley. Final details of the alignment of the Project at this location will be resolved between the Township of Langley and the Proponent after Project certification.

Impacts of the Project on fish and fish habitat and on Pacific water shrew habitat are expected to be compensated for in Unnamed Creek. Noise, air quality, and other socio-community impacts have been mitigated to the extent possible.

With respect to impacts on agricultural operations, the Agricultural Land Commission and the Ministry of Agriculture, Food and Fisheries have accepted the alignment of the Project, with the exception of an approximately 0.5 kilometre section of the Abernethy Connector in Maple Ridge, where they have accepted a 100 metre wide corridor within which the final alignment of the roadway will be established at the permitting stage, if the Project is granted an EA Certificate.

The Katzie First Nation has indicated that the Proponent has not fully addressed many of its concerns, and that the Project will have residual effects, even taking into account proposed mitigation measures. The EAO and federal Responsible Authorities note that the Proponent has proposed, and committed to federal and provincial agencies to implement, numerous

location, design and other impact management measures. The EAO and federal Responsible Authorities are satisfied that these measures will minimize effects to the extent practicable, given that final design details for the Project will not be known until after the Project receives an EA Certificate and, through a bidding process, the Proponent has selected a party with which to enter into a design/build arrangement to deliver the Project. They are also aware that the Proponent and the Katzie are attempting to negotiate an economic benefits agreement, comprising cash compensation and job, training and contracting opportunities for Katzie, and that negotiations are continuing.

In conclusion, the EAO and federal Responsible Authorities are satisfied that:

- the Application and Application Supplement, together with additional information subsequently provided at the request of these agencies, adequately identified and assessed the potential significant adverse environmental, economic, social, heritage, and health effects of the Project;
- public and First Nations consultation, and the distribution of information about the Project, have been adequately carried out by the Proponent;
- issues identified by the public, First Nations and federal, provincial and local government agencies, where they were within the scope of the EA, were adequately addressed by the Proponent during the review of the Application; and
- practical means have been identified to prevent or reduce to an acceptable level most potential significant adverse effects arising from the Project, and appropriate compensation measures are proposed where an acceptable level of impact management is not achieved solely by means of Project design and implementation measures.

PART A INTRODUCTION

1. BACKGROUND

On August 1, 2003, the Greater Vancouver Transportation Authority (GVTA) also known as TransLink (Proponent), submitted an application to the EAO for an Environmental Assessment (EA) Certificate for the New Fraser River Crossing Project (Project), pursuant to the *Environmental Assessment Act*, SBC 2002, c. 43 (Act). The Application was screened and modified, and in its final form (dated September 15, 2003), was made publicly available. Subsequently, on November 27, 2003, the Proponent submitted a Supplement to the main Application which provided additional information on the Project, and in particular, additional information on the Abernethy Connector. The Application Supplement (dated December 1, 2003 in its final form) was also made publicly available.

The Project was also subject to federal review under the *Canadian Environmental Assessment Act (CEAA)*, since approvals are required under the *Fisheries Act*, the *Navigable Waters Protection Act* and the *Transportation Act*.

2. PURPOSE OF THIS REPORT

This Assessment Report documents the environmental assessment review of the Project under the BC *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*. The purpose of this report is to:

- describe the Project;
- summarize the process for the review of the Application;
- report on the adequacy of distribution of information by the Proponent during the review of the Application;
- report on whether the Application has adequately identified and assessed the potential adverse environmental, economic, social, heritage or health effects of the Project, including potential effects on First Nation interests;
- summarize the issues considered during the review of the Application; and
- report on whether practical means have been identified to prevent or reduce to an acceptable level any potential significant adverse effects of the Project.

This report describes Project effects and proposed mitigation measures, as reported in two documents submitted to the EAO by the Proponent - the Application and the Application Supplement. In this report, we refer to both documents as the Application.

3. ENVIRONMENTAL ASSESSMENT PROCESS

3.1 PROVINCIAL PROCESS

The Proponent has applied for an EA Certificate under the Act because the proposed Project is a reviewable project under part 5, Table 9 of the *Reviewable Projects Regulation* (B.C. Reg. 370/02). A section 10 Order, confirming that the Project will require an EA Certificate in order to proceed, was issued by the EAO on March 18, 2003.

A decision on whether an EA Certificate will be issued for the Project will be made by the Minister of Sustainable Resource Management, the Minister of Community, Aboriginal and Women's Services (Responsible Minister for the Project), and the Minister of Water, Land and Air Protection, following their review of this Report. If an EA Certificate is issued, the Proponent will then need to obtain various specific permits, licences and other approvals in order to construct and operate the Project – see summary listing in section 13 of this Report.

3.2 FEDERAL PROCESS

A project is subject to the *Canadian Environmental Assessment Act*, SC 1992, c. 37 where a federal authority either: proposes a project; sells, leases, or otherwise transfers control or administration of land to enable a project to be carried out; contributes money or any other form of financial assistance to a project; or exercises in relation to the project a regulatory duty (such as issuing a license, permit or approval) that is listed in the *Law List Regulations*.

This Project will require the federal government to exercise a regulatory duty under section 35(2) of the *Fisheries Act*, under section 5(1) of the *Navigable Waters Protection Act*, and under section 101(3) of the *Transportation Act*, all of which are listed in the *Law List Regulations*. Each of these legal instruments is included on the *Law List Regulations*, thus triggering *CEAA*.

The Canadian Transportation Agency (CTA) did not participate actively in the review of the Project as a Responsible Authority, although it did review key documentation during the screening process.

Responsibility for the *Navigable Waters Protection Act* (NWPA) was transferred from the Minister of Fisheries and Oceans to the Minister of Transport on March 29, 2004. As a result, TC is now identified as a Responsible Authority. Review of the impact of the Project on navigation was conducted by the Navigable Waters Protection Division (now a division of TC). Pursuant to the EA protocol between TC and DFO for the transition period from March 29 to October 1, 2004, the substantive review of other environmental impacts of this Project and preparation of the *CEAA* Screening Report was undertaken by DFO. TC supports conclusions drawn by DFO throughout this document regarding adverse effects.

The *CEAA* review of the Project is a screening-level assessment, and the Responsible Authorities are DFO, TC and CTA.

3.3 FEDERAL/PROVINCIAL HARMONIZATION

The *Canada/British Columbia Agreement for Environmental Assessment Cooperation* provides for coordinated environmental assessment processes to avoid uncertainty and duplication where a project is subject to review under the *BC EA Act* and *CEAA*. For cooperative reviews, the *CEAA* assessment is conducted using the process established by the *BC EA Act*, and the results are documented in a common environmental assessment report.

Pursuant to the Agreement, the federal government was invited by the EAO to comment on key documents prepared by the Proponent. Representatives of the federal government sat on the two technical working groups set up by the EAO to ensure that issues of federal concern were identified and addressed during the review of the Project.

At the conclusion of the EA review, each government will make their respective decisions regarding approval of the Project. The two decisions will be made on the basis of shared information gathered and analyzed through the single review process. To complete a screening under *CEAA*, the federal Responsible Authorities are basing their *CEAA* conclusion on relevant factors reported in this Assessment Report, and on other requirements for federal decision-making.

3.4 OVERVIEW OF THE HARMONIZED REVIEW PROCESS

Pre-Application Phase

The pre-application phase formally commenced with the issuance of a section 10 Order for the Project on March 18, 2003. The section 10 Order specified that an EA certificate is required for the Project. Public, First nations and government agency consultations conducted at the pre-application phase were intended to ensure a full scoping of the issues raised by the Project, so that these would be adequately reflected in the terms of reference set for the Proponent's EA Application.

To facilitate the involvement of federal, provincial and local government agencies and any potentially affected First Nations, the EAO established two advisory working groups – the Socio-economic/Community Working Group and the Biophysical/Technical Working Group. Although all potentially affected First Nations were invited, only the Katzie First Nation actively participated in the work of the working groups. The role of the working groups was to provide policy and technical expertise throughout the review process, from the perspective of the mandates of the individual member organizations. Participants in the working groups were as follows:

Socio-Economic/Community Working Group Membership

Local Government

City of Surrey
Township of Langley
District of Pitt Meadows

District of Maple Ridge

Provincial Government

Environmental Assessment Office (EAO)
Ministry of Small Business and Economic Development (MSBED)
Ministry of Agriculture, Food and Fisheries (MAFF)
Agricultural Land Commission (ALC)
Fraser Health Authority (FHA)

Federal Government

Canadian Environmental Assessment Agency (CEA Agency)
Health Canada (HC)

First Nations

Katzie First Nation

Bio-physical/Technical Working Group Membership

Local Government

City of Surrey
District of Pitt Meadows
Greater Vancouver Regional District (GVRD)

Provincial Government

Environmental Assessment Office (EAO)
Ministry of Agriculture, Food and Fisheries (MAFF)
Agricultural Land Commission (ALC)
Fraser Health Authority (FHA)
Ministry of Water, Land and Air Protection (MWLAP)
Ministry of Sustainable Resource Management (MSRM)
Ministry of Transportation (MoT)

Federal Government

Canadian Environmental Assessment Agency (CEA Agency)
Health Canada (HC)
Environment Canada (EC)
Fisheries and Oceans Canada (DFO)

First Nations

Katzie First Nation

On June 23, 2003, the EAO issued a procedural order under section 11 of the Act, specifying the scope of the assessment and the methods and procedures to be undertaken for the Project. The order set the scope of project (see below, section 4.2 for more details), and also indicated that the scope of the assessment would be established by means of finalized terms of reference for the Application. In general terms, the scope of the EA assessment was defined to include potential environmental, economic, social, heritage and health effects of the Project, including potential effects on First Nations interests. The assessment of the Project was required to take into account practical means to prevent or reduce to an acceptable level any potential significant adverse effects. The order provided for the Proponent to submit a main Application, and a later Application Supplement.

The EAO prepared a draft of the Application Terms of Reference (ToR) which outlined the proposed information requirements for the Application, based on earlier issue scoping activities. The ToR were intended to include all of the identified issues which were deemed to fall within the scope of the EA process, and for which information was required so that review participants could effectively consider the effects of the Project. Included in the ToR were factors specifically required under *CEAA* in order for RAs to reach a conclusion on the likelihood of the Project causing significant adverse environmental effects. These *CEAA* topics included accidents and malfunctions; effects of the environment on the Project; current use of land and resources for asserted traditional purposes by aboriginal persons; and cumulative environmental effects. The ToR were vetted by the two technical working groups, and were approved on July 4, 2003.

Application Phase

The Proponent filed its Application on August 1, 2003, and following a screening by the EAO and federal Responsible Authorities, during which working group members were also invited to screen the document, the Application was accepted for review by the EAO on September 2, 2003 (in its finalized form, it was dated September 15, 2003). The Application Supplement was submitted on November 27, 2003, and following a brief (one-day) screening, was accepted for review by the EAO on November 28, 2003 (in its finalized form, it was dated December 1, 2003). Public comment periods were held on both documents, to allow the public the opportunity to comment on the Project, and the Proponent held several open houses and public meetings in local communities. The two technical working groups also conducted detailed reviews of both submissions.

4. PROJECT INFORMATION

4.1 PROJECT PROPONENT

The Proponent for the Project is the Greater Vancouver Transportation Authority (GVTA), also known as TransLink. The GVTA was created in 1998 by the *Greater Vancouver Transportation Authority Act* (Bill 36) to plan and finance a regional transportation system that moves people and goods efficiently and supports the regional growth strategy, air quality objectives and economic development of the Greater Vancouver Regional District (GVRD). The GVTA jurisdiction encompasses 21 municipalities and one electoral area within the Greater Vancouver area.

On February 13, 2004 the GVTA created a subsidiary, Fraser Bridge Project Ltd., to be responsible for the construction and operation of the Project. The GVTA as the sole shareholder of the subsidiary, will set the regulatory framework for bridge toll rates and collection, and will retain ownership of the property and right-of-way. The GVTA has requested that, if an EA Certificate is granted, it be issued in the name of Fraser Bridge Project Ltd.

Many of the commitments made by the Proponent with respect to the Project are of a long-term nature, and will extend beyond the construction phase of the Project. If a Certificate is granted by Ministers in the name of Fraser Bridge Project Ltd., then as a contingency in the event that Fraser Bridge Project Ltd. ceases to be an entity, the Certificate should provide for the responsibility for implementing all remaining commitments to default to the GVTA, unless a new holder of the Certificate is named through procedures followed under section 19 of the *BC EA Act*.

4.2 PROJECT DESCRIPTION

The location and basic layout of the Project is shown in Figure 1.

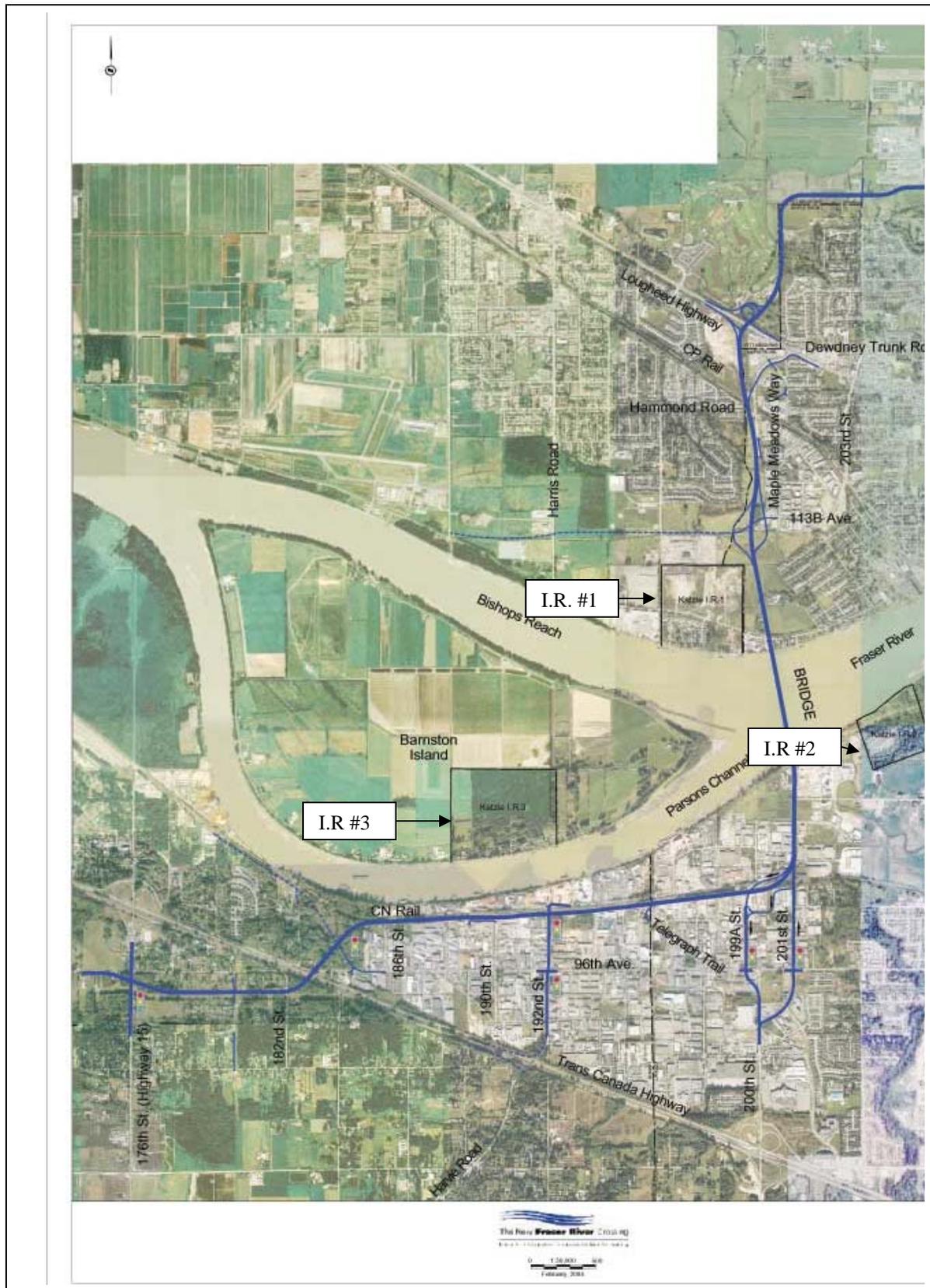
The Project includes the construction of a new six-lane tolled bridge crossing the Fraser River (River), new controlled access four-lane arterial roads on both sides of the River, as well as road upgrades to improve traffic flows and facilitate the integration of the new crossing into the existing road network. “Controlled access” means that access is provided only at specific points or intersections and there are no lanes or driveways onto or off from Project roadways.

The bridge crossing is located east of the Port Mann Bridge and connects the Districts of Maple Ridge and Pitt Meadows on the north shore with the City of Surrey and the Township of Langley on the south shore. The length of this component of the Project, from its connection to Highway 15 in Surrey to the Lougheed Highway in Pitt Meadows, is approximately 10.5 km, including approximately 2 km connecting roads.

The Project also includes the approximately 2.9-km Abernethy Connector (Connector) which extends from the interchange at Lougheed Highway in the District of Pitt Meadows, to a connection with 128th Ave at 210th street in the District of Maple Ridge. The Connector runs north along the Pitt Meadows-Maple Ridge municipal boundary, then turns east into the District of Maple Ridge.

Construction is anticipated to begin in late 2004, with completion in 2007. The capital cost of the Project is estimated to be \$600 million, and the Project will generate an estimated 6,500 person years of construction employment.

Figure 1. New Fraser River Crossing Project Roadways.



Scope of the Project

For the purpose of the environmental assessment, the section 11 Order defined the scope of the Project to include the following on-site and off-site physical works, as well as the activities associated with construction, operation and maintenance of these works:

- (a) the physical works which will be constructed, including:
 - (i) the new bridge;
 - (ii) any road development in a new right-of-way (RoW) or road widening or relocation along an existing RoW;
 - (iii) modification of existing access roads to and from the bridge and its access roads (whether through reconstruction, relocation, elimination or other changes);
 - (iv) development of new road-related structures and excavations, and modification of any existing structures and excavations (whether through additions, removals or other changes) – examples would include the grade separations over the Canadian National and Canadian Pacific Railway lines, and across the Terasen pipeline RoW; and
 - (v) development or modification of water diversion and drainage structures serving the Project (whether through additions, removals or other changes);
- (b) methods and locations for disposal of rock, surplus material and other waste;
- (c) construction, use and maintenance of new ancillary facilities such as equipment storage and marshalling areas and gravel borrow areas, and any use, modification or decommissioning of any existing ancillary facilities for Project-related purposes;
- (d) ancillary road system modifications adjacent to the bridge and approach roads associated with construction, operation and maintenance of the Project;
- (e) off-site facilities such as any construction camps or other infrastructure services associated with and necessitated by implementation of the Project;
- (f) activities associated with the construction, operation and maintenance of the bridge and approach roads, including ongoing maintenance and traffic management; and
- (g) other physical works or activities which, in the view of the EAO's Project Assessment Director, form an integral part of the Project

4.3 Project Justification/Benefits

The need for an additional crossing was highlighted in 1993 by the GVRD in its Transport 2021 Long Term Transportation Plan, and again in 1997 in the British Columbia Transportation Financing Authority's (BCTFA) Lower Mainland Highway Systems Report. Building upon these regional transportation plans, the Proponent recognized the growing need for the New Fraser River Crossing in its 2000 Strategic Transportation Plan, where it was targeted for implementation between 2005 and 2010. Each of these plans recognizes the need for the added north-south capacity to address the anticipated travel demand growth and improve the connectivity of the regional transportation network.

The introduction of the proposed new crossing will provide significant time-saving benefits for those local travelers who currently drive between Maple Ridge/Pitt Meadows and Surrey/Langley. Current average peak-hour trip times are estimated to be between 60 and 75 minutes. The new Fraser River crossing will offer significantly shorter trip times between the municipal centres, with an estimated peak-hour time saving in the 20-to-30-minute range. The more direct link will also improve the response time for emergency services and enable the adjacent municipalities on opposite sides of the River to utilize their emergency services resources more efficiently.

4.4 PROJECT ALTERNATIVES

The concept of a new crossing of the Fraser River has been part of the provincial and regional transportation plan for a number of years and, as stated above, has been recognized in transportation plans dating back to the early 1990's. While these plans do not explicitly compare the proposed crossing to alternatives, their inclusion of a fixed link Fraser River crossing in this general location implicitly acknowledges the desirability of the new crossing over possible alternatives including:

- status quo;
- expanding the Fraser River Albion Ferry service;
- adding capacity to the Port Mann bridge along the Trans-Canada Highway;
- expanding transit services; and
- implementing other transportation demand management measures (TDM).

The Proponent concluded that none of the above alternatives would adequately meet the demand for north-south capacity between the growing municipalities on both sides of the Fraser River. The additional capacity to be provided by the New Fraser River Crossing Project was seen as complementing the existing TDM programs by improving access to mass transit facilities as well as increasing the options for cyclists and pedestrians.

In addition to examining alternatives to the Project as a whole, several corridor alternatives were considered, including crossings at Barnston, Cottonwood and Albion. Conceptual designs for each corridor option were developed, together with cost estimates, traffic flow projections and origin-destination information. Based on the review of alternatives, as well as consultation with the public, the 200th Street crossing (the proposed Project) was selected as the preferred option.

At the proposed crossing site, the Proponent did consider the option of implementing the Project entirely by means of tunnelling. The tunnel-only option was judged not to be feasible, given a number of adverse factors - excessive property requirements for its construction, significant disruptions of private property access and local road networks, risks associated with accommodating or relocating major utilities located along its alignment, longer construction duration, impact on the Katzie and Fraser River fishery during construction, major impacts on the river foreshore, and greater capital cost.

A Comparative Assessment Study which compared a bridge-only option to a bridge/tunnel option - the 200th Street Bridge-Only option and the Barnston Island Bridge/Tunnel

option – at the proposed crossing site was completed in the Spring of 2003. After weighing various economic, environmental, First Nation and technical feasibility considerations, the 200th Street Bridge option was selected by the Proponent as the preferred option for the New Fraser River Crossing Project.

PART B INFORMATION DISTRIBUTION AND CONSULTATION

5. ACCESS TO REVIEW DOCUMENTATION

The EAO maintains an electronic Project Information Center, available through the EAO website (<http://www.eao.gov.bc.ca>), for the purpose of facilitating public access to information on the EA reviews of projects. The Application and other information related to the review of the Project, such as documentation and correspondence provided by the Proponent about the Project, and comments received from the public, First Nations and government agencies, were posted on this website.

The Proponent also made brochures available at each open house, with Project-related information, and continues to maintain an information phone line as well as a website with current information. The Proponent also made hard copies of the Application available at local libraries and municipal halls.

6. PUBLIC CONSULTATION

6.1 MEASURES UNDERTAKEN BY THE PROPONENT

The public consultation program for the Project consisted of three phases, each corresponding to a different Project management context.

Phase 1, “Project Definition”, began in December 2001 and continued to March 2002. The primary consultation goals were to determine the nature and extent of support for a new tolled crossing in the 200th Street corridor, and to identify issues that would need to be addressed, should the Project proceed. Phase 1 culminated with release of the Proponent’s summary report in April 2002, which concluded there was strong public support for the proposed tolled crossing, and for the use of tolls to pay for construction and operation of the Project.

Phase 2 began in April 2002, and will continue until Project implementation begins in 2004 (if an EA Certificate is granted). Phase 2 is divided into three stages:

- Stage 1, which began in April 2002 and ended in March 2003, involved a comparative assessment of two main crossing options within the 200th Street corridor - the 200th Street Bridge-Only Option and the Barnston Island Tunnel Option. As noted above, this stage concluded with publication of a summary report, and selection of the 200th Street Bridge Option as the preferred alignment on March 28, 2003.
- Stage 2, which began in April 2003 and continued to July 2003, resulted in refinements to the selected 200th Street Bridge alignment.
- Stage 3, which began in August 2003, includes the review of the Application, subsequent adjustments to the alignment, and resolution of any remaining mitigation

issues with affected neighbourhoods. The Proponent's stated consultation goals are to: facilitate public participation in the environmental assessment process; resolve mitigation issues with neighbourhoods affected by the alignment; and define the public consultation/communication approach to be used for a subsequent Phase 3.

Phase 3, which would apply if an EA certificate is granted, covers the implementation phase, and includes detailed design and construction by the builder(s). This phase will focus on communication and response relating to anticipated construction issues (e.g. noise and traffic disruption). The related division of responsibility between the Proponent and the Developer is not yet fully determined.

Overall, the Proponent's consultation program has:

- identified and facilitated the involvement of people who were interested in and/or affected by the Project;
- provided the public with information about route options and related comparative assessment considerations; and
- incorporated participants' input in developing an alignment and associated road network intended to best meet and balance the needs and interests of affected communities.

Consultation Results

The Proponent's outreach program has been extensive, reaching over 5000 people through three public forums, three open houses and town hall meetings, participation in community events, and fifty-one individual meetings with agencies and community groups. The Proponent also hosted a series of design workshops to bring together community residents, businesses, municipal staff, and environmental groups to provide input on possible design elements for the roadway connections and bridge.

The public has demonstrated great interest throughout the entire process, with at least 676 calls being received on the Proponent's Project telephone information line, 2050 questionnaires being submitted, and more than 79,000 hits on the Proponent's website.

6.2 MEASURES UNDERTAKEN BY THE EAO

In accepting the Application for review, the EAO evaluated the adequacy of the Proponent's program of public consultation. The EAO was satisfied that sufficient steps had been taken by the Proponent to include public input in the preparation of the Application. The EAO directed the Proponent to prepare a more detailed public consultation plan for review and approval, prior to commencement of the formal public comment periods on the Application and Application Supplement.

The EAO established a sixty-day formal public comment period on the Application (from September 24 to November 24, 2003). A notice of the EA review of the Project and public comment period was advertised in several newspapers, including the *Vancouver Sun* and the

Vancouver Province, as well as local papers, and was posted on the EAO website (the electronic Project Information Centre).

The EAO also established a thirty-four day public comment on the Application Supplement (from December 9, 2003 to January 12, 2004). A notice of the EA review of the Supplement and public comment period was advertised in the same newspapers as the Application notice, and also posted on the EAO website.

The EAO received 37 public comments during the two formal public comment periods, and the Proponent responded to all of these comments. The public comments received, Proponent's responses, and tables summarizing the issues and responses are posted on the EAO website.

6.3 PUBLIC FEEDBACK

The following summarizes the key issues and concerns raised about the Project by the public, and how these have been addressed. These issues are discussed in more detail under Part C of this report - Review of the Application.

1. A potentially major impact of the Project will be the visual, shadow and privacy impacts on residents abutting the RoW and related structures. Development of the Project will affect the views from a number of homes on both sides of the River. The Proponent has committed to preparing a Landscape Design Plan to address visual and privacy issues. Design measures will vary by location, but would include berming, noise walls, landscaping, plantings and visual screening.
2. Several sections of the alignment and connecting road network have been questioned at various stages of the Project planning process. The Proponent's response is that it has consulted extensively with all communities, and has made numerous adjustments to the alignment based on input received.
3. Public concern was raised with respect to air quality and public health impacts. The Proponent responded that, although there are some potential health risks associated with traffic emissions from the Project, these risks are low, especially compared to existing individual health risks reported in local studies and other risks faced by the average individual on a daily basis.
4. Some concern has been raised regarding the potential noise impacts for residents located along the alignment. The Proponent has conducted noise studies to identify areas where mitigation is required. Potential mitigation techniques, such as quiet pavement, noise walls, vegetative screening and berms, will be implemented in accordance with cross-province MoT noise guidelines for public roads.
5. Property acquisition has been an on-going issue with residents whose properties are directly affected by the Project alignment. Proponent representatives have been available at all public events to discuss the property acquisition process, and to answer questions, and will be dealing with individual property owners on a one-on-one basis. Approximately 133 properties will be impacted either through partial or outright property purchases.

6. The public raised various construction-related issues, including access restrictions, noise, property acquisition, emergency services, travel, and fisheries. The Proponent proposes to address these issues by means of the following measures:
 - Development of a Construction Traffic Management Plan as part of the construction process, to assist in mitigating impacts at the local scale. The plan will identify means to minimize the adverse affects of construction, including maintaining access.
 - The establishment of a local area Construction Advisory Committee (since renamed the Community Liaison Committee), made up of representatives of municipalities, local communities, and businesses, to deal with construction phase access and other issues of concern.
 - Development of a Communications Plan to convey this information to the communities, businesses and road users.
 - Development and staffing of a Project drop-in centre, where residents can obtain current information on the Project.
 - Refraining from night construction in residential areas.
 - Minimizing noise and dust impacts – various specific commitments are made.
 - Staggering construction along the alignment in order to concentrate the impacts in terms of location and duration.
7. Community members wish to be kept informed, and want to have input into the final design of the Project. The Proponent will require the Contractor/Operator to provide information to the public in the Project area on the design of the Project. Public feedback will be incorporated into the final design, where applicable. The Community Liaison Committee will provide a forum to assist the Proponent with resolving Project issues.

6.4 CONCLUSIONS

The EAO is satisfied that sufficient steps have been taken by the Proponent to inform and consult the public at various steps in the process. The EAO is also satisfied that public comments received during the environmental assessment process have been adequately considered in the assessment.

Practical means have been identified to prevent or reduce to an acceptable level potential adverse effects, although these will not be entirely eliminated. As is the case with projects of this type, there will be localized effects from the Project that will likely have negative impacts on specific properties and their owners or occupiers. The selected alignment and design of the Project minimize the number of properties that would be subject to economic and social effects, and the overall numbers affected are low. As well, the proposed approaches to construction and operation of the Project, and the impact management and mitigation measures identified, will minimize the magnitude, duration, extent and frequency of adverse effects.

7. FIRST NATIONS CONSULTATION

7.1 MEASURES UNDERTAKEN BY THE PROPONENT

Early in the planning of the Project, the Proponent recognized the need to ensure that the Project considered its potential impact upon First Nations, and identified ways to minimize, mitigate or accommodate for such impacts, where appropriate. Seven First Nations (the Katzie, Tsawwassen, Kwantlen, Kwikwetlem, Matsqui, Semiahmoo and Sto:lo First Nations) were initially identified as potentially being affected by the Project. The Proponent provided a dedicated First Nations Advisor to lead and coordinate First Nations consultation efforts and related processes. Consultation included in-person meetings, telephone calls, letters, faxes, emails, provision of Project-related information packages, and agreements.

While the Proponent has met with the Semiahmoo and Kwantlen First Nations, the Katzie First Nation has taken the most active interest and role in the Project. All seven initially identified First Nations were provided with regular updates throughout the review process, and with opportunities to meet with the Proponent. Several of these First Nations contributed to the archaeological work, but have chosen not to participate further in the review.

During the Application review phase, the Proponent undertook an extensive consultation and communication program with those First Nations that could potentially be affected by the Project. This program continued during the review of the Application Supplement on the Abernethy Connector, and included provision of information to all relevant First Nations, and face-to-face meetings and information exchange.

Consultation on Archaeological Resources

In March 2003, the Proponent's archaeology consultant produced a report entitled *New Fraser River Crossing Project: Comparative Assessment: Archaeological Resources* (CAAR report) which was produced working in conjunction with input from Katzie, Sto:lo, Tsawwassen, Semiahmoo and Kwikwetlem First Nations. The purpose was to determine if archaeological, heritage and asserted traditional use resources were present in the Project area and could be impacted by one or more of the Project options.

The CAAR report evaluated the potential impact of the following 3 options for a new crossing of the Fraser River:

1. a 200th Street bridge upstream of I.R. #1;
2. a tunnel under Barnston Island; and
3. a bridge with a 192nd Street connection.

Identification of archaeological, heritage and asserted traditional use resources allowed a comparison of the crossing options based on the distribution of these resources. Although not all areas were accessible for field study due to land ownership or inaccessibility, sufficient information was acquired to indicate that Option 2 was the least desirable from an

archaeological perspective, with Option 3 slightly preferred over Option 1. Option 3 was subsequently dropped from further consideration due to constraints unrelated to archaeology. Option 1 was selected for the Project, using a multiple account evaluation that included consideration of CAAR report findings.

Katzie First Nation

The Katzie have asserted traditional and current interests in the vicinity of the Project, including three reserves in the immediate vicinity (Pitt Meadows, Langley and Barnston Island). The Katzie have been a primary focal point for consultation and communication by the Proponent.

As part of the Proponent's consultation program with the Katzie First Nation, it:

- met regularly with the Katzie and exchanged Project information;
- negotiated a consultation MOU with the Katzie that provided resources for a technical advisor to assist in their participation in the environmental assessment;
- initiated development of a consultation agreement to address consultation during the construction and operational phases of the Project;
- provided resources to the Katzie for their direct participation in environmental, archaeological and heritage studies; and
- provided resources to the Katzie to develop the *Katzie Land Use, Occupancy and Impact Assessment Study* (KUS), and to provide comments relating specifically to the Application Supplement on the Abernethy Connector.

In addition, the EAO funded technical assistance for review of the Application Supplement on the Abernethy Connector, including identification of potential opportunities relative to Project activities.

The KUS highlights the continued connection of the Katzie to the River and to their surrounding territory. It is anticipated that the building and operation of the Project will impact some uses in some areas (see section 7.3 - First Nations Feedback).

Prior to submission of the Application, the Proponent held more than 30 meetings with the Katzie, as well as communicating by means of numerous telephone calls and e-mails. The Proponent was available to meet with the Katzie during review of the Application. The Katzie participated in consultations carried out during the comment period on the main Application in the fall of 2003, but did not submit detailed written comments on issues related to the contents of the Application at that time – they began to submit comments early in 2004, being funded to do so by the Proponent. The Katzie did participate in the review of, and did comment on, the Application Supplement on the Abernethy Connector, with funding jointly provided by the Proponent and the EAO.

The Proponent met regularly with the Katzie beginning on December 10, 2003 to discuss and negotiate a benefits agreement. Several meetings were held to discuss benefits and Project mitigation.

The Proponent has made commitments with respect to continued Katzie participation in the design, construction and operation of the Project (see section 9.5 - Archaeological Resources, and section 10 - First Nations Interests). These commitments are contained in the Proponent's Table of Commitments and Assurances (see Appendix A). If an EA Certificate is granted for the Project, the commitments in the Proponent's Table of Commitments and Assurances will be given the force of law – compliance with the commitments will be made a condition of the Certificate.

Semiahmoo First Nation

The Semiahmoo expressed some interest in ensuring that the Project considered their fishing interests, and their interests in archaeological sites. The EAO invited the Semiahmoo, as it did all of the other potentially affected First Nations, to participate in one or both of the working groups established by the EAO to assist in guiding the review of the Application, but the Semiahmoo did not do so.

Additionally, the Proponent met with the Semiahmoo, provided Project information to the Semiahmoo, and has made a standing offer to meet with them and provide them with briefings and additional information.

Other First Nations

The Proponent continued to contact and correspond with all originally identified First Nations, and maintained a standing offer to meet with them and provide them with briefings and information.

7.2 MEASURES UNDERTAKEN BY THE EAO

The EAO communicated on a regular basis with all First Nations, and provided them with written updates on progress of the review process. The EAO ensured that all Project documentation was sent to First Nations representatives, and that they were kept fully informed at all stages of the EA review. All First Nations were invited to sit on both of the advisory working groups.

The Katzie First Nation accepted the opportunity to sit on both intergovernmental technical working groups prior to the submission of the Proponent's EA Application, but, as noted above, did not review and comment in detail on the Application until some time after the comment period on that submission had ended. The Proponent and the EAO provided funding for Katzie to assist in their review of the Abernethy Connector Supplement, and to identify potential opportunities relative to Project activities. The EAO and the Katzie First Nation met on 8 occasions to discuss Project issues, including 3 meetings involving the Proponent, and 5 meetings involving various government agencies.

In accepting the Application for review, the EAO evaluated the adequacy of the Proponent's program of First Nations consultation. The EAO was satisfied that sufficient steps had been taken by the Proponent to include First Nations input in the preparation of the Application

and the Application Supplement, and that future consultation, as proposed in the Application, would be satisfactory provided that:

- ongoing consultations by the Proponent with First Nations included discussion of any aspects of the Application that First Nations consider incomplete; and
- future consultations by the Proponent met the requirements specified in the section 11 Order.

The Katzie continued to provide feedback and raise issues on the Project after the close of the formal public comment periods, and late into the review of the Application. On March 26, 2004, 169 days into the 180-day legislated review period for the Application, the EAO wrote to the Proponent, requesting additional information with respect to issues raised by the Katzie First Nation, as well as regarding other matters (Pacific water shrew impacts and required clarifications of various Proponent commitments). This request was supported by several federal agencies. To ensure adequate time to assemble, submit and review the additional requested information, the EAO suspended the time limit for the review of the Application for 73 days, bringing the legislated timeline back into effect on June 7, 2004, with 11 days left. During the period of timeline suspension, the EAO, federal agencies, and the Proponent continued to correspond with and meet with the Katzie to try to resolve their issues and concerns. As a result of these exchanges, the Proponent has made various additional commitments with respect to Katzie concerns which are reflected in its Table of Commitments and Assurances (see Appendix A).

7.3 FIRST NATIONS FEEDBACK

The comments on the Project provided by the Katzie First Nation and the Proponent's responses to these are discussed in section 10 - First Nations Interests. Despite the suspended time limit and additional time for review, discussion and meetings, and additional information and commitments provided by the Proponent, the Katzie First Nation is of the view that consultation and accommodation for potential Project impact on their interests have not been adequate, since not all of their issues and concerns have been addressed to their satisfaction.

7.4 CONCLUSIONS

The EAO and the federal Responsible Authorities are satisfied that sufficient steps have been taken by the Proponent to inform the First Nations at various steps in the assessment process, and that the Proponent satisfied First Nation consultation requirements in the preparation of the Application. The EAO and the federal Responsible Authorities are also satisfied that First Nations comments received during the EA review have been properly considered.

PART C REVIEW OF THE APPLICATION

8. ENVIRONMENTAL EFFECTS

8.1 FISHERIES AND AQUATIC RESOURCES

Potential Effects

The Application indicates that there is potential for adverse effects on fisheries and aquatic resources in the Fraser River and watercourses draining into the river from the north and south. Potential effects include permanent and temporary alteration, disruption and destruction/loss of fish habitat.

Effects can generally be grouped into three broad categories:

- impacts from the design footprint of the Project;
- impacts from construction activities; and
- impacts from operations and maintenance activities.

Design Footprint

The most significant impact on fisheries and aquatic resources would be the permanent loss of habitat resulting from the footprint of the Project. The placement of bridge piers, culverts, and road and interchange development will result in a total loss of approximately 65,000 m² of instream and riparian habitat along the main roadway south of the Lougheed Highway (including the Fraser River), and approximately 40,000 m² of instream and riparian habitat along the Abernethy Connector at various watercourse crossings. The Proponent proposes to provide/create sufficient new habitat to compensate for the loss of habitat.

Specific compensation requirements will be defined in an Authorization issued under section 35(2) of the *Fisheries Act*, to be developed between the Proponent and DFO. The Authorization will take into consideration the types, qualities and amounts of habitat that will be negatively affected by the Project, and will utilize this information to determine appropriate habitat compensation ratios.

The footprint of the Project will also result in the permanent alteration of fish habitat. The significance of impacts from the alteration of fish habitat in the Fraser River, as a result of changes to flow characteristics and bedload movements from bridge piers, is considered to be low. Permanent disruption of fish movement associated with the installation of bridge piers and culverts is not anticipated.

Construction

Construction impacts are generally considered to be short-term in duration, although the Project will take several years to complete. Construction activities have the potential to generate direct and indirect impacts on watercourses through the temporary loss of instream

habitat and riparian vegetation, temporary disruption to resident and migrating fish, and temporary alteration of water quality.

Temporary losses of fish habitat will occur in the Fraser River and smaller watercourses as a result of temporary construction structures, such as coffer dams and piers. The significance of these losses is considered to be low.

The operation of machinery and equipment, and presence of construction materials in and adjacent to watercourses has the potential to temporarily disrupt resident and migrating fish. However, with the delineation of environmentally sensitive 'no-work' areas (e.g. Fraser River foreshore habitats) and scheduling of activities around timing/work windows (e.g. juvenile fish out-migration and fish spawning), the significance of the impact is considered to be low.

Land-based and water-based construction activities have the potential to temporarily alter water quality, thereby affecting fisheries and aquatic resources. However, water quality impacts are unlikely with the application of Best Management Practices (BMPs), and the significance of any effects that may occur is expected to be low. Effects are expected to be of limited duration and consequence in the Fraser River, given the naturally occurring high levels of suspended sediment.

Operations

Contaminants deposited on road surfaces are washed off by rain into roadside ditches, storm systems and watercourses. Road/bridge operations (e.g. oil and grease from vehicles), maintenance activities (e.g. salting to de-ice), and the possible release of deleterious substances as a result of accidents/spills, have the potential to impact water quality and fisheries and aquatic resources.

"First flush" effects, where heavy rain succeeds a prolonged period of dry weather during which contaminants accumulate on pavement, are expected to be mitigated by the high annual precipitation in the area which maintains long-term low concentrations of contaminants in runoff. The likelihood that water quality will be permanently altered by the Project is low where watercourses are located within areas that are currently extensively developed. The addition of a biofiltration component to relocated ditches, and also proper maintenance of the local drainage system, will assist in mitigating temporary impacts.

The application of road salt is not expected to have a significant impact on the environment, based on local climatic conditions, and the frequency of use and application rate for the area. The implementation of operational procedures and an Emergency Response Plan are expected to offset potential impacts from accidental release/spill of deleterious substances.

Overall, operation/maintenance of the Project is not expected to permanently alter water quality or significantly impact fisheries and aquatic resources.

Mitigation

The Application describes overall strategies to address potential impacts of the Project on fisheries and aquatic resources that are consistent with DFO's *Policy for the Management of Fish Habitat*.

Route Selection

Project route selection considered avoidance of fisheries and aquatic resources, where possible. Refinements of the alignment were made to further avoid sensitive habitats such as the Leoran Brook mainstem. Design criteria were considered to ensure that conservation and protection objectives, such as fish passage and setback requirements, are achieved at watercourse crossing locations.

Best Management Practices

Mitigation measures and BMPs are identified that will prevent or reduce potential adverse effects during construction, such as undertaking work during specific times of the year when sensitive species are at a reduced level of risk, and measures to control soil erosion and instream sediment. A comprehensive environmental management plan (EMP) that addresses potential risks to fisheries and aquatic resources will be submitted by the Proponent to agencies for review and acceptance prior to start of construction.

Habitat Compensation

The Application indicates that the Project will cause destruction of fish habitat that cannot be avoided or mitigated, and identifies conceptual options for compensation that are feasible/achievable, including: creation of Fraser River foreshore embayment habitat; creation of new stream/slough habitat and enhancement of existing habitat; fish access improvement in Unnamed Creek; and improvement of water quality. Final habitat compensation and monitoring requirements will be detailed in an authorization required under the federal *Fisheries Act*, to be issued by DFO.

The Application concludes that, with mitigation and compensation measures, no residual adverse effects on fisheries and aquatic resources are expected from construction and operation of the Project.

Issues Raised and Proponent Responses

Issue: DFO expressed concern with the Proponent's proposed approach to estimating the amount of fish habitat compensation, because DFO had not reviewed or endorsed the weighting factors which the Proponent applied to fish habitat.

Response: The Proponent acknowledged that DFO policy will guide agreement on the amount and type of habitat compensation required for the Project, and noted that

the information provided in the Application was intended only as an aid to evaluating the significance of potential impacts.

Issue: DFO noted that there are no specific details about impacts from temporary structures, and requested identification of limits or criteria around what might occur.

Response: The Proponent responded that the Application provided information on temporary structures required for bridge construction, including temporary coffer dams for pier construction. Temporary structures for roadway construction are expected to be typical of construction of an arterial road, except that special works may be required to complete the Trans-Canada Highway underpass. Work plans that provide details on temporary works will be prepared prior to construction. Plans for temporary works that potentially affect fish or fish habitat will be submitted to DFO in support of an application for an authorization under section 35(2) of the *Fisheries Act*.

Issue: DFO raised concerns about a number of unresolved mitigation issues associated with the Project, in particular, those associated with the crossing structure at Lower Unnamed Creek and the 180th Street ditch relocation.

Response: The Proponent stated that minimum standards for the crossing structure will be finalized in conjunction with clarifying and finalizing the habitat compensation package. Information on the crossing structure at Lower Unnamed Creek, and additional detail on proposed works at the 180th Street ditch, will be submitted to DFO.

Conclusions

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not result in significant adverse effects on fisheries and aquatic resources.

8.2 VEGETATION, WILDLIFE HABITAT AND WILDLIFE

Potential Effects

Ecosystems in the Project area have been considerably altered through past and ongoing land uses, and forest, wetland and riparian habitats have been lost and fragmented. The Application indicates that there is potential for adverse effects on vegetation, wildlife habitat and wildlife from the footprint of the Project, construction activities and operations/maintenance. Potential effects include: permanent loss, alteration and

fragmentation of vegetation and habitat; impacts on wildlife movement; and wildlife disturbance and mortality.

Vegetation

Approximately 13 hectares (ha) of remnant natural vegetation would be permanently lost as a result of the footprint of the Project, and there could be minor temporary loss of vegetation in adjacent areas during Project construction. These areas do not represent unique or especially sensitive plant communities, no red-listed (rare) plant species have been confirmed, and degradation has occurred from the proliferation of weedy and invasive plant species. Three red-listed plant communities occur in the Project area. These are at a structural stage that is common in the region, and the reduction in cover from the Project is not considered to be significant.

Wildlife Habitat

From a wildlife perspective, the most valuable habitats in the Project area are woodlots and riparian zones. The permanent loss of approximately 13 ha of natural habitat resulting from the footprint of the Project would potentially have long-term indirect impacts on wildlife. However, the loss is not expected to significantly affect any particular species or population of common wildlife occurring in the area. Most species in this area are typical of this part of the Fraser River Valley, and are not particularly susceptible to population impacts. The permanent loss of habitat is small (< 1%) relative to the size of local regional parks, and proposed fisheries riparian habitat compensation, which would include features intended as wildlife habitat, would reduce the amount of habitat loss by approximately 5 ha.

Though areas temporarily disturbed by construction activities will be rehabilitated, the return to full productivity for the wildlife species presently supported by these habitats is unlikely due to an increase in existing habitat fragmentation. Habitat fragmentation will affect a larger area than the footprint of the Project and would potentially have long-term indirect and direct impacts on wildlife. Woodlots that are isolated into smaller blocks of habitat will have reduced suitability to support various wildlife species. However, these are not considered to be of critical importance to any listed species, and most of the woodlots that would be affected by the Project are on privately owned property, and will ultimately be impacted by development.

Wildlife

Potential direct impacts on wildlife from the Project include impacts on movement as a result of isolation of habitat blocks, mortality resulting from collisions with vehicles, and disturbance from construction activities and traffic noise during operation. Most direct impacts on wildlife will have been realized once the Project is operational, approximately three years after construction.

Impacts on wildlife as a result of construction activities are expected to be of short-term duration. Disturbance effects will affect breeding activities of birds and life activities of

smaller mammals. Mitigation for disturbance-associated impacts during construction is feasible, such as conducting site clearing of tree and shrub habitat outside of the bird-breeding season.

Wildlife road kills can increase substantially after winter de-icing salt applications because birds and animals move to roadsides to feed on the salt. The application of road salt during operation/maintenance of the Project is not expected to have a significant impact based on local climatic conditions, and the frequency of use and application rate occurring in the area.

Amphibians: There will be a long term reduction of up to 4,800 m² of riparian habitat that is suitable for the red-legged frog, though this habitat loss may be reduced through fisheries habitat compensation measures. Red-legged frogs are blue-listed for this region. The reduction and alteration of habitat is of significance locally, but not regionally or provincially. The Application reports that impact avoidance is not feasible. Mitigation and compensation will include the use of open bottomed culvert structures or bridges (Unnamed Creek), planting of suitable riparian vegetation adjacent to watercourse crossings, and creation of small wetland ponds.

Reptiles: Three species of garter snakes occur in the Project area. Impacts from habitat loss are predicted to be long term but localized. Specific mitigation measures are not considered necessary, however, measures implemented for other species related to aquatic and riparian habitat may also benefit garter snakes.

Raptors: Impacts of the Project on raptor species are related to the loss of established nest sites, roosting sites, foraging terrain and disturbance effects during construction and operation. Impacts are predicted to be localized and unlikely to affect regional populations. Mitigation options include monitoring nest sites for use during construction, and placement of artificial perching and nesting sites within the Project area. Blue-listed Barn owls, which are breeding residents in the area, have a nest site in proximity to the Project, and are subject to direct mortality from collision with vehicles. The nest structure will be relocated or replaced sufficiently far away from the Project.

Other Birds: Impacts on waterfowl and most other aquatic birds are largely limited to short-term disturbance of migrating and wintering waterfowl along the Fraser River during construction. According to the Proponent's Application, the effects of construction or habitat loss on the blue-listed great blue heron are expected to be minimal – field studies did not confirm the presence of this bird along the alignment. With respect to green heron (also blue-listed), although no individuals or nesting sites were found along the alignment, this bird would be expected to occur in the area. Any potential long-term, localized impacts on green heron, such as loss of riparian foraging and/or nesting habitat in the vicinity of Unnamed Creek and Katzie Slough, can be mitigated through the proposed restoration of riparian habitat, as well as through fish habitat compensation – this would also benefit great blue heron, if affected. Fish habitat compensation requirements, by enhancing riparian cover and micro-habitat for fish and amphibians which provide food for herons, will also offset localized heron habitat losses elsewhere. The smaller bird species recorded in the Project

area are common in the region, and none are red-listed. Mitigation for habitat loss specific to these species is not considered necessary by the Proponent.

Mammals: Impacts on mammals are related directly to habitat loss and further fragmentation of remaining habitat units. Impacts are considered to be long-term, but localized. The Pacific water shrew is listed in Schedule 1 of the federal *Species At Risk Act* – Schedule 1 came into effect at the beginning of June 2004. The potential for impact on this species from the Project is related to the loss of riparian habitat, and is considered long-term and of local and potentially regional significance. Fisheries habitat compensation measures will be integrated with the habitat needs of this shrew. A major realignment of the Project was undertaken to protect existing habitat for the shrew in the vicinity of Unnamed Creek (discussed below in greater detail under issues raised by EC-CWS). A trapping program to confirm presence/absence was undertaken in areas south of the Lougheed Highway and none were found. Further sampling is required for the Abernethy component of the Project. If presence is confirmed, the Proponent has committed to implement reasonable mitigation measures, as agreed with applicable regulatory agencies, prior to commencement of construction.

Mitigation

Project route selection and alignment considered a variety of environmental parameters and, where possible, has generally avoided what remains of valuable natural wildlife habitat in the area. The Application concludes that the impacts on valued habitats (woodlots, riparian zones and raptor nest sites) from the Project ranges from none expected, not significant or of low significance, to no residual impact with mitigation.

For a project of this scale, located in a largely urbanized setting where mitigation measures are limited by land use and ownership, it is difficult to fully mitigate or compensate for loss of natural plant communities and wildlife habitat. Most of the woodlots that would be impacted by the Project are on privately owned property, and may be impacted by development in the long term, whether or not the Project proceeds.

Construction Phase

Design and construction-stage habitat/wildlife mitigation measures that would be implemented include:

- designing watercourse crossings at specific sites to minimize effects on riparian habitat and to incorporate elements that will enable continued habitat functioning;
- protecting adjacent riparian zones along specific watercourses;
- implementing BMPs at crossings during construction to minimize damage to riparian habitat and deterioration of water quality;
- designing the Fraser River bridge structure to provide artificial habitat for wildlife;
- applying construction timing windows for relevant bird species;
- monitoring raptor nests during construction;
- implementing a management plan for barn owls; and
- restoring disturbed habitats as quickly as possible following construction.

Operational Phase

For operation/maintenance of the Project, standard procedures similar to those of the Ministry of Transportation would be established. Specific habitat/wildlife mitigation measures would include:

- managing watercourse riparian zones that are protected through tenure as fish and wildlife habitat;
- managing vegetation in riparian habitats by physical means only;
- allowing tall grass (old field) habitat for small mammals and foraging raptors in grassed roadside areas; and
- monitoring during winter de-icing salt applications, if particularly sensitive species and or adjacent habitats are identified.

A comprehensive EMP that addresses potential risks would be submitted to agencies for review and approval prior to start of construction.

Conceptual habitat/wildlife compensation measures that would be implemented or pursued include:

- incorporating elements of habitat for wildlife into fish habitat compensation measures;
- securing and preserving property that encompasses specific watercourse crossings to compensate for impacts on woodlot habitats; and
- obtaining conservation status for some watercourse riparian habitat.

Specific compensation measures would be finalized prior to the start of operation of the Project.

Issues Raised and Proponent Responses

Issue: MWLAP requested additional information on potential effects on blue-listed plant species and communities.

Response: The Proponent indicated that studies focused on red-listed plant species and communities, since these are endangered or threatened. Blue-listed species are of concern because of characteristics that make them particularly sensitive to human activities or natural events. No mitigation or compensation for blue-listed plant species or communities, or red-listed plant communities is proposed, since these are not recognized or designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or under the federal *Species at Risk Act*. However, the Proponent agreed to undertake additional studies of blue-listed plant species and communities prior to the start of construction activities. If presence is confirmed, the Proponent has committed to implement reasonable mitigation measures, as agreed with applicable regulatory agencies, prior to commencement of construction.

Issue: MWLAP indicated that more frequent raptor nest monitoring might be needed at certain times during construction, and noted that section 34 of the *Wildlife Act* protects all heron and eagle nests, regardless of whether they are active or not.

Response: The Proponent committed to an adaptive approach to more frequent monitoring, and acknowledged that inactive nests of great blue herons and bald eagles are protected year-round.

Issue: EC-Canadian Wildlife Service (CWS) noted that the loss of vegetation and wildlife habitat in various coniferous and mixed forest stands is probably undervalued, and questioned the context for the Application characterizing these habitats as being degraded or of reduced value.

Response: The Proponent acknowledged the value of the remaining natural vegetation in the study area, in a local and regional context. The Proponent noted that while the reporting on habitat features of the area was accurate (i.e. the habitat primarily consists of isolated woodlots located on private property in an urban setting where increased development is expected in the future), mitigation and compensation for Project impacts have been identified.

Issue: EC-CWS expressed concerns over the adequacy of proposed wildlife habitat compensation.

Response: The Proponent identified options for compensation of wildlife habitat and made specific commitments. Other options exist for compensation that are feasible/achievable. Any final compensation requirements for wildlife habitat would be resolved/negotiated between the Proponent and CWS prior to start of construction.

Issue: EC-CWS expressed concerns over the potential for impacts on the Pacific water shrew (PWS) from the Project at Unnamed Creek, located on the south side of the Fraser River in Surrey, and the need to consider draft best management practices/guidelines for this species. The PWS is listed for protection in Schedule 1 under the federal *Species At Risk Act*.

Response: The Proponent made the following commitments to address concerns for this species.

Any adverse effects on species listed in Schedule 1 of the *Species at Risk Act* will be avoided or lessened in compliance with section 79(2) of that Act. A mitigation and monitoring plan for applicable Schedule 1 listed species will be developed and implemented. The mitigation/monitoring plan will be provided to CWS and MWLAP for their review and comment prior to commencement of construction in relevant affected areas.

Noting Figure 1-3 of Volume 1, section C of the Application for an Environmental Assessment Certificate (September 15, 2003), the Project intersection with the 96th Avenue Connector and the proposed South Fraser Perimeter Road will be shifted

approximately 30 m to the west to provide an approximately 75-m buffer zone (greenbelt) between the 96th Avenue Connector and the eastern (main) tributary of Unnamed Creek. The Project mainline crossing of Unnamed Creek will be a bridge located at the existing, Terasen (formerly Trans-Mountain Pipelines Ltd.) pipeline. Unless otherwise agreed to by DFO and CWS:

- The bridge will have a minimum clear span of 55 m.
- The minimum horizontal (i.e. “setback”) distance between the wetted channel of Unnamed Creek and the FRC bridge substructure (i.e. each bridge end abutment) will be 15 m.
- The minimum vertical clearance of the bridge (i.e. between bridge ends, the minimum distance from the underside of the bridge to existing ground level) will be 3 m.
- Fill that may be required to achieve the vertical clearance will be contained at the abutment to reduce the area of the Project footprint in the vicinity of the creek.
- The bridge abutments will be vertical.
- The bridge will include a minimum gap of 1.5 m between the eastbound and westbound lanes.
- Irrigation under the bridge (e.g. using bridge/roadway drainage) will be implemented as necessary to mitigate the rain shadow effect of the bridge. If bridge/roadway drainage is used for that purpose, measures will be implemented to address water quality.

Appropriate mitigation measures (e.g. fencing) will be developed and implemented to protect PWS during Project operation. At a minimum, mitigation will include installation of a barrier or other measure(s) to prevent PWS-vehicle collisions. Proposed mitigation measures will be submitted to CWS and MWLAP for review and comment prior to implementation. Follow-up monitoring, as per guidelines issued under *CEAA*, will be undertaken to track the effectiveness of installed mitigation measures. Monitoring results will be provided to CWS and MWLAP. Depending on monitoring results, additional mitigation may be added as agreed between relevant parties.

Unauthorized motorized vehicle access to the Unnamed Creek crossing compensation area along the Terasen pipeline right-of-way will be restricted.

Properties along Unnamed Creek between 96th Avenue and the CN Rail line will be acquired and permanent conservation status (e.g. a covenant) will be established for the parts of those properties not required specifically for road works (i.e. for the Project and for the possible future South Fraser Perimeter Road).

In addition, the Proponent will make best efforts to achieve conservation status for as much as possible of the land along Unnamed Creek between the CN Rail line and the creek’s confluence with Fraser River (e.g. through land acquisition, restrictive covenant or other institutional arrangement) within the financial parameters agreed between the Proponent and CWS. If conservation status for Unnamed Creek north of

the CN Rail line cannot be achieved within the agreed financial cap, the Proponent will instead allocate funding for the purpose of securing conservation status for other land as agreed between the Proponent and CWS, that cost being subject to the same financial cap as agreed for Unnamed Creek north of the CN Rail line.

Issue: Public concern was raised with regard to the introduction of a new road into an agricultural area in the Abernethy corridor, and the potential of inviting more subdivisions to encroach on wildlife habitat.

Response: The Proponent noted that growth management plans for the area are developed by the District of Maple Ridge, and any urban development on agricultural land is subject to approval by the Agricultural Land Commission. With regard to Project impacts on wildlife, the Proponent re-affirmed that wildlife studies have been undertaken to identify how potential impacts can be minimized or avoided and what compensation would be required.

Issue: A member of the public noted that dragonflies inhabit shoreline aquatic habitats that may be impacted by the Project, and requested an inventory of rare dragonflies and their breeding habitats in the Project area. If present, appropriate mitigation and/or compensation measures, was recommended. This request was supported by MWLAP, given the possibility raised by the that writer that blue-listed or red-listed dragonfly species may be present.

Response: The Proponent responded that potential impacts on dragonflies and their habitat(s) will be avoided during Project implementation, since these values will benefit from the overlap with other identified terrestrial and aquatic habitat values where mitigation and/or compensation measures have been proposed. The Proponent has committed to undertaking the suggested inventory prior to construction.

Conclusions

The EA review of the Project, as described above, has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not result in significant adverse effects on vegetation, wildlife habitat and wildlife.

8.3 CONTAMINATED SITES

The Proponent initiated a limited environmental site assessment to identify and evaluate the potential to encounter significant liabilities related to soil and/or groundwater contamination along the Project route. The Application indicates that the potential for soil and/or groundwater contamination along the route was evaluated (through a partial stage 1 preliminary site investigation), and that this information was used for alignment selection,

defining property acquisition strategies and estimating RoW costs. There were no known or recorded contaminated sites along the alignment prior to the assessment. The assessment determined that the alignment included 9 high risk and 23 moderate risk sites. None of these sites would be acquired for RoW, and all are down-gradient of the Project. Contamination concerns related to the Abernethy Connector component of the Project were determined to be low.

Any necessary more detailed assessments would be carried out in accordance with applicable legislation and regulations at the time of Project implementation, and as agreed between parties involved in property transactions. These assessments would further characterize potential contaminated sites in advance of final design and construction to eliminate/minimize the degree to which contaminated material may be encountered, or to allow preparation of appropriate contaminated materials handling and remediation procedures in advance of construction.

Typical construction activities where contaminated soil or groundwater may be encountered include excavation for roadways, bridges, pier foundations, installation of new underground utilities, or where dewatering may be required. A Contaminated Soils/Groundwater Management Plan would be developed prior to start of construction. Any contamination caused by activities during construction would be characterized and cleaned up.

Conclusions

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not result in significant adverse effects on or from contaminated sites.

8.4 CONCLUSIONS

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not have a significant adverse effect on the environment.

9. ECONOMIC, SOCIAL, HERITAGE AND HEALTH EFFECTS

9.1 AGRICULTURAL RESOURCES

The Project area south of the Lougheed Highway extends through the eastern fringe of a large block of Agricultural Land Reserve (ALR) land that is not currently cultivated. Most of these lands are acknowledged by the ALC to be in transition to urban uses, notwithstanding their current designation within the ALR. Agricultural sensitivity for this segment of the Project is identified as low in the Application.

The portion of the Project area north of the Lougheed Highway, the Abernethy Connector, is located almost entirely within the ALR. The Application indicates that much of the ALR land that would be intercepted by the Connector has already evolved from agricultural use to rural residential use, while other areas remain in commercial agriculture. The land use pattern in the study area consists of expanses of urban development surrounded by large blocks of ALR land. Overall, the northern portion of the Project area is identified in the Application as having high agricultural sensitivity.

Potential Effects

Potential impacts on agriculture from the Project, as identified in the Application, include permanent impacts associated with the loss or severance of agriculturally sensitive lands, disruption of/interference with farm facilities/operations and temporary loss of agricultural land from construction activity.

Permanent Impacts

The permanent loss of agricultural land between the Fraser River and the Lougheed Highway Interchange is predicted to include 16 ha of ALR land, and 6 ha of non-ALR land in agricultural use (a horse boarding operation).

Affected ALR lands are either remnants likely to be designated for exclusion and re-development in the future or lands retained in long-term golf course use. The Application concludes that the loss of 22 ha of agriculturally sensitive lands (ALR land and non-ALR land in agricultural use) cannot be avoided or mitigated, but that this loss has no significance in a land use, local or regional context. The Agricultural Land Commission (ALC) has not indicated the need for any requirements to be met under its Net Benefit to Agriculture Framework (ALC Handbook), and no specific impact management measures have been proposed.

North of the Lougheed Highway, the Abernethy Connector passes through four major commercial agricultural operations, including farms that have been continuously operated by the same farm families for more than a hundred years. In this section of the Project, most areas of agriculturally sensitive lands are inside the ALR, but some of this land is not

currently in use for agricultural purposes. The permanent impact on ALR land, without mitigation, is predicted to be approximately 30.2 ha. This is comprised of:

- permanent loss of 8.3 ha of ALR land as a result of the footprint of the Project that cannot be mitigated;
- without mitigation, 7.2 ha of ALR land permanently severed (future agricultural use impossible or very unlikely); and
- without mitigation, 14.7 ha of ALR land operationally severed (existing farm use is constrained because of access limitations that usually persist indefinitely and are effectively permanent, although these lands would not be lost to future potential agricultural use).

The severance effects on some properties are more pronounced than others. These are listed below.

In the case of the Formosa Nursery farm, the alignment cuts the farm into two large pieces on either side of the RoW. Functional access between the two remaining areas would still be possible, although this would raise a wide variety of safety, liability, licensing and circuitry issues. The Proponent has proposed to mitigate effects by accommodating the passage of wide farm machinery (up to 4.27 m or 14 ft.) across the Abernethy Connector at 203rd Street to allow crossing of the RoW.

The Project will also impact the Hughson property (currently leased to Veinotte Morgan Farm, which boards and trains horses). The loss of 1.2 ha of land, or 35% of the land, is expected to affect operations at the Veinotte Morgan Farm.

The Hampton farm will be impacted through a severance of approximately 10.3 ha from the main part of the farm. The severed area, which is presently used for forage production and pasture, would be located on the north side of the RoW, while the farm headquarters and main portion of the farm would be on the south side of the RoW. Functional access across the RoW would still be possible, although such access may not be safe. The Proponent has proposed to design and construct an overpass across the Hampton Farm to allow movement of farm equipment under the Connector.

The Laity property would be impacted through the loss of 0.3 ha. The main concern is how the Project would affect the farm's ability to continue to move machinery along 209th Street and over to 210th Street. The Proponent has proposed to design and construct a service road link along the south side of the Connector between 209th Street and 210th Street to create a 4-way intersection at 210th Street.

The Application identifies a wide variety of other potential permanent impacts on existing agricultural use within the Abernethy Connector corridor, but indicates that most of these can be mitigated. These impacts include:

- interception by the Project RoW of farm drainage ditches and installed field drainage;
- interception of farm irrigation systems;
- interception of farm buildings;

- interception of farm utilities, including power and phone lines, livestock watering facilities, and other water pipelines;
- interception of farm fencing;
- increased night-time light near light-sensitive cultivation;
- increased security concerns (protection of livestock, machinery, crops, fencing, buildings) related to the increased public access that the RoW would provide into and through the farm properties involved; and
- interference by the proposed roadway improvements with visibility across farm properties (reducing the ability of farm operators to check on farm labour, livestock, trespass, etc.).

Operation/maintenance of the Abernethy Connector has the potential to cause long-term impacts on commercial agricultural activities. Appropriate agriculture-sensitive roadway operation and maintenance procedures will be required to mitigate the following potential concerns:

- herbicide use for vegetative control along portions of the RoW adjacent to future certified organic farming operations could affect farm certification or necessitate additional buffer zones;
- poorly maintained RoW ditches which would be tied into the regional agricultural drainage system could cause localized flooding of adjacent farmland;
- poorly maintained RoW fences, leading to livestock escapement onto the RoW;
- lack of adequate maintenance and upkeep of the drainage and lighting systems at any farm underpasses provided as part of the Project; and
- increasing traffic levels, leading to increasing difficulties for farm machinery crossing proposed local street intersections.

Temporary Impacts

The Application indicates that an assessment of temporary impacts from construction would be completed during detailed planning, when construction management plans and schedules are available. Between the Fraser River and Lougheed Highway Interchange, there is potential for temporary severance of approximately 7 ha of non-ALR pastureland (a horse boarding operation) located west of the RoW. This property is slated for future development, and this loss is not considered to be significant from a land use, regulatory or local perspective. Within the Abernethy Connector component of the Project, construction activity will generally be confined to the RoW, although severances identified on three properties offer the opportunity for use as off-RoW temporary laydown areas.

Mitigation

The Application reports that agricultural regulatory issues for the Fraser River to Lougheed Highway Interchange component of the Project would be resolved through the ALC permitting process necessary to acquire RoW through ALR lands. No agricultural-sensitive highway operations or maintenance procedures would be required.

The Application concludes that this portion of the Project would not result in any significant residual effects on agricultural resources. However, the permanent loss of 6 ha and temporary severance of 7 ha from the above-noted horse boarding operation (non-ALR land) is potentially significant to the owner/operator of the property. Potential conflicts would be resolved through property transactions and mitigation or other agreements between the Proponent and the owner/operator. Issues involving operation of the golf course would also be resolved through agreement between the Proponent and the owner/operator.

The Application indicates that the Abernethy Connector will result in residual land impacts or net losses to local agricultural resources, but concludes that these losses would not be of regional significance. Current land uses and the small sizes of holdings diminish the potential for future commercial agricultural use, and the ALC has indicated that it would look favourably on exclusion applications to its office for some properties. The ALC has advised that, in reviewing an application to dedicate and construct the Connector through the ALR, it will look for evidence that the application proposes resolution of specific agricultural problems created by the route, demonstrates mitigation as necessary, and provides an overall benefit to agriculture. A conceptual option to offset residual impacts has been identified in the Application that will address existing flooding problems. The Application concludes that the Abernethy Connector would not result in any significant residual effects to agricultural resources, once offsetting benefits have been confirmed. Outstanding regulatory issues would be resolved through the ALC permitting process necessary to acquire RoW through ALR lands.

The Abernethy Connector would impact several existing commercial farms within the ALR, and pose concerns for some individual farmers, particularly if impacts are not mitigated to the full extent that is possible and practicable. It is anticipated that these impacts will be resolved directly through property transactions and mitigation or other agreements made between the Proponent and the owners/operators, subject to the oversight of the ALC. The Proponent's mitigation commitments include providing farm machinery and livestock underpass and ditch crossings, increasing the downstream capacity of municipal drainage ditches (possibly necessitating section 35(2) *Fisheries Act* authorizations), maximizing the width of the vegetative buffers, and replacing intercepted farm buildings and services. To avoid or mitigate operational impacts, agriculture-sensitive roadway operation and maintenance procedures would be implemented, including:

- no herbicide use for vegetative control along portions of the RoW adjacent to certified organic farming;
- regular maintenance and cleaning of RoW ditches which form part of the regional agricultural drainage system;
- regular maintenance and repair of RoW fences;
- regular maintenance and upkeep of the drainage and lighting systems of installed farm underpasses; and
- maintenance of light barriers which will shield light-sensitive operations (Pelton Reforestation farm).

Issues Raised and Proponent Responses

Issue: MAFF identified the potential for increased complaints about normal farm practices (e.g. odor, noise, dust, slow-moving vehicles, etc) as a result of increased traffic and public access/presence.

Response: The Proponent responded that, for the most part, the anticipated users of the Connector (including pedestrians and vehicle traffic) currently use other local rural roads that are already subject to the effects of farm operations. It is anticipated that the Connector will provide a more direct and faster route through the area, thereby reducing the duration of user exposure to these effects.

Issue: MAFF expressed concern about increased traffic levels along the Connector, which may increase difficulties for existing and future farms not assessed in the Application in moving farm machinery and animals.

Response: The Proponent noted that the area identified (128th Avenue extending east of 210th Street) is outside the scope of the Project, and within the jurisdiction of the District of Maple Ridge. It indicated that it had advised the District of this issue. The effect will be partially offset as a result of the Connector drawing traffic away from other nearby rural routes, thereby improving movement for farm operations in those other areas. The Proponent noted that one of the objectives of the Project planning process is effective integration with local roads, and it is working with District staff to achieve this regarding 128th Avenue.

Issue: MAFF noted that the Project may lead to greater pressure for non-farm use of farmland and further exclusions of land from the ALR.

Response: The Proponent acknowledged that greater pressure on ALR lands is a legitimate concern, and noted that highways along the margins of urban areas often become the boundaries between urban and agricultural areas. However, this is an incremental effect given the wide variety of other factors that influence ALR conversion (e.g. proximity to urban development, proximity to golf course development, history of allowed exclusions/subdivisions, local government land use plans, etc.).

Issue: The ALC and MAFF expressed concern over alignment options being considered for the Abernethy Connector west of 203rd Street (an approximately 0.5 kilometre long section) and impacts on agricultural lands (the Formosa Nursery farm).

Response: Agreement was reached between the Proponent and the agencies on a 100-m wide corridor in which the roadway would be located, rather than a specific alignment. The final alignment will be resolved based on input from the Districts of Maple Ridge and Pitt Meadows, the ALC and the land owner at the permitting stage, if the Project is granted an EA Certificate.

Issue: Public concern was raised regarding the proposed alignment along the Abernethy corridor, which will affect several farms, including two working Century farms.

Response: The Proponent clarified that only one Century farm is bisected by the alignment. The Connector bisects the Hampton historic farm, but skirts the Laity historic farm and the Pelton Reforestation farm. The alignment west of 203rd Street is being discussed with the municipalities and the ALC in an attempt to minimize the impact on the Formosa Nursery farm.

Issue: Public concern was raised with regard to the introduction of a new road into an agricultural area in the Abernethy corridor, and the potential of inviting more subdivisions to encroach on established neighborhoods.

Response: The Proponent noted that growth management plans for the area are developed by the District of Maple Ridge, and that any urban development on agricultural land is subject to approval by the Agricultural Land Commission.

Conclusions

The ALC and MAFF have accepted the alignment of the Project, with the exception of an approximately 0.5-km section of the Abernethy Connector, where they have accepted a 100-m wide corridor within which the roadway will be aligned, based on input from the Districts of Maple Ridge and Pitt Meadows, the ALC and the land owner at the permitting stage.

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not result in significant adverse effects on agricultural resources.

9.2 COMMUNITY AND SOCIO-ECONOMIC EFFECTS

In spite of the alignment's relatively short length, the Project directly affects four municipalities, the City of Surrey and Township of Langley in the south, and the Districts of Pitt Meadows and Maple Ridge in the north. The Project is also in close proximity to Katzie Reserve #1 on the north side of the River.

The Proponent's assessment of impacts on communities was grouped into four broad categories:

- neighborhood impacts;
- transportation impacts;

- construction impacts; and
- navigation impacts.

Below are the findings, as reported in the Application.

9.2.1 Neighbourhoods

On the south side of the River, the route largely traverses the Port Kells commercial area through the northern portions of Surrey and Langley Township. On the north side of the River, the alignment follows Katzie Slough, which acts as a natural barrier between neighborhoods in Pitt Meadows and Maple Ridge. The Abernethy Connector is located in an area characterized by a mix of rural residential and agricultural uses.

Potential Effects

The Application discusses three key issues which relate to neighborhood impacts: community cohesion; properties purchased and partially purchased; and visual, shadow and privacy impacts.

Community Cohesion

The Application describes community cohesion impacts as referring to the degree to which the Project bisects or cuts through neighborhoods. It also refers to the degree to which the use and enjoyment of an individual's home or property is affected. Overall, Project design has attempted to minimize community cohesion impacts. Despite this, as with many major highway projects in built-up areas, there will be localized impacts which negatively affect individual property owners and which will not be fully mitigated or compensated for.

The Project route will be visible from adjacent properties, which will be subject to an increase in traffic noise. These factors will negatively affect residents' use and enjoyment of their homes. A total of approximately 120 properties could be affected in one way or another. This figure does not include homes that will need to be purchased.

Properties Purchased and Partially Purchased

A total of 118 properties (not including the Connector) will require purchase by the Proponent, 30 requiring outright purchase, and 88 requiring partial purchase. More than half of these properties (65) are in Surrey. Langley has 36 properties requiring acquisition but most of these are partial purchases. Maple Ridge has 13 affected properties and Pitt Meadows has four affected properties. Property acquisition costs have been estimated at about \$50 million, with 20 percent of this total associated with residential property acquisition.

The 'outright purchase' properties will require acquisition from the property owner at a negotiated price, set within the legal framework of the Proponent's powers of expropriation. The 'partial purchase' properties will also require that the property owner sell the portion of

the property required for the RoW. Properties which are 'partial purchase' will likely continue to be affected by the proximity of the Project. In the case of residential properties, there will likely be noise and visual issues. Some of these impacts can be mitigated by such techniques as berming, landscaping, barriers, screens, etc. For commercial/industrial properties, there may be impacts on access and parking, and limitations to future expansion.

In terms of impacts on businesses, there are numerous businesses which are in close proximity to the alignment in all four affected municipalities. In total, 78 businesses are expected to require full or partial purchase. Seventy of the businesses are classified as industrial and eight as commercial. Nineteen businesses will need to be purchased in their entirety.

Along the Abernethy Connector, property is required from a total of 15 property owners, plus the Maple Gardens Golf Course. The total property required for the RoW is approximately 8.5 ha. There are several large lot rural residential properties in the Abernethy area which will be affected as the alignment runs between or through several agricultural properties – see section 9.1 – Agricultural Resources - for discussion. Visual, light intrusion and privacy impacts will be felt by some homes in this vicinity.

Visual, Shadow and Privacy Impacts

The landscape within the study area is an urban valley abutting the Fraser River. The visual quality of the area in terms of its naturalness is limited on the south shore due to the extensive industrial development that has occurred.

The specific visual, shadow and privacy impacts, as described in the Application, are discussed below (also see section 10.4 - Cultural Heritage Sites and Practices, and section 10.5 - Privacy):

- *South Port Kells (Surrey)*: There are a number of properties located within 100 m of the alignment, and several within 50 m of the alignment. Some visual and privacy impacts would be likely to occur, based on proximity to the Project.
- *Walnut Grove (Langley)*: Views from a few residences along 98A Avenue at the western edge of Walnut Grove may include part of the Project structure as it elevates over the CN tracks.
- *Port Hammond (Maple Ridge)*: Views may be impeded for the residents located on Wharf Street /Hazelwood Street, and for some residents in the western section of the Port Hammond community who currently have distant views to the west.
- *Wildwood Crescent (Pitt Meadows)*: There are several properties in the southeast corner of this development which are within 100 m of the Project alignment. However, these homes are screened from the alignment by trees.
- *Hammond Road (Pitt Meadows)*: The homes at the eastern end of Hammond Road at the CP Rail crossing will be very close to the Project. Due to the elevated crossing of CP Rail, the Project will be visible to a number of homes in this neighbourhood. Shadow and privacy impacts are likely to occur at this location.
- *Telep (Maple Ridge)*: There are several properties located approximately 100 m from the alignment at the western edge of the community. Residents currently have a

westward view of the golf course driving range and the Lougheed Highway. The Lougheed Highway interchange will be visible from the western end of the Telep neighbourhood.

Generally, with regards to the Abernethy Connector, the alignment is at grade and the visual, shadow and privacy impacts will affect fewer properties.

Mitigation

To address the community and neighbourhood impacts of the Project, the Proponent has committed to continuous involvement of residents throughout the entire design and construction phase. A Construction Advisory Committee (since renamed the Community Liaison Committee) will be established to provide a forum for discussion of appropriate mechanisms for consulting with the public and to address construction issues.

The Proponent has committed to prepare a Landscape Design Plan to address visual and privacy issues. Landscape design measures will vary by location, but would include berming, noise walls, landscaping and plantings, as appropriate.

The Proponent will also provide visual screening where necessary and where possible. This solution will apply to the neighbourhoods of South Port Kells, Walnut Grove, Port Hammond, Wildwood Crescent, Hammond Road, Telep and Katzie I.R. #1.

Issues Raised and Proponent Responses

Issue: During the open house sessions held throughout the Project design phase, many issues related to property acquisitions were raised. Residents whose properties are directly affected raised questions regarding the process of property acquisition, and concerns with regard to the effectiveness of mitigation. Proponent representatives were available at all public events to discuss the property acquisition process and to answer questions, and indicated that they would be working on a one-on-one basis with individual property owners.

Response: The Proponent's policy is to treat all persons having an interest in property in a fair and equitable manner based on the principle that, after receiving compensation, the owner should be in the same economic position as before the Project proceeded. If a property owner is not satisfied with an offer, the Proponent will fund an independent appraisal. All persons having an interest in property which is required for the Project, inclusive of owners and tenants, will be contacted in a timely manner to allow sufficient time for the parties to consider their position and to find alternate accommodation, if necessary.

Issue: Much public interest was expressed in both the open houses and the formal comment periods related to having property owners included in design-related decisions.

Response: The Proponent reported that the results of the design workshops held throughout the development of the Application will be incorporated into the design

guidelines which will be included in the Request for Proposals inviting bids to deliver the Project. Design concepts for the bridge, including landscaping and visual design elements, will be presented to the public at the detailed design stage. In addition, the Proponent has committed to the use of a Community Liaison Committee as a forum for addressing construction issues, as noted above.

9.2.2 Transportation

From a transportation planning perspective, the Project improves the overall transportation network by separating residential and industrial traffic and by providing a shorter, more direct link between the north and south shores of the Fraser River. During the construction phase, and for a period of time after construction, there will likely be some negative impacts caused by driver confusion with the new routing patterns. These impacts are expected to be temporary as residential and commercial road users adjust to the new network.

Potential Effects

Local Road Closures

The Project will result in the closures of several existing roads in the Port Kells Industrial Park and the South Port Kells neighbourhoods in Surrey. A number of roads will also need to be realigned to accommodate the Project.

Business Access

Access to individual property driveways for the delivery of materials and products is a key concern of local businesses. Several businesses require access for large trucks bringing in materials and taking out finished products. Providing adequate room to allow trucks to turn into these properties is important from a design perspective.

Mitigation

There are numerous access points to neighbourhoods and businesses along the route. Overall, access will be maintained throughout the construction period, but temporary closures will occur periodically. A Construction Traffic Management Plan will form part of the construction process to assist in mitigating impacts. This plan will identify means to minimize the adverse effects of construction phase access.

Issues Raised and Proponent Responses

Issue: Public concern was raised about potential access to the bridge via Hammond Road and Bonson Road (south end), and also from Harris Road.

Response: The Proponent advised that there will be no direct access at Hammond Road. The main access points for Pitt Meadows traffic are the planned interchange at

the Lougheed Highway (at approximately 200th Street), and the airport connector road at 113B Avenue.

Issue: The public asked how emergency vehicles would access the Anniedale area in Surrey.

Response: The Proponent clarified that they are prepared to place an emergency access at the end of the cul-de-sac on 96th Avenue.

Issue: Business owners in Langley were concerned that there was no provision in the plan for the businesses on the east side of 201st Street, between 96th and 98th Avenues, to access 96th Avenue or to go south or east without first making a long circuitous loop to the north and around to the west. This would cause hardship to the affected businesses and is a change to the present traffic flow.

Response: The Proponent suggested that construction of the one-way couplet for the Project will require traffic north of 96th Avenue to use the connector to 199A Street in order to return to 96th Avenue. Studies show that this would add a maximum of about 1.5 km of additional travel distance. Assuming an average overall speed of 40 km per hour, the additional travel time is approximately 2 minutes.

9.2.3 Construction

Construction of the Project is expected to take approximately three years. The Abernethy Connector is expected to take approximately two years to complete. Construction start-up is anticipated for late 2004, with completion in late 2007.

Potential Effects

From a social or neighborhood perspective, construction-related impacts include:

Noise: Noise will be most significant where construction is occurring above grade or elevated structures are being built. The Proponent has proposed a series of mitigative measures to minimize construction related impacts (see section 9.5 - Noise).

Health Care: Based on highway construction norms, the worker injury rate would be about five accidents per one hundred person-years of employment. Estimates of annual construction jobs are approximately 2,200, for an estimated accident total of 22 per year. This is the number of claims predicted to be filed with the Workers Compensation Board, and that require transportation to a health facility. This estimate does not include less serious injuries that would be dealt with on-site.

Community Emergency Services: As noted in the Health Care description above, there could be an additional 2 work-related accidents per month during construction that require attendance. This is not expected to have a significant impact on the provision of emergency services in any of the four municipalities.

Impact on Local Businesses: The effects on local businesses are varied, and are expected to be both positive and negative. Negative impacts are those associated with congestion arising from construction-related traffic delays. This congestion, coupled with changes to access, will affect customers, as well as the delivery of supplies and shipment of product. These impacts are expected to be highly localized. There will also be the nuisance factor caused by noise and dust. See section 10.1 – Fishing - for a discussion of construction related effects on First Nations and commercial fisheries.

Impact on Vehicle Travel Times and Operating Costs: Construction of some components of the Project (e.g. the Lougheed interchange) will have an impact on vehicle travel times and operating costs. These impacts will occur due to congestion and traffic movement delays. These delays will add time to vehicle trips, and will increase vehicle operating costs. The degree of impact will depend on the amount of congestion and the duration of the delays. Although it will be difficult for commuters to alter their travel schedules, it is assumed that a portion of discretionary travelers will alter the timing and the routing of their trips.

The incremental increase in vehicle operating costs is not expected to be significant. The increase in operating costs is a function of an increase in vehicle idling time. With short and intermittent stoppages, operating cost increases will be minor.

First Nations and Commercial Fisheries: See section 10.1 - Fishing - for discussion of construction-related effects on fisheries.

Commuters: Some delays will be unavoidable. A Construction Traffic Management Plan will be developed and implemented to minimize these impacts. Commuters will be affected in specific portions of the alignment. On the south shore, construction will temporarily affect residents of the Port Kells neighbourhood. On the north side, construction of the interchange at the Lougheed Highway will cause some temporary delays.

Commercial Vehicles: Construction of the connection to Highway 15 in Surrey, and the couplet in Langley, will have temporary impacts on commercial vehicle movements. Similar impacts can be expected during the construction phase for the interchange at the Lougheed Highway. Measures to maintain traffic movement at these locations will be part of the Construction Traffic Management Plan.

During construction of the Abernethy Connector, access across the Connector for south-bound traffic at 203rd Street will need to be maintained, as will the functionality of movements at 128th Avenue and 210th Street.

Mitigation

Construction-related mitigation strategies proposed in the Application include:

- A Construction Traffic Management Plan which will form part of the construction process to assist in mitigating impacts. The plan would identify means to minimize the adverse affects of construction, including maintaining access;

- Utilizing the local area Project Construction Planning Advisory Committee, made up of representatives of municipalities, local communities and businesses, to address construction-phase access and other issues of concern with representatives from the construction contractor and the Project owner;
- Implementing a Communications Program to convey information to communities, businesses, road users, commercial and First Nation fishermen and other commercial and recreational vessels;
- Developing and staffing a drop-in centre where residents can obtain current information on the Project;
- Refraining from night-time construction in residential areas;
- Minimizing noise and dust impacts through the use of berms and shields; and
- Staggering construction along the alignment in order to minimize construction site impacts.

Issues Raised and Proponent Responses

Issue: HC raised a concern regarding the effects of night-time construction noise on sleep.

Response: The Proponent advised that night-time construction is not anticipated at this point. Also, see section 10.5 - Noise.

Issue: MSBED was concerned about where construction machinery would be stored and how the removal of fill would be managed.

Response: The Proponent clarified that the location for storing construction machinery has not been established at this time. It is expected that the Contractor/Developer will make the required arrangements with local property owners and/or use property purchased for the Project but still available for temporary uses. Locations and methods for the disposal of unsuitable soil during construction have not been finalized. The Contractor/Developer will provide input into this matter. All federal, provincial and municipal requirements will be adhered to.

Issue: MSBED raised an issue with regard to minimizing noise and dust impacts during construction.

Response: The Proponent noted that construction noise can be minimized by using modern and well-maintained equipment, and by the use of berms and shielding. Dust suppression can be attained by wetting the work area during dry periods. The actual procedures to be implemented will be developed by the Contractor/Developer and approved by the Owner, and will be included in an EMP that will be developed prior to construction. Public input on the effectiveness of the measures will be obtained.

9.2.4 Navigation

Under the federal *Navigable Waters Protection Act* (NWPA), an established review process must be followed for the new bridge crossing of the Fraser River, and any work to be

undertaken must be approved by the Navigable Waters Protection Division of Transport Canada (NWPD) prior to construction.

The Application assessed the potential effects of the Project on Fraser River marine traffic.

Potential Effects

Fraser River Marine Traffic

The Application concluded that impacts on current users of the waterway in the vicinity of the Project would be minimal. Vertical clearances (bridge height from 19.5 m to 40.0 m GSC [Geodetic Survey of Canada]) and horizontal clearances satisfy the majority of navigational users. The proposed height would accommodate an intermodal container terminal which is currently being considered for a location upstream of the proposed crossing.

Transport Canada identified a number of requirements, and the Katzie First Nation identified a number of issues related to drift net fishing and bridge design. In response the Proponent made a number of commitments to avoid or mitigate potential adverse effects.

Mitigation

- Fraser River bridge design and construction will comply with the requirements under the *Navigable Waters Protection Act* and related permit conditions.
- The navigational clearances for the bridge over the Fraser River are:
 - aircraft: minimum underside elevation of the bridge over Bishops Reach is 40.0 m GSC;
 - width of navigation channel, Bishops Reach is 170 m;
 - aircraft: minimum underside elevation of the bridge over Parson's Channel is 19.5 m GSC; and
 - width of navigation channel in Parsons Channel must be at least 120 m (to satisfy NWPD requirements), and, in fact, the Proponent has committed to a minimum clearance between piers of 125 m at this and other in-river locations, per discussions with the Katzie.
- Scour protection will be provided around the pier pile caps to maintain the integrity of the structure as required. Scour protection will not protrude above the bed of the river.
- Final design will be approved by NWPD.
- Possible in-river sedimentation of the navigational channel as a result of Project construction activity will be monitored and mitigated as needed.
- A hydraulic assessment of the final design of the bridge will be conducted to confirm the hydraulic assessment completed previously in support of the Application for an Environmental Assessment Certificate. Post-construction monitoring will be carried out to confirm modeling results.
- Pier protection works will be constructed in such a way as to allow objects to pass freely, without becoming entangled in the piers.

Also see section 10.1 - Fishing.

Conclusions

The Districts of Maple Ridge and Pitt Meadows, Township of Langley, and City of Surrey have accepted the alignment of the Project, with the exception of the potential for a minor variation of the Couplet in Langley. Final details of the alignment of the Project at this location will be resolved between the Township of Langley and the Proponent at the permitting stage, of the Project is granted an EA Certificate.

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not have a significant adverse community or socio-economic effect.

9.3 AIR QUALITY AND HEALTH

The air quality and public health assessments for the Project used a modelling approach that explored worst-case traffic scenarios for the years 2011 and 2021. The studies found that emissions from vehicles using the Project will not have any significant incremental effect on air quality and public health risk, even in areas in close proximity to the Project. Some potential air quality effects were identified for the construction phase, but these are expected to be fully mitigable, using standard environmental protection measures to which the Proponent has committed.

The air quality assessment undertaken by the Proponent has demonstrated that emissions from traffic, once the Project is open for use, will not cause ambient concentrations in residential areas to exceed ambient objectives set for the Project.

Although there are some potential health risks associated with traffic emissions from the Project, these risks are relatively small compared to existing individual risks reported in local studies and other risks faced by the average individual on a daily basis. Common daily non-pollution-related risks are much greater than the estimated incremental health risks attributed to the Project.

Potential Effects

Concentrations of criteria air contaminants (CACs) were predicted in assessing the potential air quality impacts of the Project to the Greater Vancouver Regional District (GVRD) airshed. The criteria air contaminants were total particulate matter (PM), inhalable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), carbon monoxide (CO), nitrogen

dioxide (NO₂), sulphur dioxide (SO₂), and volatile organic compounds (VOCs). The assessment process:

- examined available ambient air quality, meteorological and climate data;
- estimated emissions of air contaminants from vehicles that would use the Project;
- predicted the effect of these emissions on ambient concentrations, using dispersion models and protocols; and
- compared predicted concentrations with federal and provincial ambient air quality objectives.

Air pollutants generated during construction include airborne dust and vehicular exhaust emissions. Airborne dust can be generated during extended dry periods, arising from disturbance of soils and aggregates, vehicular traffic on temporary gravel roads, or wind erosion of stockpiles. Specific information about construction activities will not be available until after the Project is approved, when detailed design and planning is completed. As a result, construction emissions could not be estimated or modelled and assessed accurately. However, the Application discusses standard measures available to mitigate construction emissions, and these are expected to be feasible and achievable.

Because primarily, the Project will redistribute traffic, total GVRD airshed emissions are not expected to change significantly. Greenhouse gas (GHG) emissions represent 0.2% of the total GHG emissions for the GVRD, and, assuming 10% of the Project traffic is new, then the total GHG emissions in the GVRD could increase by 0.02%.

The Project will bring new traffic volumes into communities where the roadway will be located, and this will result in an increase in local ambient concentrations of air pollutants (within 1000 m of the Project) as a result of vehicle emissions and fugitive road dust.

Lougheed Highway, South

Analysis of the predicted concentrations for the CACs, road dust and PM_{2.5} from diesel exhaust for each averaging period for the years 2011 and 2021 showed that there were some cases within 100 m of roadways where ambient air quality objectives could be exceeded. The highest ambient concentrations of pollutants emitted from traffic occur very close to the edge of the roadside. The Proponent has committed to requiring the Contractor/Operator to develop and implement an Air Quality Management/Monitoring Plan (AQMP) applicable to the operational phase of the Project.

Those cases where ambient air quality objectives were predicted to be exceeded are for cumulative concentrations of vehicle emissions from the Project, the Trans-Canada Highway and the Lougheed Highway, plus background concentrations. The predicted ambient concentrations for all pollutants do not exceed Canada or BC ambient air quality objectives beyond 50 m away from the Project, and beyond 100 m away from the Trans-Canada Highway or the Lougheed Highway. Some pollutants meet the objectives at the edge of the roadways. Ozone concentrations in the Project area, produced by reactions in the atmosphere between NO₂ and VOCs, will continue to be consistent with concentrations elsewhere in the GVRD airshed.

In the residential area on the north side of the Fraser River, the residual impact of the Project will be low, and cumulative concentrations are expected to remain below ambient air quality objectives for all pollutants and averaging times. There were no sensitive receptors such as schools that were closer to the Project than the selected residential area, hence, ambient concentrations are expected to be well below ambient objectives for the schools in the Project area.

Abernethy Connector

The incremental impact of emissions from traffic along the Abernethy Connector is such that ambient air quality objectives will be met for all parameters. This is the case next to the edge of the road as well as further away. Along the portion of the Connector that is beyond the zone of dominance of emissions from the rest of the Project and the Lougheed Highway, the impact of emissions from traffic is predicted to be very low.

Mitigation

Operational Phase

The extent of air quality impacts from the Project, once operational, is expected to be local. During operation of the Project, air quality standards will be met within a very short distance from the roadway for all air quality parameters. Adverse air quality effects from the Project are unlikely, no significant residual impacts will be generated, and further management is likely not required. The GVRD Air Care program is the prime mitigation measure, because it is expected that vehicle emissions for many pollutants will be reduced, and enforcement of the new emission standards will improve air quality. If needed, the Proponent will develop a protocol for addressing road dust issues (e.g. cleaning sand/gravel accumulations) during Project operations.

Construction Phase

Potential construction impacts on air quality will be localized and short-term, and mitigation measures, such as for road dust, are available to minimize these impacts. The Proponent will develop and implement best management practices and mitigation measures during construction to ensure that potential air quality issues are addressed.

Issues Raised and Proponent Responses

Issue: HC noted that the 1-hour NO_x (nitrogen oxides) concentration in 2011 exceeds the maximum acceptable objective/guideline, and requested a description of the associated health risk.

Response: The Proponent responded that predicted NO_x concentrations only exceeded the guidelines at the golf course adjacent to the Lougheed Highway interchange, and at least 98% of the time, the cumulative concentration does not

exceed the objective. As well, it was assumed that all emitted NO_x is fully converted to NO₂ which is overly conservative, and the cumulative 1-hour NO_x concentration is likely to be well below the acceptable objective. If concentrations exceeded the objective, then sensitive individuals may experience respiratory difficulties.

Issue: The FHA requested clarification of the number of persons in the area identified as having an acute inhalation hazard index greater than 1 for respiratory systems.

Response: The Proponent indicated that there are six homes within 100 m of the edge of the Abernethy Connector that are not dominated by emissions from the Lougheed Highway or the interchange of the Project and the Lougheed Highway. These residences are located along the east-west portion of the Abernethy Connector. Assuming four people per home, up to 24 people could dwell in an area with an acute inhalation hazard index just above 1 for respiratory systems for 2011. Thus for 2011, the total acute inhalation hazard index for the respiratory system indicates a marginally increased acute hazard. This suggests that, for sensitive people in these homes, there is a slight chance of short-term, episodic respiratory responses to ambient concentrations of pollutants. For 2021, the estimated acute inhalation non-cancer hazard index for the respiratory system is just at the acceptable hazard index threshold of 1.0, and there should be no occurrences (or, at the very most, rare occurrences) of episodic respiratory responses to ambient concentrations of pollutants. Hence, for people in these homes, the health risks are not expected to be significant in 2011, and would be even less significant in 2021.

Issue: MSBED raised a concern regarding minimizing dust impacts.

Response: See response to similar query under section 9.2.3 – Construction.

Issue: The GVRD noted that additional support for programs such as the AirCare on Road program should be considered.

Response: The Proponent noted that, although not specifically a Project-related issue, it supports the AirCare on Road program, and is willing to discuss this matter with the GVRD.

Issue: HC requested clarification in regards to hazard indices and pollutant exposure pathways, such as food, soils and water.

Response: The Proponent indicated that food and water are either unlikely or minimal pathways for exposure to pollutants from vehicle exhaust, and that the primary pathway is inhalation. Soil was included in the hazard index analysis, as was dermal absorption.

Conclusions

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities, with advice from Health Canada, are satisfied that the Project will not have significant adverse effects on air quality and health.

9.4 NOISE

Potential Effects

The Proponent adopted the MoT Revised Policy for Mitigating the Effects of Traffic Noise from Freeways and Expressways (1993) as a guideline in the assessment and mitigation of potential noise impacts associated with the Project. The MoT noise policy states that mitigation measures will be considered on an MoT freeway or expressway project, and carried out if found feasible, cost-effective and widely supported by the affected residents, if and where, ten years after Project completion, the predicted total (Project plus baseline) community noise level is within pre-determined parameters. (These parameters were described in detail in the Application).

The MoT policy also contains a noise exposure limit applicable to schools.

Proponent documentation indicates that baseline noise levels are generally highest on weekdays. At some monitoring sites, industrial activities make significant contributions to the baseline noise environments. It is possible that weekend baseline noise levels could be somewhat lower at these sites. With the relatively modest predicted Project-related increases in traffic noise levels, some sites do not qualify for mitigation of noise impacts under MoT noise mitigation policies. At other sites, it would not be practicable to achieve baseline noise levels.

Operational Phase

The Application reports that projected impacts of traffic noise at many of the 31 residential locations monitored will not reach the mitigation thresholds contained in the MoT noise policy, due to high baseline noise levels (principally from railway activities and Trans-Canada Highway traffic) or to substantial setback distances. In approximately ten residential locations, thresholds will be approached or marginally exceeded. However, since the noise assessment was based on a conceptual level of design, potential impacts at these sites will need to be confirmed to determine whether mitigation is required and that mitigation measures can be sufficiently effective.

Construction Phase

The Application anticipates that construction of the Project will have the potential to create noise impacts well outside the physical limits of the construction zone. Construction noise has the potential to disrupt the normal living patterns of individuals and communities and, if severe or persistent enough, may result in negative individual reactions and/or concerted opposition from the impacted community as a whole.

The major construction phase of the Project involves the use of multiple pieces of heavy equipment, including bulldozers, excavators, loaders, haul trucks, graders, pavers and cranes. The levels of noise to which any adjacent noise-sensitive areas may be exposed will depend on the types and numbers of heavy equipment active, their condition, their usage factors, the setback distance from the construction zone, and the presence of any shielding elements, such as landforms, forest belts or buildings.

A number of locations have been identified where the distances between the Project alignment and adjacent residences could result in construction noise levels being sufficient to interfere with domestic activities. The potential exists to cause annoyance and negative community reactions. In locations along the Abernethy Connector, such as on 201st Street near Telep Avenue in Maple Ridge, and at several more widely separated rural and farm residences along the northern limit of the study area, there is potential for widespread individual complaints to more organized community action. In locations such as the Hammond Road and Fairfield Avenue/Herring Place areas in Pitt Meadows, and the 96th/94th Avenue area south of the Trans-Canada Highway in Surrey, community reactions could result in potential sporadic to widespread complaints.

Mitigation

Operational Phase

A number of mitigation measures for minimizing noise impacts from Project operations are identified in the Application. They include the use of parapet noise barriers, roadside noise barriers, earth berms and or berm/wall combinations. Impacts may also be mitigated through the use of low-noise or quiet asphalt pavement, or the application of speed zones in populated areas. As with projected traffic noise levels, the effectiveness of mitigation measures such as noise barriers would be verified through more refined computer modelling, based on a more detailed level of design.

Along the Project alignment, there are a total of approximately 130 homes at which the current noise environment exceeds the limits recommended by Health Canada for noise impacts for this Project. It is estimated that, by years 2016/2017, with the Project completed but without any mitigation, this number would increase to approximately 412 homes. However, with effective mitigation for all locations which have been projected to either potentially or clearly warrant mitigation consideration under the MoT policy, the number of homes exceeding Health Canada's limits would be reduced to about 225, of which 95 would be attributable to the Project. The Application concludes that the significance of residual

noise level effects during roadway operation, relative to the baseline, is considered to be low, based on the magnitude, duration, geographic extent, frequency and reversibility of effects.

Construction Phase

Measures identified to minimize impacts from construction-generated noise include avoiding night-time work as much as possible, keeping affected communities informed of the schedule and duration of any particularly noisy activities planned, and educating construction personnel regarding the management of noise.

The EMP that is to be developed and approved for the Project will contain a component (Construction Noise Monitoring Plan) that would address the monitoring and control of road construction noise. The plan would detail the parameters (i.e. working hours, noise levels, etc.) that must be met during construction, and require compliance with municipal regulations/by-laws relating to noise.

Issues Raised and Proponent Responses

Issue: MoT noted that bridge deck expansion joints can be a particular noise problem for those living near bridge structures. Producing reasonably quiet deck joints could be an identified requirement of the detailed bridge design.

Response: The Proponent stated that bridge design criteria for expansion joint characteristics and performance will include durability and ride-ability, which will reduce noise. Consistent with MoT policy, follow-up noise monitoring will be conducted during the first year following Project completion to assess the effectiveness of mitigation measures where they have been implemented, and to confirm projected post-Project noise levels.

Issue: HC noted that the evidence regarding mitigation of noise impacts as a result of familiarity may not be applicable to sleep disturbance.

Response: The Proponent acknowledged that familiarity with traffic noise will not necessarily lead to an absence of impacts on sleep quality.

Issue: HC requested evidence that highway noise levels are consistently lower during the night-time for the Project area, and indicated this cannot be assumed because potential increases in truck traffic could make night-time noise levels match those during the day.

Response: Given the predicted levels, character and time pattern of Project traffic noise, it is not expected that the Project will disturb sleep to any significant degree.

Issue: HC noted that there does not appear to be any evidence provided in the Application that would be pertinent to the potential for impacts on schools as a result of construction noise.

Response: The Proponent responded that there are no schools located close enough to the Project to be significantly impacted by construction noise (or traffic noise, once operational), although there may be an indirect increase of traffic volumes on some local roads.

Issue: HC commented that the intent of requesting an assessment of Project traffic noise relative to guidelines from other jurisdictions was to provide an indication of the impact in those sites where mitigation was either not required or only potentially required if the MoT policy were applied. HC suggested that this analysis was not completed, and undertook its own analysis using data supplied by the Proponent and the National Guidelines for Environmental Noise Control, 1989. As a result of this analysis, although not mandatory, noise control is recommended for several sites using the criteria in the national guidelines, particularly in those cases where complaints warrant further investigation.

Response: The Proponent responded that the Application described the numbers of baseline monitoring sites at which daily average noise levels exceeded the HC guidelines, and the average amounts by which these guidelines were exceeded, both before and after the Project, and the results of the requested analysis would not be materially different from the one provided in the Application.

Conclusions

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities, with advice from Health Canada, are satisfied that the Project will not result in significant adverse effects from noise.

9.5 ARCHAEOLOGY RESOURCES

An Archaeological Inventory and Archaeological Impact Assessment were undertaken, and the Katzie, Semiahmoo and Sto:lo First Nations participated in these studies.

Potential Effects

The archaeological work along the alignment south of the Lougheed Highway identified several previously unrecorded resources consisting of four confirmed archaeological sites, four possible archaeological sites, one culturally modified tree, two areas containing disturbed/redeposited archaeological materials, several areas with potential for foreshore archaeological remains, several areas of asserted aboriginal traditional use significance, and, two areas of 20th century foundation remains. Possible footprint impacts and RoW impacts on archaeological sites were confirmed. Potential design and construction practice mitigation measures were identified, as well as construction and operations-stage residual impacts identified for confirmed sites and potential sites.

A large archaeological site in the footprint of the original Abernethy Connector alignment was discovered during the archaeological assessment. The site is viewed as being very significant. A smaller archaeological site that cannot be fully avoided by the Project was also discovered.

The Katzie First Nation expressed concern about the destruction or disturbance of the identified archaeological resources, as well as destruction or disturbance of resources not identified to date (unrecorded sites) in the archaeological studies. The Katzie also expressed concern about the depth at which archaeological investigations would be undertaken during construction, and that deep testing needs to be undertaken with flexibility in the locations where this would be conducted. (Also see section 10.4 - Cultural Heritage Sites and Practices.)

Mitigation

The Proponent committed to avoiding and protecting the majority of identified archaeological sites during construction and operation of the Project.

Along the alignment south of the Lougheed Highway, three sites of a limited nature and shallow depth will be the subject of an archaeological excavation prior to construction, under permit pursuant to the *Heritage Conservation Act*. The culturally modified tree that was identified will be avoided and protected, if feasible.

The large archaeological site identified during the assessment of the Abernethy Connector will be avoided in its entirety through realignment of the Connector. The Proponent will protect the site from disturbance during construction, and a qualified archaeologist will monitor construction activity. The Proponent has committed to additional archaeological investigation and impact management in compliance with the *Heritage Conservation Act*, and in consultation with First Nations in the event that advancement of design and/or construction planning could in any way affect this large site. Mitigation will be conducted on the smaller site identified within the Connector alignment through an archaeological excavation under permit pursuant to the *Heritage Conservation Act*. Known archaeological sites to the east and southeast of the proposed Connector will be protected from construction disturbance.

The Proponent will develop an Environmental Management System (EMS), including an Archaeological Contingency Plan, to manage encounters with known and previously unidentified archaeological resources during construction. If archaeological materials are exposed during construction in an area not previously identified as an archaeological site, activity on or in the immediate vicinity will be suspended, and relevant parties will be notified, including the Katzie First Nation and other relevant First Nations. Activity will remain suspended, pending assessment by relevant authorities.

Deep testing by machinery to depths ranging from 2 m to 5 m below the surface will be undertaken on the Project RoW in Fraser River shoreline areas built up by fill and in specific

portions of the Katzie Slough. Locations and timing will be determined in consultation with the Katzie First Nation.

Conclusion

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not result in significant adverse effects on archaeological resources.

9.6 CONCLUSIONS

The environmental assessment findings suggest that there will be modest localized noise and aesthetic impacts on communities, even with mitigation measures applied, which cannot be completely eliminated by practicable means. In assessing the relative magnitude of the impact of the Project on residential, agricultural and commercial properties, the EAO considered whether or not the Proponent had sufficiently consulted the public; whether or not there was serious consideration of alternative routings to minimize impacts; and whether or not the Proponent has made reasonable efforts to mitigate these effects.

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and, supplemental information provided by the Proponent, including responses to issues identified, mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that the Project will not have significant adverse economic, social, archaeological or health effects.

10. FIRST NATIONS INTERESTS

The Project is situated within an area identified as traditional territory by the Katzie First Nation. There are three Katzie reserves in proximity to the Project (see Figure 1). Katzie I.R. #1 is located on the north bank of the Fraser River (Bishops Reach), approximately 220 m along the river to the west (downstream) of the Project corridor. At its closest point (north east corner), I.R. #1 is approximately 80 m from the Project corridor. Katzie I.R. #2 is located on the south bank of the river, approximately 560 m to the east (upstream) of the Project corridor. Katzie I.R. #3 is located on the south side of Barnston Island (north bank of Parsons Channel), approximately 1.8 km to the west (downstream) of the proposed bridge.

The Katzie First Nation has stated that it maintains a close historical relationship to its territory, and particularly to the Fraser River, which extends beyond the arbitrary/artificial boundaries of their reserve lands. To assist the Katzie First Nation in identifying cultural

impacts, the Proponent funded the Katzie Traditional Use Study, which mapped and recorded 577 use areas relative to the Project site.

The Katzie First Nation raised a broad range of concerns with respect to the Project, generally related to asserted potential adverse effects on their cultural resources, traditional uses and communities, such as potential impacts on the traditional Fraser River salmon drift net fishery in the area.

Some of the technical issues raised by the Katzie were also raised by other parties, such as government agencies, and were not considered unique to their communities/members or directly related to their specific aboriginal interests. Thus, not all of the technical issues raised by the Katzie are addressed in this section of the report. Those of a more general nature which were raised by government agencies are discussed elsewhere in the report. Examples of these types of issues include broader impacts of the Project on fish and wildlife resources.

As discussed below (see section 10.4 – Cultural Heritage Sites and Practices), some of the broader issues raised by the Katzie could not be resolved or addressed in the specific context of consultations on this Project, such as the potential for the Project to facilitate/promote development and population growth in the Pitt River/Maple Ridge area, and the potential for decrease in lands available for treaty land selection.

Issues raised by the Katzie which are specific to both the Katzie and the Project are discussed below.

10.1 FISHING

The Fraser River is the most important salmon bearing river in the province. The River supports all species of salmon and a productive gillnet fishery, both First Nations and commercial. There are approximately 400 gill-netters operating from the Mission Bridge to the Fraser River estuary. To catch fish, a gillnet vessel sets a net and drifts down a section of the River.

The April 15, 2004 report by A. F. Lill & Associates, commissioned by the Proponent, indicates that the Katzie assert as follows:

- They have over 150 members licenced to actively fish during openings, roughly a third of their total membership. The Katzie estimate that they have approximately 120 vessels that participate in the fishery over the course of a year, and 50-70 vessels that fish in the largest single opening (numbers reported in recent years).
- Katzie salmon net fisheries take place in a defined area between the territories of two neighbouring bands. Their fishing area, the section of the River in the vicinity of their communities, is renowned as the best, most productive area to fish in the lower Fraser River between Hope and the estuary. During the key salmon fishery openings, there can be up to 100 Katzie and commercial boats drifting through the area of the new bridge crossing.

- The Katzie drift fishers use a variety of boats, from 16-foot outboard-powered open skiffs to standard commercial gillnet vessels. They employ gillnets which are 50 fathoms (91.5 m) long by 8 m to 12.3 m deep. With 10-m buoy lines attached, the nets will stretch approximately 110 m, when towed. Sometimes two boats are tied together with 50-fathom nets set out from either side. In the proposed location of the bridge, nets are sometimes drifted across virtually the entire width of the river, especially when fisheries are most intense.
- Many of the Katzie fishing boats are open skiffs with small outboard motors and the nets are pulled on-board by hand. These skiffs are not as manoeuvrable and cannot haul in their nets as quickly as larger, more powerful commercial-type gill-netters using powered drums. Skill is needed to make appropriate corrections to the net's drift. A fisher has some limited ability to tow the net to get around obstacles, depending on the circumstances, but avoids doing this, if at all possible, since it is hard on the fish in the net, and the net is not catching fish when it is being towed.
- A fisher starts a drift by releasing the net under power in an arc across the current, with a float marking its outboard end until the net is played out. The gillnet is held up to the water surface by a series of floats on the top of the net, and hangs almost vertically weighted down by a lead line along the bottom of the net. The fishing vessel usually stays secured to one end of its net as it drifts downstream, but the net can be released and left to drift with a float marking each end until it is ready to be picked.
- A number of factors enter into where a fisher chooses to set and pick up the net, including known "hot spots" for catching salmon, actual success on previous drifts, currents and tidal conditions, the proximity of other fishers and any competing marine traffic, and known obstacles in the river, such as logs that are partially embedded in the river bottom. Based on such factors, experienced fishers have established productive drift locations and fishing patterns. A staff anthropologist employed by the Katzie has documented drift locations.

Potential Effects

The Katzie maintain that the location and number of bridge piers (which govern the spacing between piers, and between piers and the river banks) have the potential to permanently impact on the Katzie's ability to leave their drift nets in the water as they travel through the bridge piers in the river, and as such, are a potential impediment to the First Nation asserted traditional and commercial drift net salmon fishery in the area. The Katzie further maintain that construction activities in the River will temporarily disrupt or act as an impediment to fishing.

The Proponent originally proposed seven piers as the maximum number, in part to address Katzie fishery concerns. Based on review feedback, the Proponent has since reduced the maximum number to 5 piers, in an effort to further mitigate adverse Project effects on the Katzie fishery. The exact number of piers and their locations is not yet known. This will be determined by the Proponent through a competitive design-build bidding process, implemented if an EA Certificate is issued for the Project.

First Nation fishery concerns and other factors or constraints will influence the basic design of the bridge (i.e. the number and locations of the bridge piers) and the associated

construction activities. Other factors include: economics; engineering feasibility (e.g. difficulty posed by substrate conditions for constructing pier foundations); DFO requirements for protecting fish and fish habitat; NWPD requirements for maintaining navigational channels; and standards set under the Canadian Highway Bridge Design Code.

A bridge design with few in-river piers would require larger spans and more massive piers, and would be more expensive to construct. Conversely, a design with too many piers would also increase costs. The Proponent has argued that, given economic limitations, flexibility is needed in the design of the bridge to address site conditions affecting construction, and to allow for innovative design solutions. The Proponent has committed that disruption of the Katzie First Nation fishery will be avoided during in-river staging and construction of the Project through effective scheduling of in-river construction activity. Subject to discussion and agreement between the Katzie, the Proponent and the Contractor/Operator, there could be further restrictions on construction when the Katzie fishery is active. The Proponent has pointed out, however, that too many restrictions on in-river construction activities would likely increase the duration of the construction period and lengthen construction-stage disruptions of fishing activity.

The design of the bridge and the methods of construction will not be known before an EA Certification decision is made. It is possible that the final design, in a worst case situation, could result in fishers terminating their drifts before reaching the bridge or starting their drifts downstream of the bridge, or otherwise having to modify their asserted traditional practices/methods either during construction or when drifting between bridge piers, once the bridge has been constructed.

The Katzie and Semiahmoo First Nations expressed concern over the location of bridge piers, the width of navigable channels, and related matters. Specifically, concern was expressed over the potential for a reduction in fishing territory, interference with claimed traditional and commercial drift net fisheries for salmon, and asserted infringement of constitutionally protected rights.

The Katzie maintain that the existence of any in-river bridge piers could cut their fishing area into two zones, especially over the long term, and particularly if 4 or 5 piers are built. The Katzie claim that this could have a major adverse impact on their ability to fish and, as a result, on their culture and their communities. Specific issues and impacts asserted by the Katzie in regards to the potential impacts of the bridge on their fishery included the following:

- The ability of small boats to fish traditional drifts will be adversely impacted.
- There will be inter-community conflict over the loss of drifts and drift frequency due to crowding, and adverse impacts on fisher safety as a result of crowding.
- There will be a net loss of fish during the time it takes fishers to re-learn to fish around or above/below bridge piers.
- There will be social (including dietary and inter-community) and cultural impacts from a net loss of fish.
- If net or boat (fishing equipment) losses are realized, there will be a loss of fishing time, and therefore economic impacts, particularly during in-river construction.

- Noise levels may increase on the water under/near the bridge as a result of vehicle traffic, and this could impact voice and radio communications when Katzie members are fishing.
- There would need to be as few piers in the river as possible. The spacing between piers would need to be 140 m or 150 m at a minimum, and at this distance there would still be some disruption to the fishery. Given the existence of snags and currents (especially around bridge piers) a narrower gap of 120 m would require fishers with boats towing nets that will stretch at least 110 m to be essentially perfect in their positioning. Cautious fishers will avoid the area. Fishers working with limited time and a high need for food, social or ceremonial fish may risk running pier gaps, with attendant risk of loss of property or even physical harm or death, if they are snagged and cannot cut loose in time.
- Pier locations need to avoid the drifts that have traditionally been the most productive/important to fishers and the community.
- Within the past year, the log booming area at the northeast end of Barnston Island has been extended in an easterly (upstream) direction towards, and approximately 380 m from, the proposed bridge location. The log booms can result in hang-ups and a potential safety-hazard if a boat is pulled into the booms during periods with strong currents. This log storage facility is a dangerous combination with bridge piers in close proximity, currents and natural snags in the river, and it should be moved.
- The number of snags (permanent and seasonal) and their locations change from year to year, and these are a problem in terms of safety, damage to or loss of fishing equipment, and fishing success.
- Piers and pier protection measures need to be shaped to minimize snagging of fishing nets and to minimize creation of hazardous current conditions. High water speeds and swirling water around piers could pose a significant risk to fishers. Hydrological impacts, especially water speed around piers, would need to be monitored, and mitigation measures adopted as needed.
- Sediment deposition resulting from construction activities and pier placement, and impacts on fishing, would need to be monitored and mitigated (see mitigation under section 9.2.4 - Navigation).
- Scour protection will be needed, and must not protrude above the surface of the river bed where nets could become snagged.
- Sediment deposition may occur that would negatively affect eulachon spawning beds.
- Construction scheduling and activities, such as the construction of more than one pier at a time, could significantly restrict fishing activities temporarily. There is no relationship between the degree of fishing activity occurring and its importance to the community. Light fishing periods are just as important as the heavier fishing periods.
- Any anchors placed for construction purposes would be an additional hazard and would need to be removed. Construction debris would need to be prevented from entering the river.

Mitigation

The Proponent has proposed mitigation measures to address asserted impacts on the First Nations fishery, including the following:

- The number, location and design of in-river piers, including pier protection, will minimize impact to the Katzie First Nation fishery, subject to regulatory, engineering and other constraints.
- The number of in-river bridge piers will not exceed 5 piers (the Proponent had originally proposed up to 7 piers).
- The minimum clearance between in-river piers (including their pier protection works), will be 125 m. In consideration of the potential effect of the bridge on Katzie drifts along Parsons Reach (which Katzie assert are preferred compared to drifts along Bishops Reach), NWPDP agreed, in consultation with the Proponent, to increase the width of the Parson's navigation channel from the existing 59 m to a new 120 m width. The Proponent has set the minimum clearance between piers at 125 m to further mitigate Project effects on Katzie drifts in Parsons Reach.
- At Bishops Reach, the existing 170 m navigation channel width has been retained, meaning that the minimum clearance between piers across Bishops Reach will be at least 170 m. NWPDP, in consultation with the Proponent, has agreed that, in the case of a 4-pier design, the navigational channel could be moved up to 15-20 m south of its present location to mitigate Project effects on Katzie drifts along the north shore of the river.
- Efforts will be made to relocate the existing log storage east of Barnston Island, subject to agreement between the log storage owner, the Proponent, Fraser River Port Authority and any other relevant parties. As noted below, prospects for this are not encouraging. The Proponent will pursue measures and/or agreements with relevant parties to prevent future log storage in this area (e.g. by a different operator).
- Snags on the river bottom caused by sunken logs currently exist in the absence of the Project. The Project would not contribute to any increase in snag occurrence, except for the possibility of accidental collisions between log rafts and the bridge substructure. Related mitigation (e.g. clean-up) will be provided for in the Emergency Response Plan and other procedures developed for operations/maintenance of the Project.
- Piers will be shaped to minimize snagging of fishing nets, and to minimize creation of hazardous current conditions.
- Scour protection will be installed around the base of the piers, as required to maintain the integrity of the bridge substructure, and will not protrude above the surface of the river bed.
- Hydrological modelling will be conducted on the final bridge design, as required by NWPDP.
- As noted above, disruption of the Katzie First Nation fishery will be avoided during in-river staging and construction of the Project through effective scheduling of in-river construction activity. Subject to discussion and agreement between the Katzie, the Proponent and the Contractor/Builder, further restrictions will be imposed on construction when the fishery is active.
- All construction materials, equipment, temporary piles, etc. will be removed from the river upon completion of construction.
- Construction material and debris will be prevented from falling into the river.

- Sediment control measures and water quality monitoring (including suspended solids) will be implemented during construction. The Proponent has committed to following interim water quality guidelines developed by MWLAP.
- Eulachon spawning beds will be monitored to evaluate any unnatural sedimentation, if required by DFO to protect fish habitat, following DFO review of final Project design and work methods.
- A marine users' communications strategy will be implemented to notify all affected marine users of the construction timelines as they relate to navigation and use of the river.
- The Proponent is prepared to upgrade Katzie fleet radios for improved communication with Fraser Port and between fishing vessels.

NWPD requires that two marine navigation channels be maintained in Bishops Reach and Parsons Channel to address marine communications issues. The locations of these channels and associated bridge pier placements have the potential to conflict with a bridge design that avoids preferred Katzie drift fishery locations. However, NWPD has indicated that, depending upon the number of bridge piers, there is some flexibility to adjust the location of the navigational channels, and this has been reflected in the Proponent's commitments.

Options to relocate the existing log storage east of Barnston Island appear limited. The Fraser River Port Authority (FRPA) reported that this area has long been known to be a potential hazard to navigation due to an unmarked sand bar, and it was decided that the installation of log booms would be an effective way to ensure public safety of the marine community. If the boom is to be relocated, the FRPA's priority would be to find another site within the same general area of the river. The FRPA has indicated that the only available nearby location is the area fronting on Katzie I.R #2 on the south side of the river, upstream of the proposed bridge.

With respect to anticipated impacts on the drift net fishery, the Proponent maintains that:

- by adjusting the start and finish points for the drifts, major drifts would still be feasible in the immediate area, and impacts should be acceptable to Katzie fishers;
- an opening of 125 m between piers is a reasonable minimum requirement to allow a Katzie boat to drift through while tending a 50-fathom net, particularly given that the Proponent has committed to shaping piers so as to mitigate any potential for snagging nets;
- disruption of the Katzie fishery can be avoided during construction of the Project; and
- based on the height of the proposed bridge and observations beneath other new bridges like Alex Fraser, traffic noise levels at the water surface should not be a significant impediment to vocal communications when fishing, particularly if radios are used.

The Proponent also maintains that any additional mitigation measures restricting the design of the bridge, beyond those identified in its list of commitments (Appendix A), would adversely limit flexibility in the design, which could have implications for the economic viability of the Project. However, the planned competitive design-build bidding process will

not preclude innovative designs from being proposed and selected for the Project that would further alleviate Katzie fishing concerns.

10.2 HUNTING

The Katzie First Nation maintains that it has traditionally hunted migratory birds off the eastern end of Barnston Island, taking advantage of the birds' down river approach to the island from the east. Barnston Island, out to mid-channel in the Fraser River (Bishops Reach and Parsons Channel) is an electoral area within the GVRD. There is regulated discharge of firearms and hunting in this area. The District of Pitt Meadows boundary is at mid-channel along Bishops Reach, and there is regulated discharge of firearms and hunting on the river in this area, but not on land. The discharge of firearms is prohibited by the City of Surrey and the Township of Langley in the area of the proposed bridge, including on the river.

The Katzie First Nation maintains that:

- its members have a limited area in which to hunt, due to land development within their territory and resulting restrictions on the discharge of firearms/hunting;
- hunting, primarily for waterfowl, is now effectively limited to the north side and east end of Barnston Island; and
- Katzie members have stopped hunting on the south side of Barnston Island, even though the area is not closed, because of the potential for public concerns/complaints to be raised.

Potential Effects

The proposed bridge will be located approximately 500 m upstream of the east end of Barnston Island, and approximately 250 m upstream from the area open to hunting. When the bridge is operational, if shooting occurred from land or the foreshore in the direction of the bridge, including shooting at low tide, the Proponent does not believe that public safety would be an issue, based on the type of ammunition that is permitted.

The Proponent reported that, if shooting was occurring from boats in the direction of the bridge closer to the hunting area boundary, then there is some risk to public safety, and management options may need to be considered. The public safety aspect is addressed in the Criminal Code, which requires safe handling and discharge of firearms.

The Katzie First Nation maintains that the Project will further limit its ability to hunt. More specifically, the Katzie maintain that:

- as a result of the Project, the GVRD and/or District of Pitt Meadows could close or further restrict hunting at the east end of Barnston Island, meaning further curtailment of hunting choice/options when there are already only limited areas open to hunting;
- pier construction will curtail hunting during bridge construction, since Katzie hunters would avoid shooting towards construction workers;
- the perception of risk associated with the discharge of firearms could result in restrictions being imposed, and there is concern that safety would be an issue for construction workers and pedestrians using the bridge walkway;

- since Katzie hunters do not discharge firearms if it is not safe to do so, they would be likely to voluntarily curtail hunting activities in the vicinity of the Project;
- this area is open to hunters from outside the Katzie community, and one bad occurrence could jeopardize the ability to hunt in this area for everyone;
- the issue/concern is not just about hunting success (number of waterfowl harvested), but about the experience and traditional use/activities; and
- assurances are needed that hunting restrictions will not be imposed and, in the event that they are, commitments are needed that there would be mitigation that is feasible.

Mitigation

The Proponent acknowledges that hunting practices may change or be altered, but maintains that this does not mean that there will be a reduction in harvesting success. Since jurisdiction over hunting rests with government agencies which are not under the Proponent's control, the Proponent is not in a position to provide assurances that hunting restrictions for safety reasons will not be imposed at the east end of Barnston Island.

As noted above, the Katzie are concerned that a bad experience with hunters from outside the Katzie community could impact the Katzie's opportunities to hunt in areas that are now open to them. The Proponent points out that this could occur whether or not the Project proceeds, for reasons unrelated to the Project.

In-river hunting - The Proponent acknowledges that, during construction of the bridge, it is possible that some in-river hunting opportunity and/or success may be affected temporarily at the east end of Barnston Island, as a result of Katzie hunters having to modify hunting practices out of respect for the safety of construction workers operating at river level. This temporary effect could be addressed in compensation provided through the benefits agreement currently being negotiated between the Proponent and the Katzie.

On-land hunting - The Proponent's view is that this on-land traditional use/activity would not be adversely affected by the Project, since Barnston Island and surrounding waters (including the east end of the island which, according to the Katzie, is favored for hunting) are sufficiently distant from the Project.

Barnston Island (GVRD):

The GVRD has no authority to make bylaws regulating the discharge of firearms under the *Local Government Act*. MWLAP is responsible for closures within the electoral areas of Regional Districts, and deals with these issues on a site-/case-specific basis as they arise. Closures are established under the *Closed Areas Regulation* of the *Wildlife Act*, and require an order in council. To initiate a regulation change, an application must be submitted to MWLAP. Aboriginal rights and preservation/conservation objectives for maintaining biological diversity are considered in the decision-making process. First Nations would be consulted and any infringement of asserted aboriginal rights would need to be assessed and addressed through mitigation/compensation strategies. MWLAP expects that, if a regulation

change were to be considered at some time in the future, opportunities would exist within the local area to mitigate and/or compensate for any lost Katzie hunting opportunities.

District of Pitt Meadows:

Cities and municipalities have the authority to regulate the discharge of firearms under the *Local Government Act*. The District of Pitt Meadows would deal with any amendments that it deems necessary to their Discharge of Firearms Bylaw because of new housing/industrial development, citizen requests and other reasons. First Nations can contact the District and request participation on the "Discharge of Firearms/Hunting Regulations Committee" if/when it is formed to look at an issue (it is not a standing committee; MWLAP is a participant). First Nations could also request that they be notified and advised of opportunities to provide input on any measures being considered by the District regarding the discharge of firearms/hunting that could affect their interests.

10.3 GATHERING

The Katzie First Nation assert that Katzie Slough is one of the most significant cultural landmarks in their territory, the surrounding area has historically been used by its members for various purposes, including hunting, fishing, and gathering of traditional food/medicinal plants, and continued presence of the Slough is vital to the transmittal of Katzie culture to future generations.

Katzie Slough in the Project area has changed as a result of various anthropogenic developments, including dyking, road and rail construction, residential, agricultural and industrial development, irrigation activity and drainage control features, etc. Many sections of the Slough are located on private property.

Potential Effects

The construction and operation of the Project (including the Abernethy Connector) have the potential to impact environmental resources in/adjacent to Katzie Slough at five locations. Its tributaries at eight locations could also be affected. Based on information provided by the Proponent in responding to review comments, including proposed mitigation measures and commitments, provincial and federal agencies were satisfied that the Project will not have significant adverse effects on fish, wildlife and habitat/vegetation resources in these locations.

The Katzie First Nation remains concerned that the Project has the potential to destroy remnants of the original Slough, particularly in those areas that remain relatively undeveloped, and about the effect that this will have on asserted traditional use activities and their culture. The Katzie are also concerned:

- about the tenure/ownership of the lands around Katzie Slough, and that mitigation efforts could be eliminated if there is a future change in land use;
- that plant species used in replanting disturbed riparian areas should have traditional use value;

- that DFO protection of fish habitat would prevent them from having access to, and harvesting plants in, rehabilitated riparian areas; and
- that vehicle air emissions from Project traffic will contaminate vegetation used for food or medicines.

Mitigation

With respect to the last item above, the Proponent reported that the risk of exhaust from Project traffic significantly contaminating edible plants that may be harvested by the Katzie and others is low, and practical means are available to establish baseline conditions for vegetation and monitor for potential effects from vehicle pollutants, once the Project is in use. If monitoring indicates that traffic emissions are adversely affecting edible plants, there are some forms of mitigation that can be carried out. The simplest is to plant a barrier of trees along the edge of the Project roadway. The trees will tend to interrupt the airflow across the roadway, and hence inhibit the dispersion of exhaust pollutants.

Riparian habitat compensation planting works and terrestrial revegetation in the vicinity of the Fraser River, Katzie Slough and Unnamed Creek will take place on lands owned by the Proponent or on lands where the Proponent has established tenure, and will include the planting of species that have traditional use value to the Katzie (e.g. wapato). The Katzie's role in developing and implementing related planting plans, as well as Katzie access to those lands for the purpose of exercising asserted gathering and cultural practices, will be defined through agreement between the Katzie and the Proponent. Access to, and harvesting/cultural practices in, compensatory habitats will comply with terms and conditions of the DFO Authorization issued under section 35(2) of the *Fisheries Act*.

- At a minimum, revegetation will respect asserted Katzie traditions regarding provenance of biological materials, preferred biophysical setting and ceremonial aspects of planting.
- An environmental effects monitoring program will be implemented prior to, during and after construction to track potential adverse effects of the Project on the planted traditional use species.
- The monitoring program will be developed in consultation with the Katzie.
- Planting, monitoring and protection of asserted traditional use species in compensatory habitats will be subject to DFO authorization under section 35(2) of the *Fisheries Act*.

The Proponent reported that the District of Maple Ridge owns land adjacent to Katzie Slough between the 113B interchange and the CP Rail RoW, and views this as greenbelt and potential future parkland. There is an opportunity to plant indigenous plants at this location as well. The Proponent has agreed to pursue this matter with the District of Maple Ridge.

10.4 CULTURAL HERITAGE SITES AND PRACTICES

The Katzie First Nation maintains that the definition of its cultural heritage is not restricted to archaeological deposits, but also encompasses claimed traditional use and activity areas, spiritual and ceremonial sites, named locations (i.e. place names), cultural landmarks, and

other places that do not necessarily contain physical evidence of occupation and use, but which are nonetheless culturally significant to the Katzie people.

Potential Effects

Potential effects of the Project on archaeological resources and Katzie asserted traditional use activities (fishing, hunting and gathering) are discussed above under sections 9.5, 10.1, 10.2, and 10.3 respectively. Katzie I.R. lands will be visible from the proposed bridge, and the potential effects on privacy are discussed under section 10.5 – Privacy - below. The potential effects of noise from the Project on Katzie I.R. lands are discussed under section 10.6 - Noise - below.

Views from Katzie I.R. #1 and I.R. #2 will be partially impacted by the proposed bridge. The bridge will likely interfere with long-distance open vistas to the south and east, such as the view of Mount Baker, for residents of Katzie I.R. #1 in Pitt Meadows. The bridge may also affect views of the mountains north of the River for residents of Katzie I.R. #2 in Langley.

The Katzie's claims in regards to cultural heritage sites and practices included the following:

- In addition to archaeological resources, cultural uses also need to be respected.
- Potential damage or disruption to ancestral spirits caused by road construction and operation through, on or in close proximity to, cultural heritage sites. Spiritual disruption of this kind can have significant impacts upon the Katzie ceremonial community. The appeasement and care taking of ancestral spiritual needs represents a significant amount of work for Katzie spiritual leaders, and necessary ceremonial activities have economic and other costs, such as time. If human remains are encountered, in addition to archaeological and other requirements, management measures are also needed to address cultural protocols/requirements (e.g. ceremonial costs).
- The steady increase in development throughout the Katzie territory has meant a corresponding reduction in/destruction of Katzie cultural heritage sites. Consequently, those sites that remain intact (regardless of their significance as defined by outside agencies) represent a finite and valuable cultural treasure that might be impacted by the Project.
- Unauthorized collection of artefacts from, and disturbance of, Katzie cultural heritage sites is an ongoing problem throughout Katzie's claimed traditional territory. The Project could increase the amount of unauthorized disturbance/collection of previously and newly recorded sites by increasing ease of access or making information about sites known to the public. Confidentiality of information about existing and any new archaeological sites encountered during construction, needs to be maintained/ensured, and this applies to construction personnel.
- The Project will eliminate the rural character of the area. The influx of people into the area from the Project will mean that Katzie members are no longer able to use already restricted spiritual areas. The ceremonial activities practiced by the Katzie require conditions that are not characteristic of densely populated and/or well traveled areas. Thus, Katzie members have to travel farther and farther away from their

villages and smokehouses to practice ceremonies that could once be performed close to home. This has both cultural and economic implications.

- Loss of oral history transmittal and impacts on Katzie's sense of community as a result of the presence of the bridge in their territory, and in the visual field between I.R. #1 and I.R. #2. Culturally significant landmarks will be lost or over-shadowed by the Project. The bridge will interfere with visual sighting of traditional navigational landmarks. The Katzie need to play a significant role in ensuring that the Project is as aesthetically benign as possible to help mitigate this impact.

Mitigation

The Proponent acknowledges that there will be some impact on views from Indian Reserves, and appreciates the importance of the visual design of the bridge to not only the Katzie but also the general public. Design concepts for the bridge, including landscaping and visual design elements, will be presented to the public at the detailed design stage. In addition, the Proponent has committed to the use of a Construction Advisory Committee (since renamed the Community Liaison Committee) to provide input on design and construction related issues.

The Proponent does not believe that the Project will severely impair Katzie access to fish, animals, plants and places of importance to the Katzie. The Proponent also believes that movement between I.R. #1 and I.R. #2 will be made easier, not impeded, and that the bridge will itself become a landmark, even if it partially obscures views of other landmarks from some vantage points.

The Proponent has made a number of commitments that relate to the protection of cultural sites and 'found human remains', including the following:

- A protocol regarding the management of any human remains found during pre-construction assessments or during Project construction, including cultural and ceremonial aspects, will be determined through consultation with the Katzie First Nation and/or other applicable First Nations, and through agreements between relevant parties. The protocol will be consistent with the Archaeology and Registry Services Branch's policy on "Found Human Remains".
- Ceremonial aspects of newly discovered material or human remains will be addressed with the Katzie First Nation as required.
- The Proponent and Katzie First Nation will negotiate a confidentiality protocol with respect to archaeological data, such as may be generated by additional Archaeological Impact Assessments. The protocol will be consistent with the requirements of the *Heritage Conservation Act*.
- There is an opportunity to further address community cohesion through a Proponent commitment, proposed for inclusion in the benefits agreement which is currently being negotiated with the Katzie First Nation, to assist the Katzie in the preparation of a community plan.
- Also see sections 9.5 - Archaeological Resources, 10.5 - Privacy and 10.6 - Noise.

Katzie concerns in regards to the Project contributing to a general increase in development and population in the Pitt Meadows and Maple Ridge area were deemed beyond the scope of the environmental assessment of the Project. The bridge Project may be expected to add to other existing and future development pressures in the area, and relevant local governments will need to be aware of this. However, it is difficult to establish a direct causal relationship between the Project and general growth trends, when so many other factors are also contributing to growth locally, even without the bridge. Such impact predictions would be speculative and difficult to defend. In addition, whether or not these concerns are realized depends on whether or not the land use decisions of local governments accommodate or resist growth pressures. The issue is not one that is amenable to treatment through the EA process, since the jurisdiction for managing growth lies elsewhere. Katzie concerns with respect to treaty table implications of the Project are also beyond the scope of an EA review – treaty issues are handled in a separate trilaterally constituted forum.

10.5 PRIVACY

Katzie reserve lands will be visible from the proposed bridge. The Katzie longhouses on I.R. #1 are approximately 350-400 m west of the proposed bridge/roadway. The nearest home on Katzie I.R. #1 is approximately 450 m west of the bridge/roadway.

Potential Effects

The Katzie First Nation raised the issue of loss of privacy and other impacts on longhouses, and spiritual and ceremonial activities on Katzie I.R. #1. The Katzie are also concerned about the effects of the Project on privacy on I.R. #2.

Mitigation

The Proponent has proposed mitigation to address Katzie privacy issues, including the following commitments:

- A landscape plan will be developed and implemented specifically to mitigate visual, privacy, air quality and noise effects of the Project on Katzie I.R. #1, and to provide aesthetically pleasing, natural visual barriers between the Project and both residences and culturally-important locations on Katzie I.R. #1. Subject to agreement between the Proponent and the Katzie, opportunities will be provided to the Katzie to participate in the development and implementation of the plan, including long-term maintenance and monitoring.
- Vehicles will not be permitted to stop on the bridge, and oversight of I.R. #1 will be limited to pedestrians and cyclists on the bridge a considerable distance away.
- Where necessary, shielding will be installed on road/bridge lighting to direct light spill away from Katzie communities.
- Construction traffic will not be permitted to use roads within Katzie I.R. #1, including the portion of Wharf Street running through Katzie I.R. #1.

The Proponent maintains that Katzie I.R. #2, approximately 560 m to the east (upstream) of the Project corridor at its closest point, is a sufficient distance away that the privacy mitigation measures (as specified for Katzie I.R. #1) are not necessary.

10.6 NOISE

The current noise environment on the three Katzie reserves may generally be characterized by fairly steady, low-to-moderate levels of background noise (typically in the 45 to 55 decibel [dBA] range), created by distant industrial activity, and punctuated by brief, higher-level noise events from marine activity, aircraft and local activities. It is generally accepted that 55 dBA is the average level above which noise can begin to have some impacts on normal day-to-day living, primarily through interference with speech, relaxation and sleep.

When, together with small changes in overall sound level, the nature of the sound also changes, it is easier to perceive the change. Changes in the level of a given type of noise (such as traffic) in the order of 3 dBA are generally not noticeable unless there is an opportunity for an immediate comparison. When such an opportunity exists, a 3-dBA noise level increase is typically judged to represent an increase in loudness of about 20%. Typically a 5-dBA increase in the level of a given sound would be judged to represent about a 40% increase in its loudness. Typically a 10-dBA increase in the level of a given sound is judged to represent about a 100% increase, or a doubling, of its loudness.

Potential Effects

With respect to potential noise impacts once the Project is operational, the Application concluded that, due to the setback distances from the Project alignment and moderate baseline noise levels, projected Project traffic noise at the three Katzie First Nation reserves does not warrant special mitigation measures (i.e. mitigation under the MoT noise policy for mitigation is not triggered). Increased noise from construction activities is predicted to be noticeable but low in terms of the community reaction categories identified (Reaction Category I – No reaction although noise is generally noticeable).

The Katzie First Nation raised a number of issues with respect to noise from the Project and its potential effects on their members/communities, including the following:

- There is concern about noise from any bridge construction activities at night.
- There is concern about the impacts of different/specific kinds of noise, and the Katzie have raised questions about whether or not the assessment/analysis considered: any difference in the effects from noise traveling over water compared to land; any difference in the effects from traffic noise on wet vs. dry pavement; the effects/difference at the I.R. #1 boundary, which is closer to the bridge than the nearest home, where measurements were taken.
- The Katzie raised questions about how the baseline noise environments compare to typical community noise exposures elsewhere, how the noise from traffic on the bridge will vary throughout the day and night, how this will compare to variations in

the existing (baseline) noise environment, and in general, about the effects of increased noise on Katzie people.

- Additional monitoring is needed to confirm baseline conditions and specific events or anomalies. The method of monitoring and modeling noise levels in the assessment was inadequate.
- Reliance on MoT's noise policy to determine when mitigation is necessary is a concern. Mitigation of noise effects on Katzie communities should not be limited by MoT policy/criteria. The Katzie are interested in any measures which could help to minimize Project noise exposure on Katzie lands.
- Katzie members hold longhouse ceremonial activities in winter from the afternoon/evening to early morning, which is currently a quiet period, according to Katzie, and are concerned about if and how such noise will be mitigated.
- Katzie ceremonial activities are not just conducted inside longhouses, but include outside ceremonies as well.
- Once the Project is completed, the Katzie are interested in the approach to verifying that actual Project traffic noise exposure agrees with predicted values, and that pre-construction mitigation decisions were in fact warranted. The effectiveness of mitigation measures needs to be confirmed.

Additional analysis of potential Project noise effects on Katzie lands was conducted by the Proponent. Duplicate 24-hour noise monitoring was conducted at a location near I.R. #1. Previously summarized noise data were then reanalysed by plotting hourly baseline noise levels against predicted Project traffic levels for all three Katzie reserves. Preliminary traffic noise modeling results assumed a posted traffic speed of 80 km/ph. Increases in noise levels could be less if the posted speed on the bridge is 70 km/hr, as now planned.

The Proponent reported that:

- The height and location of the bridge over water was accounted for in predicting traffic noise levels at Katzie I.R. #1 and I.R. #2.
- There would not be any perceived noise difference between wet or dry bridge deck/pavement conditions within Katzie I.R. #1, due to bridge shielding at tire level.
- Because of the elevated position of traffic on the bridge and the noise shielding provided by the bridge parapet, there would only be a very gradual increase in traffic noise levels as one approached the eastern limit of I.R. #1 from the baseline monitoring location.
- Assuming windows are closed in winter, traffic noise levels inside longhouses are not projected to be sufficient to interfere with ceremonies.
- The average bridge traffic noise levels at Katzie I.R. #1 will typically be below 55 dBA during the daytime, and will fall below 50 dBA, and eventually to ~45 dBA during the late evening and night-time as traffic volumes steadily decrease. Traffic noise levels at night-time will be lower than the baseline levels created by other persistent sources such as industry. Due to its steady nature, traffic noise during the daytime will mask (obscure) other intrusive noises, such as noise from industry, aircraft and railway activity. It may also mask desirable natural sounds.
- Project traffic noise at Katzie lands (particularly I.R. #1 and I.R. #2) will tend to be more noticeable due to its character than to the associated increases in overall

community noise levels. The main effect that traffic noise will have on the Katzie will be a perceptual one. While acclimatization will occur over time, the initial perception will be that the nature of the noise environment has been altered due to the introduction of a more steady and somewhat more intense background noise which has a character that is relatively unobtrusive but different from the baseline noise environment.

- At times, Project traffic noise at Katzie I.R. #1 is projected to have hourly average levels 2 to 4 dBA higher than corresponding baseline noise levels. Depending on the time pattern which traffic on the bridge ultimately adopts (i.e. variation in hourly volumes with time of day and night), in 2016, increases of 4 to 5 dBA in the combined hourly average noise levels may be expected during some parts of the day. As the combined average noise levels from baseline and Project traffic approach, and at times exceed, 55 dBA, there may be minor interference with speech communications when outdoors. Given the anticipated levels, character and time pattern of Project traffic noise, it is not expected that it will disturb sleep to any significant degree.

Mitigation

The Proponent has made the following commitments to address potential noise impacts on Katzie communities:

- Additional assessment of potential noise impacts on Katzie communities will be completed during final design to determine possible noise mitigation measures that may be warranted to protect Katzie communities from adverse noise impacts during construction and/or operation of the Project. Additional baseline noise monitoring will be undertaken in Katzie communities as part of the assessment. Related noise mitigation measures will be implemented as agreed between the Proponent and the Katzie.
- Noise mitigation measures will not necessarily be limited to those provided for in the 1993 MoT Noise Mitigation Policy. Landscape measures to ensure privacy will also contribute to noise mitigation (e.g. perceived noise effects may be reduced by visually screening the noise source).
- Landscape measures to ensure privacy will also contribute to noise mitigation.
- To mitigate noise impacts from construction, Project night-time construction affecting Katzie communities will be prohibited from 9:00 p.m. to 7:00 a.m., in accordance with the most restrictive local municipal bylaw, unless otherwise agreed between the Katzie, the Proponent and the Contractor/Operator.
- Lands in the vicinity of the longhouses on Katzie I.R. #1 are of special significance to the Katzie, and serve an important Katzie need. In consultation with the Katzie, mitigation measures (e.g. earth berms, walls, wall-berm combinations, vegetation screens, etc.) will be implemented in close proximity to the longhouses on I.R. #1 to limit noise levels resulting from the Project. Noise monitoring will be conducted to track the performance of implemented noise mitigation measures. Corrective measures will be implemented if noise monitoring demonstrates that a 57-dBA L_{eq} (1 hr) limit is exceeded, and the exceedance is related to Project operations.

- Noise monitoring will be conducted at regular intervals during construction and operation of the Project to track the continuing applicability of assessment findings to Katzie communities, and to confirm that any noise mitigation implemented in the vicinity of Katzie communities continues to perform as intended to mitigate adverse marginal noise effects attributable to the Project. Monitoring results will be provided to the Katzie.

With respect to establishing a limit of 57 dBA L_{eq} (1 hr) (see the second-to-last bullet, above), it is understood that the longhouses on Katzie I.R. #1 have special significance in terms of potential noise impacts in that culturally significant ceremonies are held there, both outside and inside the buildings. There are no known noise guidelines or criterion specifically intended for application to such a ceremonial site. Some guidance in establishing an appropriate limit for highway noise in special situations such as the Katzie longhouses is provided by noise limits for various land use categories listed in U.S. Code of Regulations (CFR) Part 772, and promulgated by the U.S. Federal Highway Administration (FHWA). These Federal Noise Abatement Criteria (NAC) were established to identify noise thresholds at which the expenditure of federal (U.S.) funds may be warranted to mitigate noise from state or federal highway projects. Land use Category A is described as “.. *Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose ...*” The limit for Category A lands is set at L_{eq} (1 hr) 57 dBA. The Proponent has recommended that this limit apply at the Katzie longhouses.

10.7 AIR QUALITY AND HEALTH

Potential Effects

The Katzie First Nation raised several issues with respect to the potential air quality and related health effects of the Project on their members/communities, including the following:

- What impact will the Project have on the air quality of Katzie lands?
- What is the cumulative impact of the Project on the air quality of Katzie lands?
- How can one be sure that vehicle emissions will improve over time (as reported), and what if they don't improve?
- How will the air quality impacts of the Project affect the health of the Katzie First Nation? Does this assessment consider the different health profile of First Nations populations? Can the effects of the Project be compared against specific diseases more prevalent in First Nations populations and the Katzie community (e.g. asthma and diabetes)? Further study of the health profile of Katzie communities is needed to identify particular vulnerabilities.
- Air quality monitoring on Katzie reserves should occur during construction and operation of the Project, not just operation. Katzie should be consulted in establishing the methodology for such monitoring.

The Proponent reported the following in response to the issues raised by the Katzie.

Relevant health studies which are specific to First Nations populations are hard to find. However, modeling of health effects of the Project addressed vulnerable populations by using studies that gave increased weighting to health effects on those individuals who are most susceptible to disease, i.e. the young and the old. Comparing potential effects of the Project against diseases more prevalent in the Katzie community is not statistically meaningful, given that the effects of the Project are small compared to the other factors affecting the Lower Mainland airshed, and the size of the Katzie population is small (~500 individuals).

General Response Concerning Air Quality within the Katzie Communities

In the residential area located off-reserve on the north side of the Fraser River, identified as Location 1 in the Application, the residual impact of the Project will be low, and ambient concentrations are expected to remain below ambient air quality objectives. The ambient concentrations of traffic exhaust at this residential location are generally greater than the concentrations predicted for any locations within Katzie I.R. #1, #2 and #3. Only the northeastern tip of Katzie I.R. #1 has predicted ambient concentrations similar to (but lower than) that predicted for the residential area. Hence, the conclusions related to the air quality and health impacts at the residential area are valid for the northeast tip of Katzie I.R. #1. At all other locations within Katzie I.R. #1, #2 and #3, the air and health impacts are less than at the residential area.

The incremental impact of emissions from Project-related traffic is predicted to be such that ambient air quality objectives will be met within the Katzie communities for all exhaust pollutants. More specifically, ambient air quality objectives will be met beyond 20 to 50 m from the edge of the Project roadway.

Cumulative Impacts

The above conclusions included emissions from the Project and from the existing Lougheed and Trans-Canada Highways, plus background concentrations of various pollutants as determined from the GVRD's air quality monitoring stations. Hence, the above conclusions relate to the cumulative impact of the various pollutants. With respect to the Northwest Langley Wastewater Treatment Plant and emissions from stockpiles of lime located in the same area, the cumulative impact of the Project plus emissions from these sources on Katzie reserve lands will be minimal.

Changes in Vehicle Emission Rates Over Time

North-America-wide regulations are in effect to control emissions from motor vehicles. These regulations mean that manufacturers must build vehicles that comply with these emission regulations or they will not be able to sell their products in North America. Consequently, it is reasonable to expect that emission rates for vehicles traveling on the Project will be lower in 2021 than in 2011. Even assuming that vehicle emission rates remain constant, the predicted ambient concentration of all pollutants within Katzie communities in 2021 will remain below ambient objectives for the Project.

Estimating Non-Cancer Health Risks of Air Pollutants

Non-cancer health effects can arise from short-term and long-term exposure to concentrations of air pollutants above certain threshold levels. Hazard indices were determined for nine sensitive areas of the human body, such as the respiratory system, the cardiovascular system, the eye, the skin and others. With the methodology used to assess adverse health effects, a combined hazard index of 1 represents a threshold below which no health impacts are noted.

Acute (short-term) non-cancer health impact:

- For 2011 and 2021, the combined acute inhalation hazard index for target organs, except the respiratory system, is below or within the order of magnitude of the acceptable hazard index threshold of 1.0.
- For 2011, the combined acute inhalation hazard index for the respiratory system indicates a marginally increased acute hazard. Within the Katzie lands the inhalation hazard index will be lower than that for the residential location.
- Acute non-cancer health risks associated with emissions of criteria and non-criteria pollutants from the Project are not expected to be significant in the Katzie communities. There is a slight chance of short-term, episodic respiratory responses to ambient concentrations of pollutants.

Chronic (long-term) non-cancer health impact:

- The combined chronic hazard index for all target organs is below the acceptable hazard index of 1.
- Chronic non-cancer health risks associated with emissions of criteria and non-criteria pollutants from the Project are expected to be insignificant.

Estimating Cancer Health Risks of Air Pollutants

For a small population, the risk of any one individual getting cancer as a result of exposure to traffic exhaust from the Project is very small. For a population of 500 people, the risk of additional cases of cancer is equivalent to 1 case every 10,000 years.

Assessing the Health Risks of Particulate Matter PM_{10} and $PM_{2.5}$

The incremental effect of the Project on the combined mortality, respiratory hospital admissions and cardiac hospital admissions was determined for both 2011 and 2021 to be less than 0.2 in a population of one million people exposed continuously to vehicle emissions from the Project. For a population of 500, this is equivalent to 1 case every 10,000 years.

Comparative Population Health Risks

The annual incremental risks of mortality per 100,000 people from Project emissions are much smaller than health risks associated with other causes. Although there are some potential health risks associated with traffic emissions from the Project, these risks are

relatively small compared to existing individual health risks reported in local studies and other risks faced by the average individual on a daily basis.

Mitigation

Air quality monitoring will be conducted at regular intervals during construction and operation of the Project to track the continuing applicability of assessment findings to Katzie communities. Monitoring results will be provided to the Katzie.

If ambient monitoring indicates that traffic emissions are adversely impacting local air quality, there are some forms of mitigation that can be carried out. The simplest is to plant a barrier of trees along the edge of the Project roadway. The trees will tend to interrupt the airflow across the roadway and hence interfere with the dispersion of the exhaust pollutants.

10.8 OTHER COMMUNITY EFFECTS

Other issues raised by the Katzie First Nation in regards to the potential effects of the Project on their communities include the following:

- A concern with regard to the extent/depth of the community cohesion discussion in the Application, and the suggestion in the Application that these impacts are not applicable to the Katzie.
- A concern that imposition of a bridge toll in concert with the elimination of the Albion Ferry could impact Katzie communities by making regular travel between I.R. #1 and I.R. #2 financially prohibitive. In expressing this concern, the Katzie questioned the process that was followed to establish the price of the toll and whether opinion polls were taken to assess the level of support for tolling.
- The potential for the bridge to be used by individuals contemplating suicide and the impacts that this could have on the Katzie community, which is sensitive in this regard. Katzie youth are at a higher risk than the youth in other communities. Individuals contemplating suicide tend to consider the nearest option on the spur of the moment.
- Katzie First Nation would most likely be first responders for anyone committing suicide off the bridge, regardless of whether or not they are a member of the Katzie Community.
- The need to ensure the safety of women near the construction site, especially at night.
- Potential development of a “crime corridor” between Surrey/Langley and Pitt Meadows/Barnston Island.

The Proponent clarified that “community cohesion”, as defined for the purpose of impact assessment, refers to the actual cleaving or bisecting of a neighborhood by the alignment. The alignment of the Project does not cross through reserve land, therefore it does not bisect any Katzie neighborhoods. However, the Proponent has committed to meetings and discussions with the Katzie First Nation during the design, construction and operational phases of the Project for the purposes of addressing and resolving issues that could arise over the duration of the Project, including general community effects.

Based on studies conducted for the Proponent by experts in tolling, the Proponent expects toll rates to be set at approximately \$2.50 per crossing. The Proponent estimates the real costs of travelling from I.R. #1 to I.R. #2 via either the Port Mann Bridge or the Albion Ferry (if the latter continues to operate) to be greater than the price of the toll. In the event that the Albion Ferry stops operating, and consistent with current provincial policy on tolling, the Port Mann Bridge and Mission Bridge will continue to provide alternative, non tolled crossings of the Fraser River for those who perceive the toll to be a financial burden. In addition, pedestrian, cycling and transit options that do not currently exist will be created by the Project.

The Proponent noted that the Application referred to a survey of Greater Vancouver residents commissioned to determine public opinion on a range of transportation topics, including tolling. The survey was conducted by Ipsos-Reid from March 27 to April 15, 2003, and included 1,000 telephone interviews. The results are summarized below.

- When questioned about support for various funding options for the range of transportation projects that are being considered in the Lower Mainland, one-quarter strongly or somewhat supported user pay.
- When questioned about acceptance of electronic tolling on newly-constructed bridges and roads, more than half the respondents (59%) indicated that tolls should comprise a medium-sized or large part, of the funding.
- When the same question was asked about tolling existing bridges and roads, the acceptance level dropped by half to 32%.
- The survey asked respondents to rate their degree of support for a variety of funding sources. The responses suggest that electronic tolling of newly constructed bridges and roads is the most desirable (48%).

Subsequent to the above-mentioned survey, reported in the Application, TransLink completed three public opinion surveys in 2003, with each survey comprised of 1000 randomly selected residents. When asked to choose from a variety of funding sources to pay for major transportation improvements, 80% of respondents (averaged over the three surveys) supported tolls on new bridges and roads. The surveys are considered representative of the opinions of GVRD residents.

The Proponent noted that, in view of the developed nature of the area where construction will occur, and the ability of construction workers to commute daily from their own homes, there will be no need for residential construction camps. Construction areas will be cordoned off and supervised, and should not pose special safety risks to the Katzie First Nation community. The Proponent has committed to no night-time construction for reasons of noise management in work areas near Katzie communities.

The Project will not provide direct access to Katzie Reserves I.R.# 1 and 2. Since potential crime-motivated traffic from Surrey/Langley will not have direct access to the Katzie Reserve, an increase in bridge-related on-reserve crime is not expected.

Mitigation

With respect to the issue of suicide prevention, the Proponent made the following commitment:

- Bridge design will include suicide prevention measures. The Proponent will evaluate proposed suicide prevention features and their justification in selecting the successful contractor/operator. The effectiveness of suicide prevention measures will be monitored during operation. Depending on monitoring results, additional suicide prevention features may be added, as agreed between the Proponent, Katzie and other relevant parties.

10.9 CONCLUSIONS

Conclusions - Katzie First Nation

Some 73 days of additional time for review, discussion and meetings were provided through suspension of the standing legislated 180-day deadline for completing the review of the Application to address various issues, including Katzie concerns. During this period, additional information and commitments were provided by the Proponent on issues raised by the Katzie, as noted in the EAO's March 26, 2004 letter. This extra period of exchanges did not fully resolve issues to the satisfaction of the Katzie.

The Katzie First Nation remains of the view that:

- the construction and existence of a bridge with any piers in the river will leave the Katzie with significant long-term impacts, and, though more expensive, a tunnel should be considered a viable option;
- until the design and construction methods of the Project are fully known and Katzie issues are addressed, the environmental assessment is incomplete;
- consultation and accommodation has not been complete or adequate;
- concerns about the Project have not been addressed, and treatment of the Katzie's special interests, relationship to the territory, or the unique impacts that Katzie community members are likely to experience as a result of the Project, have not been appropriate or satisfactory;
- even with the mitigation measures contained in the Proponent's list of commitments, the Project will still have numerous long-term adverse residual impacts on Katzie asserted use of resources for traditional purposes, and Katzie communities, rights and interests, that will be significant in severity, extent and duration;
- compensation offered by the Proponent during negotiations on a benefits agreement does not reflect the significant, long-term impacts of the Project on the Katzie, and accommodation of Katzie rights and interests must include compensation for the impacts of the Project that are not fully mitigated;
- the burden resulting from the Proponent's efforts to realize cost-savings in developing the Project (i.e. a bridge vs. a tunnel) will not be accepted by the Katzie; and
- the Project will infringe Katzie asserted aboriginal rights and title.

The Katzie maintain that numerous impacts that they identified have not been addressed at all by commitments from the Proponent, including:

- the impacts of tolls on Katzie members (especially when combined with the discontinuation of the Albion Ferry);
- distrust of consultation;
- impacts of the Project on their treaty negotiations;
- impacts of future land development (that is facilitated or made possible by reason of the Project) on the Katzie;
- loss or disruption of cultural sites, landmarks and views of culturally significant natural landmarks;
- interference with the transmittal of oral history;
- community and social cohesion; and
- potential development of a “crime corridor” between Surrey/Langley and Pitt Meadows/Barnston Island.

The Katzie maintain that the Project/bridge will adversely impact their culture, traditions and way of life, and that all of the specific concerns about the Project that have been raised by the members of their community are related to, and will impact, these values. They maintain that, if the Project proceeds, views of important cultural landmarks such as the Golden Ears and Mount Baker will be impacted, they will not be able to teach their children the ways of traditional uses (fishing and hunting) and to be thankful to the Creator, and as they do not have a written language and their traditions are passed down verbally, their already eroded traditions and culture will be severely impaired.

The Katzie indicated to the Proponent and DFO that it may be possible for DFO to provide longer and more frequent fishery openings, or different opportunities within Katzie territory. Any such opportunities have not yet been identified or confirmed.

The Katzie indicated that they were discussing a Benefit or Accommodation Agreement with the Proponent as a means of mitigating the residual adverse impacts of the Project and justifying asserted infringement of their aboriginal rights and title, but that successful completion of the agreement should not be deferred until after an EA Certificate is issued for the Project. At the time of referral of this report to Ministers, the Katzie and the Proponent have not been able to conclude such an agreement.

Conclusions - EAO and Federal Responsible Authorities

The Proponent has committed to the following with respect to continued consultation with the Katzie First Nation:

- Jointly with the Katzie First Nation, to negotiate a Katzie-Proponent Project Agreement, committing to a benefits package that will provide for financial compensation as well as opportunities for contracting of Katzie services, construction and operational phase employment and other benefits and opportunities for the Katzie.
- Consistent with the proposed Katzie First Nation-Proponent Project Agreement and the Table of Commitments and Assurances (see Appendix A), meetings and

- discussions with the Katzie will continue through the design, construction and operational phases of the Project for the purpose of resolving issues raised in the August 2003 “Katzie Land Use, Occupancy, and Impact Assessment Study” (KUS) or other issues affecting Katzie principles and interests (e.g. hunting). Such Proponent consultation efforts will be made on a ‘best-efforts’ basis, and will be dependent upon the willingness of the Katzie to engage in such consultations. This over-arching commitment applies to all references to consultation with the Katzie listed in the Table of Commitments and Assurances for specific issues (Appendix A).
- Cooperation with the Katzie First Nation during the course of Project implementation will be consistent with the terms of written agreements in place with the Katzie and the Table of Commitments and Assurances (see Appendix A). Based on input from the Katzie, the Contractor/Operator will be required to develop and implement a Katzie First Nation Communications Plan applicable to the design and construction phase of the Project.

The Proponent did consider the option to implement the Project entirely by means of tunnelling along the proposed alignment, but the tunnel-only option was found not to be feasible for many reasons (see section 4.4 – Project Alternatives).

The Proponent rejected the Katzie recommendation of mediation to assist the parties in concluding a Benefit or Accommodation Agreement. If the parties are unable to successfully conclude such an agreement, including any offer of financial compensation, through negotiation, the Proponent has advised the EAO that it will make a formal offer to the Katzie for their acceptance or rejection.

The construction and operation of the Project may have some impact on Katzie First Nation interests and communities, but the extent of this will not be known until the final design of the Project or its construction has been completed. However, the EAO and federal Responsible Authorities (with advice from Health Canada on matters of relevance to health issues) are satisfied that:

- First Nations consultation, including distribution of information, has been adequately carried out by the Proponent;
- the Proponent will continue to conduct appropriate broadly-based consultation with First Nations, if First Nations are willing to participate;
- issues identified by First Nations that were within the scope of the EA process were addressed to the degree possible by means of impact mitigation measures during the review of the Application;
- where possible, practical means have been identified to prevent or reduce potential significant adverse effects of the Project on First Nations interests, including any effect on change to the current use of lands and resources for traditional purposes by aboriginal persons; and
- the opportunity exists for any residual effects of the Project on First Nations interests to be addressed by the Proponent through a benefits agreement that may, for example, include financial compensation or employment, training and/or contracting opportunities.

11. ENVIRONMENTAL MANAGEMENT

The Application describes the environmental management approach that would be used in implementing the Project. The approach includes the development and implementation of environmental performance standards and an approved Environmental Management Plan (EMP), and external environmental auditing for compliance.

The Proponent will prepare environmental performance criteria to be included in its Request for Proposals to build the Project, and elaborated upon in contract documents. These criteria would establish minimum environmental requirements that the prospective developer(s) and contractor(s) would be required to meet or exceed in building the Project. Factors that would be taken into account in developing the criteria include:

- regulatory requirements arising from the EA review of the Project;
- Proponent's agreements with First Nations and other stakeholders;
- applicable environmental legislation, regulations, etc.;
- regulatory requirements relating to authorizations, approvals and other permits;
- bylaws and other requirements of the GVRD and local governments affected by the Project; and
- applicable standards and codes of practice for projects of this type, such as MoT standards.

An approved EMP would be in place prior to construction of the Project. The EMP would consist of the following component plans which the Proponent would circulate to appropriate federal, provincial and local government agencies and First Nations for review:

- Environmental Consultation/Communication Plan;
- Environmental Training/Orientation Plan;
- Environmental Monitoring Plan;
- Archaeological Contingency Plan;
- Hazardous Materials Management Plan;
- Contaminated Soils Management Plan;
- Spill Contingency and Response Plan;
- Waste Management Plan;
- Vegetation Debris Disposal Plan;
- Construction Noise Monitoring Plan;
- Construction Air Quality Monitoring Plan;
- Construction Traffic Management Plan;
- Erosion and Sediment Control Plan;
- Water Quality Monitoring Plan;
- Schedule of Environmentally Sensitive Activity;
- Wildlife Mitigation Plan;
- Riparian Restoration Plan;
- Terrestrial Revegetation Plan; and
- Reclamation Plan.

The Proponent will retain a qualified, independent environmental monitor to facilitate and track compliance with environmental requirements. The environmental monitor will have the authority to direct and order suspension of construction activities.

Issues Raised and Proponent Responses

Issue: DFO expressed concern about statements in the Application indicating the Proponent would require the developer that builds the Project to address certain issues. Specifically, there was concern about the number of issues being deferred to the developer/builder for resolution. Firm commitments for certain issues needed to be made by the Proponent, unless these could clearly be addressed by or through some other mechanism.

Response: The Proponent acknowledged the need for more specifics on environmental commitments to complete the EA review, environmental performance criteria and habitat compensation concepts. Revised commitments were provided and are included in Appendix A of this report.

11.1 CONCLUSIONS

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments. Based on this information, the EAO and the federal Responsible Authorities are satisfied that acceptable Environmental Management Plans, including monitoring, will be developed and implemented and for the Project.

12. FEDERAL CEAA REQUIREMENTS

The Application addressed several factors that required consideration under *CEAA* by the federal Responsible Authorities. These factors included:

- environmental effects of the Project, including effects on species identified in Schedule 1 of the *Species at Risk Act*;
- environmental effects of accidents or malfunctions which may occur in connection with the Project;
- effects of the environment on the Project;
- effects of the Project on the current use of land and resources for traditional purposes by aboriginal persons;
- the significance of residual environmental effects of the Project after mitigation measures have been incorporated; and
- cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out.

12.1 ENVIRONMENTAL EFFECTS OF THE PROJECT

The Application addressed a broad range of potential environmental effects of the Project. These are discussed in detail in preceding sections of this Assessment Report, and include:

- fisheries and aquatic resources;
- vegetation, wildlife habitat and wildlife;
- contaminated sites;
- air quality;
- noise;
- agricultural resources;
- community and socio-economic effects;
- archaeological resources; and
- First Nations interests, including fishing, hunting, gathering, cultural heritage sites and practices, privacy, noise, air quality and health, and other community effects.

With respect to most of these issues, the Proponent was requested to provide clarification or additional information for evaluation during the Application review stage. In some cases, adjustments were made to the design requirements of the Project, and additional mitigation measures were agreed upon. Many commitments that will minimize adverse environmental effects of the Project are detailed in the attached Table of Commitments and Assurances (see Appendix A). Further details pertaining to fish habitat will be addressed in the *Fisheries Act* section 35(2) authorization which DFO will have to issue for the Project to proceed.

12.2 ACCIDENTS AND MALFUNCTIONS

The Application outlined preventative/proactive environmental protection measures that, with emergency response planning, will prevent or mitigate the risk of environmental effects from accidents and malfunctions during construction and operation of the Project. Some additional measures were agreed upon during the Project review, and these are identified in the Table of Commitments and Assurances (see Appendix A).

Detailed measures to address potential construction accidents and malfunctions, such as fuel spills, sediment discharges and other events, will be specified in an EMP. This EMP will be developed and approved for the Project prior to construction. Operation of the Project is not expected to differ significantly from the operation of other road and bridge projects in the Lower Mainland. Safety considerations are being considered in the design of the Project, and this should lead to a safer roadway, with fewer accidents and emergency situations. An environmental management system would be implemented for operation/maintenance of the Project that will include an Emergency Response Plan component, developed in compliance with applicable federal and provincial legislation, regulations and standards, as well as with regional and local government bylaws and standards. These measures are expected to ensure minimal impacts on the environment. The Proponent has addressed the issue of accidents and malfunctions to the satisfaction of the federal Responsible Authorities.

12.3 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The Project will incorporate appropriate design requirements to address catastrophic events such as floods and earthquakes. The most significant potential effect of the environment on the Project is the possibility that a major Fraser River flood event could potentially damage the structural integrity of the bridge. The Application addresses the potential long-term and short-term impacts from flooding, and identifies contingency planning measures. The Application discusses and addresses potential geotechnical hazards. This includes long-term design and operational concerns with respect to seismic events (earthquakes) and slope failures, and short-term slope failure risks related to construction activities.

The bridge will be designed to withstand up to a 1-in-200-year flood; a 1-in-1000-year earthquake (the bridge would sustain only minor damage after a 1-in-475-year earthquake), and a 1-in-100-year windstorm.

12.4 CURRENT FIRST NATIONS USE OF LAND AND RESOURCES

For discussion on the current use of land and resources for asserted traditional purposes by aboriginal persons, refer to section 10 – First Nations Interests, notably sections 10.1 – Fishing, 10.2 – Hunting, 10.3 – Gathering, 10.4 - Cultural Heritage Sites and Practices and 10.9 - Conclusions.

Given the importance of the Project area to the Katzie First Nation, issues pertaining to potential impacts of the Project on Katzie reserves, and on activities in the vicinity of the Project, were given careful consideration. With respect to the issue of hunting, the federal Responsible Authorities are relying upon the expertise of provincial agencies to address potential adverse effects. The federal Responsible Authorities relied on expert advice from Health Canada to evaluate potential adverse effects of the Project on noise, air quality and health, and other community effects.

Given that the final bridge design is unknown at this time, DFO has agreed to work with the Katzie First Nation to determine the level of impact on the Fraser River salmon fishery once the final design is known, and to work with the Katzie to find viable solutions for addressing any residual impacts.

DFO will also work with the Katzie First Nation to incorporate culturally relevant plants into the fish habitat compensation works that will be required as a condition of the *Fisheries Act* Section 35(2) Authorization which will have to be issued by DFO for the Project to proceed. This may provide Katzie with increased opportunity to enjoy and gather plants of cultural significance within their claimed traditional territory.

12.5 CUMULATIVE ENVIRONMENTAL EFFECTS

The Cumulative Environmental Effects Assessment for the Project was submitted as part of the Application Supplement (Component 3). Of the residual effects identified in the

Application, further analysis of cumulative effects was completed for fisheries and aquatic resources, and for vegetation, wildlife habitat, and wildlife. The impact assessments completed for air quality, noise, and public health included a cumulative effects component. Those assessments used modeling that was driven by traffic data which had already factored in the cumulative effects of other projects. Further assessment of air quality, noise, and public health effects, therefore, was not considered necessary.

Agricultural and archaeological resources were excluded by the Proponent from further analysis, on the basis that there are no ongoing or imminent projects with which residual effects of the Project can interact cumulatively. The federal Responsible Authorities consider that additional development pressures (other road building projects, urbanization, etc.) will have the potential to affect agricultural and archaeological resources, however, the Provincial Government has the authority to manage such impacts via the authority of the Agricultural Land Commission and the *Heritage Conservation Act* respectively.

The Application assessed the cumulative effects of the Project using the Project's contribution to the total impervious area in a watershed as an indicator of ecosystem health. In addition, the assessment considered the cumulative effect of the Project on the regional major road network. The Application concluded that, with mitigation, residual cumulative effects are likely from increased impervious surface area and increased fragmentation of habitat, but that the significance of these effects is low. There was some uncertainty regarding the cumulative contribution of the Project to impervious surface area in two small tributary watersheds south of the Fraser River, and related monitoring would be undertaken.

Issues Raised and Proponent Responses

Issue: EC expressed concern that the cumulative effects analysis did not include the proposed South Fraser Perimeter Highway (SFPH).

Response: The Proponent indicated that considerable uncertainty remains regarding the alignment of the SFPH project, and noted that this Project triggers both the *BC EA Act* and *CEAA*, and once more precisely defined, will require its own cumulative effects assessment, including an assessment of any potential interaction with the New Fraser River Crossing Project.

EC's concerns with respect to cumulative effects of the proposed SFPH will be at least partially addressed by the recent agreement reached by EC the B.C. Ministry of Transportation and the Proponent to begin developing a strategic regional approach for other road building projects in the Lower Mainland, with the objective of minimizing additional cumulative impacts on important wildlife habitats.

12.6 CONCLUSIONS

The EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments;

and supplemental information provided by the Proponent, including responses to issues identified, mitigation measures and commitments. Based on this information, the federal Responsible Authorities are satisfied that the factors requiring consideration under *CEAA* were adequately addressed, and that the Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the mitigative measures that the Proponent has committed to implement.

13. PERMITS, LICENCES AND AUTHORIZATIONS

The following permits, licences and authorizations are required for constructing the Project.

Permit Type	Discipline	Relevant Authority
Authorization under section 35(2) of the federal <i>Fisheries Act</i>	Fisheries/Aquatics	DFO
Permit under section 5(1) of the federal <i>Navigable Waters Protection Act</i>	Navigation	Transport Canada - NWPD
Permit for bridge tenure from Fraser River Port Authority	Use of River	Fraser River Port Authority
Approval under section 101(3) of the Canada <i>Transportation Act</i>	Railways	Canadian Transportation Agency
Heritage Investigation Permit under section 14 of the <i>Heritage Conservation Act</i> (to mitigate 3 sites identified to date)	Archaeology	MSRM
Alteration permits under s. 12 of the <i>Heritage Conservation Act</i>	Archaeology	MSRM
Notifications pursuant to regulations under the BC <i>Water Act</i> (re. stream crossing construction)	Water Management	LWBC
Permit under the <i>Wildlife Act</i> for fish/wildlife salvage preceding stream crossing construction	Wildlife	MWLAP
Approval under the ALR <i>Use, Subdivision and Procedure Regulation</i>	Agriculture	ALC
Permit to construct, alter or repair a sewage disposal system (re. septic fields) pursuant to Sewage Disposal Regulation (411/85) under the <i>Health Act</i>	Health	FHA
Municipal permits, licences and authorizations	Various	GVRD and 4 Local Municipalities

PART D CONCLUSIONS

14. CONCLUSIONS

The Districts of Maple Ridge and Pitt Meadows, the Township of Langley, and the City of Surrey have accepted the alignment of the Project, with the exception of the potential for a minor variation of the Couplet connecting to the south end of the bridge in Langley. Final details of the alignment of the Project at this location will be resolved between the Township of Langley and the Proponent after Project certification.

Impacts of the Project on fish and fish habitat and on Pacific water shrew habitat are expected to be compensated for in Unnamed Creek. Noise, air quality, and other socio-community impacts have been mitigated to the extent possible.

With respect to impacts on agricultural operations, the Agricultural Land Commission and the Ministry of Agriculture, Food and Fisheries have accepted the alignment of the Project, with the exception of an approximately 0.5 kilometre section of the Abernethy Connector in Maple Ridge, where they have accepted a 100 metre wide corridor within which the final alignment of the roadway will be established at the permitting stage, if the Project is granted an EA Certificate.

The Katzie First Nation has indicated that the Proponent has not fully addressed many of its concerns, and that the Project will have residual effects, even taking into account proposed mitigation measures. The EAO and federal Responsible Authorities are satisfied that the Proponent has proposed, and committed to, numerous location, design and other impact management measures which will minimize effects to the extent practicable, given that final design details for the Project will not be known until after the Project receives an EA Certificate and, through a bidding process, the Proponent has selected a party with which to enter into a design/build arrangement to deliver the Project. They are also aware that the Proponent and the Katzie are attempting to negotiate an economic benefits agreement, comprising cash compensation and job, training and contracting opportunities for Katzie, and that negotiations are continuing.

In conclusion, the EA review of the Project has considered: the information contained in the Application (including the Abernethy Connector Supplement to the main Application); comments from the public, First Nations, federal and provincial government agencies, and local governments; and supplemental information provided by the Proponent, including responses to issues identified, proposed mitigation measures and commitments.

In conclusion, the EAO and federal Responsible Authorities are satisfied that:

- the Application and Application Supplement, together with additional information subsequently provided at the request of these agencies, adequately identified and assessed the potential significant adverse environmental, economic, social, heritage, and health effects of the Project, including potential effects on First Nations interests;

- public and First Nations consultation, and the distribution of information about the Project, have been adequately carried out by the Proponent;
- issues identified by the public, First Nations and federal, provincial and local government agencies, where they were within the scope of the EA, were adequately addressed by the Proponent during the review of the Application; and
- practical means have been identified to prevent or reduce to an acceptable level most potential significant adverse effects arising from the Project, and appropriate compensation measures are proposed where an acceptable level of impact management is not achieved solely by means of Project design and implementation measures.

Based on the information provided by the Proponent, the Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the mitigation measures committed to by the Proponent.

APPENDICES

APPENDIX A TABLE OF PROPONENT'S COMMITMENTS AND ASSURANCES

APPENDIX A

**NEW FRASER RIVER CROSSING PROJECT:
TABLE OF COMMITMENTS AND ASSURANCES**

June 15, 2004

TABLE OF CONTENTS

A. Environmental Management (General)	1
A1. Environmental Performance Criteria	1
A2. Environmental Management System	2
A3. Environmental Management Plan	4
A4. Environmental Oversight	5
B. Technical	5
B1. Fraser River Bridge Design	5
B2. Roadway Design – Right-of-Way	7
B3. Drainage	7
B4. Navigable Water	8
B5. Contaminated Sites	10
B6. Accidents and Malfunctions	11
B7. Utilities	13
B8. General Construction	14
B9. Operations and Maintenance	14
C. Fisheries and Aquatic Resources	15
C1. Habitat Compensation	15
C2. Environmental Management Plan – Fisheries and Aquatic Resources	16
C3. Best Management Practices	18
D. Wildlife, Wildlife Habitat and Vegetation	22
D1. Additional Assessment	22
D2. Habitat Compensation and Conservation	23
D3. Best Management Practices	23
E. Agricultural Resources	29
E1. Property Specific mitigation	29
E2. Operations and Maintenance Commitments	33
E3. Net Agricultural Benefit	34
F. Archaeology	34
F1. Impact Management (General)	34
F2. Additional Archaeological Impact Assessment	35
F3. Archaeological Contingency Plan	37
F4. Archaeological Monitoring	37
F5. Site Specific Commitments	38
G. Socio-community and Socio-economic (SCSE)	39
G1. Continuing Consultation on SCSE Matters	39
G2. General Mitigation Measures	40
G3. Specific Mitigation (Katzie First Nation: Page 46)	41
H. Air Quality	47
H1. Construction Phase	47
H2. Operational Phase	50
I. Noise	50
I1. Design Mitigation	50
I2. Construction Noise Management/Monitoring Plan	51
I3. Construction Noise Mitigation – Best Management Practices	52
I4. Commitments during Post-Construction Phase	55

TABLE OF COMMITMENTS AND ASSURANCES – June 15, 2004

The following Table identifies Fraser Bridge Project Ltd. (FBPL) and/or TransLink commitments related to the EAO certification of the New Fraser River Crossing Project (FRC). All references to undertakings by the Contractor/Operator represent Fraser Bridge Project Ltd. commitments. In this Table, it is understood that FBPL is a Relevant Party on all commitments. Other Relevant Parties named opposite individual commitments include agencies or authorities with a pertinent, legislated mandate to fulfill with respect to the FRC and/or parties that will receive information for review and comment.

ALC	Agricultural Land Commission	FBPL	Fraser Bridge Project Ltd.	MAFF	Ministry of Agriculture, Food and Fisheries
CEAA	Canadian Environmental Assessment Agency	FHA	Fraser Health Authority	MoT	Ministry of Transportation
CWS	Environment Canada, Canadian Wildlife Service	GVRD	Greater Vancouver Regional District	MSRM	Ministry of Sustainable Resource Management
DFO	Fisheries and Oceans Canada	HC	Health Canada	NWPD	Navigable Waters Protection Division of Transport Canada (TC)
EC	Environment Canada, Environmental Protection	KFN	Katzie First Nation	WLAP	Ministry of Water, Land and Air Protection

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
A	ENVIRONMENTAL MANAGEMENT (GENERAL)		
A1	<p>Environmental Performance Criteria</p> <p>Fraser Bridge Project Ltd. (FBPL) will prepare minimum environmental performance criteria (EPC) that the Contractor/Operator will be required to meet. The EPC are elaborations of the more general environmental protection commitments summarized in this Table. Responsibility for attaining the EPC will be transferred to the Contractor/Operator through the contracting process.</p>	Contracting Phase	

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>The environmental performance criteria will require the Contractor/Operator to comply with at least the following:</p> <ul style="list-style-type: none"> FBPL environmental objectives including commitment to regional environmental objectives as outlined in the Livable Region Strategic Plan; Applicable environmental legislation, regulation, standards and codes of practice; Regulatory requirements arising from the BCEAA/CEAA environmental review; Regulatory requirements relating to authorizations, approvals and other permits; Bylaws and other requirements of GVRD and municipalities affected by the project; and FBPL/TransLink agreements with Katzie First Nation and other stakeholders. <p>FBPL will provide an Environmental Oversight function to audit environmental compliance with the terms of the Environmental Assessment Certificate.</p>		
A2	<p>Environmental Management System</p> <p>The Contractor/Operator will be required to implement an Environmental Management System (EMS) that conforms to the principles of ISO 14000 or equivalent. In addition, minimum requirements for the EMS will include, but not be limited, to:</p> <ul style="list-style-type: none"> Qualified environmental personnel; Integration of Contractor/Operator's EMS with the FBPL's Environmental Oversight Program; Mechanism for managing compliance with the EAC, the DFO Authorization and other permits, licenses and approvals; Acquisition of environmental permits under the Contractor/Operator's control; 	Design, Construction and Operation	

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Mechanism for integrating environmental objectives and requirements with the design process;</p> <p>Environmental management of the Contractor/Operator’s partners, affiliates and subtrades including provision of a mechanism that requires them to meet project commitments and comply with related environmental requirements;</p> <p>Contractor/Operator’s environmental quality management and integration with the Contractor/Operator’s overall quality management program;</p> <p>Environmental monitoring; and</p> <p>Environmental reporting.</p>		
	<p>Environmental Monitoring</p> <p>The Contractor/Operator will be required to retain the services of a qualified, independent environmental monitor or environmental monitoring firm (the “Environmental Monitor”) to facilitate and track the Contractor/Operator’s compliance with project specific environmental requirements (“environmental requirements”) as described in: the Environmental Assessment Certificate; other project specific environmental permits, licenses or approvals; the Contractor/Operator’s EMP; environmental section(s) of the contract documents; and, more generally, applicable environmental legislation, regulation, policy, standards, and best management practices.</p> <p>The Environmental Monitor will have the authority, and will be under obligation, to direct and order the immediate suspension of construction activities that, in the Environmental Monitor’s judgment, may contribute to present or potential unacceptable non-compliance with the above listed environmental requirements or otherwise may contribute to present or potential unacceptable environmental risk.</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
A3	<p>Environmental Management Plan</p> <p>The Contractor/Operator will be required to prepare and implement an Environmental Management Plan (EMP) that includes at least the following components:</p> <p>Schedule of Environmentally Sensitive Activity;</p> <p>Clearing and Vegetation Debris Disposal Plan;</p> <p>Fisheries and Aquatic Habitat Protection Plan;</p> <p style="padding-left: 40px;">Fisheries and Aquatic Habitat Mitigation and Compensation Plan</p> <p style="padding-left: 40px;">Drainage, Erosion and Sediment Control Plan</p> <p style="padding-left: 40px;">Water Quality and Habitat Protection: Concrete Works</p> <p style="padding-left: 40px;">Water Quality Monitoring Plan</p> <p>Wildlife Mitigation Plan;</p> <p>Riparian Restoration Plan;</p> <p>Hazardous Materials Management Plan;</p> <p>Contaminated Soils Management Plan;</p> <p style="padding-left: 40px;">Imported soil sampling/testing</p> <p style="padding-left: 40px;">Excavated soil sampling/testing</p> <p>Waste Management Plan;</p> <p>Spill Contingency and Emergency Response Plan;</p> <p>Construction Air Quality Monitoring Plan;</p>	<p>Plan preparation will follow contract award; Plan implementation is through design and construction</p>	<p>DFO, NRPD, CWS, GVRD, MSRM, and WLAP</p>

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Construction Noise Monitoring Plan; Reclamation and Terrestrial Revegetation Plan; Archaeological Monitoring and Contingency Plan; Environmental Monitoring Plan; Environmental Training/Orientation Plan; and Environmental Consultation/Communication Plan</p> <p>The EMP will be submitted for FBPL's review and acceptance following contract award. The EMP will be implemented through design and construction.</p>		
A4	<p>Environmental Oversight FBPL will provide external environmental auditing of the Contractor/Operator. FBPL's environmental oversight will conform to the principles of ISO 19011. The auditing function will include tracking the Contractor/Operator's compliance with the Environmental Assessment Certificate, the EMP, environmental requirements of the contract and other requirements.</p>	Design, Construction and Operation	
B	TECHNICAL		
B1	Fraser River Bridge Design		
	<p>6-lane bridge. Design will comply with "Canadian Highway Bridge Design Code" (CAN/CSA-S6-00). Pier location and design will comply with the requirements of applicable regulatory agencies,</p>	Design and Construction	DFO, NRPD, KFN, Fraser River Port Authority

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>including DFO and Transport Canada’s Navigable Waters Protection Division.</p> <p>The magnitude and extent of “harmful alteration, disruption and destruction” (HADD) of fish habitat will not exceed that assumed for the purpose of impact assessment conducted in support of the Application for an Environmental Assessment Certificate.</p> <p>Scour protection will be provided around the pier pile caps to maintain the integrity of the structures as required. Scour protection will not protrude above the bed of the river.</p> <p>The number of in-river bridge piers will not exceed 5 piers.</p> <p>In the event of a 5-pier design, the location of navigation channels will be as shown in Drawing No. 2334S248 (Revision A).</p> <p>In the event of a 4-pier (or fewer piers) design, Transport Canada will consider moving the Bishop’s Reach navigation channel 15-20 m south of the navigation channel location shown in Drawing No. 2334S248 (Revision A).</p> <p>The southernmost in-river pier will be sited near the outer (northern) edge of the existing log storage area located adjacent to, and south of, the Parson’s navigational channel.</p> <p>Pier locations will avoid environmentally sensitive foreshore habitat.</p> <p>The minimum clearance between in-river piers (including their pier protection works), will be 125 m.</p> <p>The existing Harken Towing log storage east of Barnston Island will be relocated, subject to agreement between Harken Towing, FBPL, Fraser River Port Authority and any other relevant parties. FBPL will pursue measures and/or agreements with relevant parties to prevent future log storage in this area (e.g., by a different Operator).</p> <p>The number, location and design of in-river piers, including pier protection, will minimize impact to the Katzie First Nation fishery, subject to regulatory, engineering and other constraints.</p> <p>Piers will be shaped to minimize snagging of fishing nets and to minimize creation of hazardous</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>current conditions.</p> <p>Bridge design criteria will include suicide prevention measures. FBPL will evaluate proposed suicide prevention features and their justification in selecting the successful Contractor/Operator. The effectiveness of suicide prevention measures will be monitored during operation. Depending on monitoring results, additional suicide prevention features may be added as agreed between FBPL, KFN and other relevant parties.</p> <p>Bridge approach viaducts will be elevated on structure through the Fraser River riparian zone. Riparian soils, as well as riparian vegetation less than 20 m in height, will not be disturbed.</p> <p>Navigational Clearances: see B4, Navigable Waters.</p>		
B2	Roadway Design – Right-of-Way		
	<p>Right-of-way width for the FRC mainline is approx. 40.0 m except for occasional widening in areas of cuts/fills.</p> <p>Right-of-way width for the Abernethy Connector is approx. 30.0 m except for occasional widening to accommodate drainage works, tree buffers and other agricultural or environmental features.</p> <p>Design will be “context sensitive”.</p>	Design and Construction	
B3	Drainage		
	<p>Detailed drainage design will comply with all applicable standards including Part 7 of the British Columbia <i>Water Act Regulation</i>. Drainage design will include at least the following general requirements:</p> <p>Drainage design will maintain natural or existing drainage catchment boundaries and drainage patterns. Drainage control structures (<i>e.g.</i>, ponds) will be incorporated in the design, where feasible, to prevent alteration of pre-construction flows.</p>	Design and Construction	WLAP, DFO, MoT, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Culverts will be sized to an appropriate current standard taking into account guidelines from Ministry of Water, Land and Air Protection (WLAP), Ministry of Transportation (MoT) and other relevant authorities.</p> <p>Culvert design will provide fish passage where required or appropriate based on continuing consultation with DFO and compliance with existing DFO/WLAP standards.</p> <p>Culvert outflows will discharge into a natural watercourse or a properly designed channel that flows to a natural watercourse or body of water (<i>i.e.</i>, culvert outlets will not be allowed to find their own path to downslope watercourses).</p> <p>Drainage design will incorporate vegetation lining, ditch blocks and other measures to control flow velocities as determined through detailed assessment and design by the Contractor/Operator. Drainage design will avoid the creation of standing water within the drainage system.</p> <p>Drainage design will mitigate potential adverse water quality/quantity effect to fish and fish habitat.</p> <p>Drainage from FRC bridges will comply with existing relevant legislation and regulations. Project design will avoid or mitigate bridge induced effects on pre-project drainage patterns.</p> <p>Existing stormwater drainage facilities whose functionality is reduced as a result of the construction and operation of the FRC will be restored to original or better condition, or the impacts will be mitigated to the satisfaction of the affected municipality.</p> <p>Peak stormwater flows from the FRC will be controlled at pre-FRC development rates such that stormwater drainage facilities continue to function as planned.</p>		
B4	Navigable Waters		
	Fraser River bridge design and construction will comply with the requirements under the <i>Navigable Waters Protection Act</i> and related permit conditions. The navigation clearances for the	Design	NWPD, DFO, KFN

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>bridge over the Fraser River are:</p> <p>Airdraft: minimum underside elevation of the bridge over Bishop's Reach is 40.0 m GSC;</p> <p>Width of navigation channel, Bishop's Reach, is 170 m;</p> <p>Airdraft: minimum underside elevation of the bridge over Parson's Channel is 19.5 m GSC; and</p> <p>Width of navigation channel, Parson's Channel, is 120 m (note however that the minimum clearance between in-river piers, including their pier protection works, will be 125 m as specified in section B1 of this Table).</p> <p>Final design will be approved by Transport Canada's Navigable Waters Protection Division.</p> <p>A hydraulic assessment of the final design of the bridge will be conducted to confirm the hydraulic assessment completed previously in support of the Application for an Environmental Assessment Certificate. Post-construction monitoring will be carried out to confirm modeling results.</p>		
	<p>All materials and equipment used in bridge construction will be marked in accordance with the <i>Collision Regulations</i> of the <i>Canada Shipping Act</i>.</p> <p>Construction material and debris will be prevented from falling into the Fraser River.</p> <p>Possible in-river sedimentation of the navigational channel as a result of FRC construction activity will be monitored and mitigated as needed.</p> <p>All construction materials, equipment, temporary piles, false works, etc. will be removed from the river upon completion of construction.</p> <p>A marine users communications strategy will form part of the Communications Plan (see Section G2 of this Table) that will be implemented to notify all affected marine users of the construction timelines as they relate to navigation and use of the river.</p>	Construction	NWPDP, KFN

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
B5	Contaminated Sites		
	<p>More detailed assessment will be carried out as required by applicable legislation and regulations at the time of project implementation or as agreed between parties involved in property transactions.</p> <p>The level of assessment will be guided by the identification of contamination risk and the nature of intended future activity on, or use of, the site.</p> <p>If required or appropriate, Site Profiles in support of rezoning or subdivision of property will be prepared and submitted in accordance with the <i>Waste Management Act</i> (or <i>Environmental Management Act</i> if in effect) and the <i>Contaminated Sites Regulation</i> (CSR).</p> <p>Using a specialist listed on WLAP's contaminated sites roster of professional experts will be considered in the event that regulatory instruments such as determinations, soil relocation agreements, approvals in principle or certificates of compliance are required.</p>	Property Acquisition	WLAP and/or Local Municipalities (as appropriate or required), EC
	<p>Best Management Practices (BMPs) will be implemented to manage potential encounters with contaminated soils/groundwater during construction, for example:</p> <p>Odorous, stained or otherwise suspect (<i>i.e.</i>, presence of debris) soil will be segregated and stockpiled pending further assessment by a qualified consultant; stockpiles will be placed on asphalt or polyethylene and covered with polyethylene;</p> <p>Surface drainage will be directed away from areas where suspect or contaminated material is stockpiled and away from excavations where contaminated materials are suspected;</p> <p>Suspect groundwater that is odorous, discoloured or that has a visible organic sheen will be segregated (<i>e.g.</i>, by pumping it to a storage tank) pending further assessment by a qualified consultant; and</p> <p>Notices of Independent Remediation will be prepared and submitted to WLAP as required by the <i>Waste Management Act</i> (or <i>Environmental Management Act</i> if in effect) and the CSR.</p>	Construction	WLAP (as appropriate or required)

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
B6	Accidents and Malfunctions		
	<p>Fraser River Bridge:</p> <p>An assessment will be completed to determine the design vessel and related potential impact loading for bridge piers.</p> <p>Seismic standard: the bridge will be designed as a lifeline crossing to withstand up to 1:1000-year earthquake in accordance with the current (2000) Canadian Highway Bridge Design Code (<i>i.e.</i>, the bridge would sustain only minor damage after a 1:475 year earthquake).</p> <p>Bridge is designed to 1:100-year windstorm.</p> <p>Bridge is designed to 1:200-year flood.</p> <p>Context sensitive design will include a significant safety component that will prevent or reduce the likelihood of accidents and also provide for efficient access to all areas of the project by emergency response vehicles.</p> <p>Flood conditions on the river will be monitored during construction to predict flow conditions during various scheduled construction activities.</p> <p>In-river construction equipment will be placed and managed so as to minimize risk of collision with marine users, fishers and other vessels.</p> <p>Operational procedures (including environmental aspects) will include emergency response planning, inspections, environmental audits, and environmental training/orientation. The operational procedures will be updated regularly to minimize potential operational malfunctions or accidents that may result in environmental degradation or loss of habitat.</p> <p>Scour and pier protection design for the Fraser River bridge will be submitted to Transport Canada's Navigable Waters Protection Division for approval.</p>	Design and Construction	DFO, NWPD, EC

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Potential slope failures (general):</p> <p>Design standards will be developed to address longterm slope stability issues relating to cuts and fills. Detailed standards will replicate MoT standards. Detailed slope design will be signed off by a P.Eng.</p> <p>Construction site slope stability issues will be addressed through compliance with BC Workers' Compensation Board safety requirements.</p> <p>The EMP will address "interim" slope stability issues through post-construction monitoring and implementation of corrective erosion controls and/or slope protection measures.</p>	Design and Construction	DFO (Responsible Authority under CEAA)
	<p>Emergency Response Planning:</p> <p>An emergency response plan will be required that includes at least the following components: initial identification of deleterious substance; internal and external notification; implementation of containment measures (<i>e.g.</i>, sorbent pads or booms); clean-up and possible remediation measures; monitoring (including sampling); and reporting.</p> <p>Construction personnel will be trained in appropriate spill response techniques.</p> <p>Construction personnel will be made aware of potential drainage paths in the event of a spill.</p> <p>Properly maintained spill response kits will be available onsite and their location identified to all construction personnel.</p> <p>Contact numbers for spill reporting will be posted at all construction sites and distributed to key personnel responsible for spill reporting (<i>e.g.</i>, report all spills that affect, or threaten to affect, fisheries and aquatic habitat to the DFO radio room and comply with the <i>Spill Reporting Regulation</i> in reporting spills to the Provincial Emergency Program).</p> <p>Up-to-date Material Safety Data Sheets (MSDS) will be immediately available onsite (these provide spill response and first aid information).</p>	Construction and Operation	DFO, WLAP, EC, GVRD, Katzie First Nation and Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
B7	Utilities		
	<p>General:</p> <ul style="list-style-type: none"> • Location of potentially affected utilities will be confirmed by working with the GVRD, the local municipalities and utility firms/authorities. • Conflicts between FRC and utilities will be mitigated during detailed design, either by avoiding utilities, relocating utilities, or by adopting mitigative construction techniques. 	Design and Construction	GVRD, Local Municipalities
	<p>North Langley Treatment Plant:</p> <p>Alignment and design issues, if any, will be resolved through agreement among the GVRD (operator of the treatment plant), FBPL and the Contractor/Operator.</p> <p>Potential construction interactions will be resolved through agreements among GVRD, FBPL and the Contractor/Operator prior to or during construction.</p> <p>Access to the treatment facility will be maintained during FRC construction and operation.</p>	Design and Construction	GVRD
	<p>Septic Fields:</p> <p>Septic fields potentially affected by the alignment will be identified prior to construction.</p> <p>Fraser Health Authority (FHA) will be apprised of findings.</p> <p>Those septic fields unavoidably impacted by the project will be replaced and/or relocated as necessary under applicable permitting from FHA.</p>	Design and Construction	FHA
	<p>Water Users:</p> <p>Existing groundwater regimes and drainage patterns will be protected.</p> <p>A more detailed assessment of potential effects on registered and unregistered well users and on surface water users will be completed during detailed design.</p> <p>The project will avoid disruption of water supply (water quantity/quality).</p>	Design and Construction	FHA, WLAP

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>An alternate water supply acceptable to affected users will be provided in the event of unavoidable, temporary interruption of service.</p> <p>Potential effects and related mitigation will be addressed in the Environmental Management Plan, including the Emergency Response Plan.</p>		
B8	General Construction		
	<p>Detailed assessment of ground and soil conditions will be undertaken.</p> <p>Suitable soils will be retained for use in construction. Suitable materials may be moved, stockpiled, stored and relocated to other sections of the FRC alignment.</p> <p>Unsuitable soils, if not required on site, will be removed, hauled and disposed of as necessary to an approved disposal site.</p> <p>The locations and methods for storing construction machinery and for the disposal of unsuitable soil or fill will adhere to all federal, provincial and municipal requirements.</p>	Design and Construction	Local Municipalities, GVRD
B9	Operations and Maintenance		
	<p>Operations and maintenance will be carried out in accordance with applicable municipal, regional and provincial requirements.</p> <p>Roadway maintenance will include all inspection, ongoing maintenance and repair activities for the road surface, road shoulders and drainage ditches necessary to ensure safe operation of the roadway throughout the year.</p> <p>Bridge maintenance will include all inspection, repair and maintenance activities to maintain the structural integrity and safe operation of the bridge.</p> <p>The bridge crossing will be tolled.</p>	Operation	GVRD, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES ¹
C	FISHERIES AND AQUATIC RESOURCES		
C1	Habitat Compensation		
	<p>For the purpose of Authorization under Subsection 35(2) of the federal <i>Fisheries Act</i>, habitat compensation plans will be developed in consultation with DFO to offset any “harmful alteration, disruption or destruction of fish habitat” (HADD).</p> <p>The compensation plans will be based on DFO’s <i>Policy for Management of Fish Habitat</i>.</p> <p>The project will implement the habitat compensation concepts proposed in documentation submitted in support of the FRC Application for an Environmental Assessment Certificate. Habitat compensation requirements, unless otherwise specified by DFO in the Authorization under Subsection 35(2) of the federal <i>Fisheries Act</i>, will include at least the following:</p> <p>Unnamed Tributary to Fraser River (“Unnamed Creek”): enhance fish access through the existing culvert at CNR line and construct biofiltration elements $\geq 600 \text{ m}^2$ south of FRC mainline crossing. A bridge will be provided for the FRC mainline crossing of Unnamed Creek.</p> <p>Fraser River: Construction of embayment habitat on the north side of Fraser River in the vicinity of the new bridge crossing. Embayment area $\geq 1200 \text{ m}^2$ instream habitat and $\geq 500 \text{ m}^2$ riparian habitat. Access to the completed embayment area will be controlled to prevent access by car, motorcycle, bicycle or other mechanized means (<i>i.e.</i>, human access will be by foot only).</p> <p>Katzie Slough: Construction of additional slough habitat and enhancement of existing slough habitat in and around the intersection of 113B Avenue and the FRC mainline. Katzie Slough compensation is $\geq 6,000 \text{ m}^2$ instream habitat and $\geq 54,000 \text{ m}^2$ riparian habitat. Bridges will be provided for the FRC crossing of Katzie Slough at CP Rail and at Lougheed Highway.</p> <p>Post-construction monitoring will be undertaken to confirm that compensatory habitats are functioning in accordance with performance standards to be agreed with DFO and outlined in the</p>	Design, Construction and Operation	DFO, CWS, Katzie First Nation

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Authorization. Additional measures will be undertaken as necessary in the event the compensatory habitats are not functioning as required.</p> <p>A suitably detailed description of all construction related activities, including temporary works, that potentially affect fish or fish habitat will be submitted to DFO in support of the Application for an Authorization under Subsection 35 (2) of the <i>Fisheries Act</i>.</p> <p>Aside from activity necessary for the purpose of installing the embayment habitat compensation on the north side of the Fraser River, construction activity will avoid the Fraser River foreshore area unless otherwise permitted by DFO in the Authorization.</p> <p>Habitat compensation works will include wildlife enhancement features as outlined in Sections D2 and D3 of this Table.</p> <p>In addition, habitat compensation works will include vegetation species that have traditional use value to First Nations as outlined in Section G3 (“Katzie First Nation”) of this Table.</p>		
C2	<p>Environmental Management Plan – Fisheries and Aquatic Resources</p> <p>The Fisheries and Aquatic Habitat Protection Plan component of the EMP referred to in A3 of this Table will, in addition to the requirements listed in section A3 of this Table, provide for implementation of standard and site-specific best management practices and other mitigation measures to minimize or avoid impacts to fish, fish habitat or water quality.</p> <p>EMP topics relating specifically to fisheries and aquatic resources will include at least the following:</p>	Pre-construction, Construction and Operation	DFO, WLAP, Katzie First Nation and other applicable relevant parties

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Assessment of possible construction methods;</p> <p>Fisheries setting;</p> <p>Hydrology and hydraulics;</p> <p>Sediment transport assessments;</p> <p>Detailed construction plans including:</p> <ul style="list-style-type: none"> Worksite isolation from stream or river flow Erosion and sediment control measures Contingency plan including spill response measures Mitigation of potential effects from concrete effected water or slurry Preventative/mitigative measures regarding fish habitat Monitoring program; and <p>Relevant regulatory framework/notification.</p>		
	<p>Protection of Fish, Fish Habitat and Water Quality:</p> <p>Environmental performance criteria developed for the RFP and subsequently integrated in contract documents will require at least the following:</p> <ul style="list-style-type: none"> • Compliance with all relevant legislation, policies, regulations and guidelines to protect fish and fish habitat including but not limited to: the <i>Fisheries Act</i>; the <i>Water Act</i>; <i>Policy for the Management of Fish Habitat</i>; and the <i>Land Development Guidelines</i>. • Compliance with all conditions of the Authorization(s) under Subsection 35(2) of the federal 		DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p><i>Fisheries Act</i> and other permits.</p> <ul style="list-style-type: none"> • Implementation of best management practices and other mitigation measures to minimize or avoid impacts to fish, fish habitat and water quality. • Implementation of a water quality monitoring program to assess pre-construction, construction, and post-construction water quality. Depending on final proposed design/method for the bridge and/or DFO requirements, possible project effects on sediment particle size distribution in the eulachon spawning area located in the downstream vicinity of the bridge will be monitored. <p>Construction practices will be modified as necessary to achieve environmental compliance.</p> <p>Widening of 180th Street between the FRC mainline and 96th Avenue, if required for the project, will occur on the west side of 180th Street and will avoid disturbance to the ditch on the east side of 180th Street unless otherwise permitted in the DFO Authorization under Subsection 35(2) of the <i>Fisheries Act</i>.</p>		
C3	Best Management Practices		
	<ul style="list-style-type: none"> • This section lists the minimum best management practices (BMPs) that will be implemented during construction of the project. • General: <p>Minimize the area of disturbance to riparian vegetation, upland vegetation and soil by clearly identifying and working within designated work areas.</p> <p>Temporary disturbance to existing vegetation along watercourses will not occur at watercourse crossings except on the project right-of-way.</p> <p>Minimize the length of time that soils are exposed by clearing ground cover immediately prior to work activities, and by revegetating disturbed areas as quickly as possible following the</p>	Construction	DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>completion of work.</p> <p>Where appropriate, enhance soil stability by using erosion control or by hydroseeding.</p> <p>Where appropriate, use impermeable covers to temporarily eliminate contact between rain and disturbed soils.</p> <p>Where appropriate, use erosion-resistant material such as riprap to ensure longterm bank stability.</p> <p>Where appropriate, undertake riparian enhancement and/or structural creek enhancement works.</p> <p>The use of herbicides for vegetation control will be prohibited along sections of the roadway that are in close proximity to surface waters.</p>		
	<ul style="list-style-type: none"> • Sediment Issues During Construction (General): • <p>Unless otherwise approved by DFO, instream and in-river works will be completed in isolation of flowing water using an appropriate isolation technique.</p> <p>Direct streamflow around worksites using appropriately sized pumps, flumes or other suitable methods.</p> <p>Select appropriate sediment control techniques based on site-specific characteristics (<i>e.g.</i>, substrates, depth, flow).</p> <p>Salvage fish from enclosures in compliance with all necessary permits for fish collection.</p> <p>Dewater worksites using appropriately sized pumps.</p> <p>Equip pump intakes with fish screens in accordance with the DFO <i>Freshwater Intake End-of-Pipe Fish Screen Guideline</i> when working in waters that potentially contain fish.</p> <p>Monitor isolation performance during construction, and repair/modify where necessary, to ensure appropriate sediment control is maintained.</p>	Construction	DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Use other measures including, but not limited to:</p> <p>Silt fences.</p> <p>Temporary seeding (e.g., hydroseeding).</p> <p>Slope protection and soil stabilization (e.g., using geotextiles, mulching, armouring).</p> <p>Installation and maintenance of temporary sediment control ponds.</p> <p>Sediment barriers including berms (e.g., using clean gravel and filter cloth), straw bales, brush, etc.</p> <p>Sediment traps.</p> <p>Other measures.</p>		
	<ul style="list-style-type: none"> • Alkalinity/pH: <p>Monitor the pH in the watercourse immediately downstream of the isolated worksite.</p> <p>Provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment.</p> <p>Immediately report any spills of concrete affected water into the aquatic environment to the DFO radio room.</p> <p>Implement emergency mitigation and clean-up measures, (e.g., use of carbon dioxide to restore acceptable pH).</p>	Construction	DFO
	<p>Fraser River:</p> <p>Scheduling of in-river works will comply with relevant timing window(s) specified in the <i>Fisheries Act Authorization</i>.</p> <p>Pier sites and associated activity will be isolated from river flow unless otherwise approved by DFO.</p>	Construction	DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	Storage tanks, filtering or other technique(s) will be used to manage dewatering or disposal of sediment-laden water.		
	<p>Project wide water quality guidelines relating to Total Suspended Solids (TSS):</p> <p>Increase in TSS in surface water and storm flows attributable to the project is limited to the following allowances:</p> <p>TSS shall not exceed background TSS levels by more than 2 mg/L during any 24-hour period when background TSS levels are between 25 mg/L and 250 mg/L; and</p> <p>When background TSS levels exceed 250 mg/L, TSS levels shall not be increased by more than 10% of the measured background TSS levels.</p>	Construction	DFO
	<p>Project wide water quality guidelines relating to pH:</p> <p>Concrete affected water resulting from project activity, whose pH range exceeds 6.5 – 8.0 pH units and a turbidity of 25 NTU, will be isolated and contained. Such water will be treated (<i>e.g.</i>, by bubbling carbon dioxide through it and filtering it) until it falls inside the 6.5 – 8.0 range and is less than 25 NTU (+/- 2 NTU), prior to releasing it to the natural environment or storm system.</p> <p>Alternatively, untreated concrete affected water will be hauled to a facility approved for related containment and/or disposal.</p> <p>The pH of run-off and/or discharge from the construction site as well as the pH of any receiving waters downstream of the work site (including watercourses and storm intakes) will be monitored frequently.</p> <p>Emergency measures will be implemented immediately if recorded pH in receiving waters falls below 6.0 or rises above 9.0 pH units, or if there is a project related increase of 1.0 pH unit (+/- 0.2 pH units) above background.</p>	Construction	DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Biofiltration: Abernethy Connector and other rural areas</p> <p>Where feasible without impairing drainage function, the biofiltration capacity of the roadside ditch will be enhanced by planting aquatic species along the ditch banks. The vegetation will reduce the erosive energy of run-off from impervious surfaces and also take up, and subsequently break down, potential pollutants. The aquatic vegetation will also provide shading and a food/nutrient input to fish-bearing waters. Native species will be used for plantings.</p>	Design and Construction	DFO
D	WILDLIFE, WILDLIFE HABITAT AND VEGETATION		
D1	Additional Assessment		
	<p>Additional assessment of provincially listed species will be conducted during spring-summer 2004 to confirm presence/absence of listed species as follows:</p> <p>FRC mainline: blue listed plants and plant communities.</p> <p>Abernethy Connector: red and blue listed plants/plant communities and vertebrates, including sampling for Pacific water shrew in ditches in the vicinity of the golf course (20+500 to 20+900) and the 203rd Street crossing (Station Nos. 21+900 and 22+000). The station numbers are based on Drawing No. 2334-1-111.</p> <p>FRC mainline and Abernethy Connector: red and blue listed dragonflies and damselflies.</p> <p>The results of the additional assessments will be forwarded to relevant agencies upon completion. If the presence of any listed species/ecosystems is confirmed by the additional assessments, reasonable mitigation measures will be implemented as agreed with applicable regulatory agencies.</p>	Pre-construction	WLAP, CWS, DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
D 2	Habitat Compensation and Conservation		
	<p>Commitments are:</p> <p>Wildlife enhancement features will be incorporated in fishery habitat compensation plans. Plans submitted to DFO for Authorization will be referred to Environment Canada, CWS for review and comment relating to prescribed wildlife features.</p> <p>Properties along Unnamed Creek between 96th Avenue and the CNR line will be acquired and permanent conservation status (<i>e.g.</i>, a covenant) will be established for the parts of those properties not required specifically for road works (<i>i.e.</i>, for FRC and for the possible future South Fraser Perimeter Road).</p> <p>FBPL/TransLink will in addition make best effort to secure conservation status for as much land as possible along Unnamed Creek between the CNR line and the creek's confluence with the Fraser River (<i>e.g.</i>, through a restrictive covenant or other institutional arrangement) or, alternatively, to secure conservation status for other land as agreed between FBPL/TransLink and CWS (<i>e.g.</i>, as part of a regional strategy to deal with transportation developments in the Lower Mainland). FBPL/TransLink's commitment will be limited to a financial cap agreed between FBPL and CWS.</p>	Design and Construction	WLAP, CWS, DFO, Katzie First Nation
D 3	Best Management Practices		
	<p>General:</p> <p>Best management practices (BMPs) will be implemented at stream crossings to minimize damage to riparian habitat and minimize deterioration of water quality. These practices include, but are not limited to, BMPs listed in Section C of this Table ("Fisheries and Aquatic Resources"). Habitat</p>	Design and Construction	WLAP, CWS, DFO, Katzie First Nation

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>features adjacent to the construction zone, especially the riparian zone, will be protected by installing and maintaining silt fencing set back from stream edges, monitoring water quality at the site and downstream, and monitoring riparian habitat condition downstream of the crossing sites.</p> <p>Other BMPs:</p> <p>Minimize the size of work areas.</p> <p>Flag or (preferably) fence off the edges of the work area to keep equipment and materials away from potential wildlife habitat.</p> <p>Equipment and vehicles are not allowed within the drip-line or the root zone of trees to be retained.</p> <p>Noting the need to prevent the spread of noxious weeds and invasive species, restore disturbed habitats as quickly as possible following construction (including areas cleared for construction but not actually needed for the completed roadway, lay-down and temporary work sites, and soil or gravel stockpile sites).</p> <p>Replanting: select appropriate native plant species that are of value for the selected species or species groups of wildlife, place coarse woody debris (rotting logs) and stumps or root-wads as micro-habitats for insects and denning or nest sites for small wildlife.</p>		
	<p>Fraser River:</p> <p>The Fraser River bridge structure will incorporate artificial wildlife habitat features to the maximum extent possible given engineering, safety and other constraints.</p> <p>A qualified independent consultant will be retained to prepare and implement a plan to monitor the</p>	Design and Construction	WLAP, CWS, DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>bald eagle nest site on the south shore of the Fraser River (west of the FRC crossing location) during construction. The plan will be provided to relevant authorities for review prior to construction in the vicinity of the nest. Environmental protection measures will be implemented as necessary to achieve compliance with the <i>Wildlife Act</i>. Monitoring reports will be distributed to relevant authorities.</p>		
	<p>Unnamed Creek and Katzie Slough:</p> <p>The FRC crossings will be designed to minimize adverse effects on riparian habitat and water quality and to incorporate elements that will enable continued function for amphibians and Pacific water shrew.</p> <p>The riparian zone and other land not required for FRC and possible future South Fraser Perimeter Road along Unnamed Creek between the CNR line and 96th Avenue will be protected.</p> <p>Crossing design will incorporate natural stream substrate and will accommodate downstream and upstream movements of small to medium sized wildlife (mainly amphibians, small mammals, and medium sized mammals).</p>	<p>Design and Construction</p>	<p>WLAP, CWS, DFO</p>
	<p>Protection of Specific Valued Ecosystem Components (VECs):</p> <p>Clearing of vegetation at woodlots, the riparian zone of Unnamed Creek, and any clearing required along Katzie Slough or its woodlots will be minimized and will not occur during the breeding season unless such clearing complies fully with the provincial <i>Wildlife Act</i> and the federal <i>Migratory Birds Convention Act</i>.</p> <p>A survey by a qualified, independent wildlife consultant will be undertaken prior to clearing to assess potential presence of heron/raptor/migratory bird nests, to update the assessment conducted in support of the Application for an Environmental Assessment Certificate. The survey results will be referred to Environment Canada, CWS for their information and review prior to commencement of any clearing activities in VECs.</p>	<p>Design and Construction</p>	<p>WLAP, CWS, DFO</p>

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Areas 1, 2, 3 (woodlots) – Replant along roadway edge as feasible (taking into account traffic safety considerations and other concerns).</p> <p>Area 5 (woodlot, Unnamed Creek) – Implement riparian habitat protection and restoration measures; replant as soon as possible with selected native species to achieve habitat objectives; integrate wildlife features in any fishery habitat compensation designs; secure riparian corridor and manage for diversity.</p> <p>Fraser River (riparian zone) – Implement BMPs during construction; restore any riparian elements affected by temporary disturbance during construction.</p> <p>Area 6 (woodlot east of Katzie Slough) – Replant disturbed areas along edge of roadway; manage remaining tree stand for biodiversity.</p> <p>Area 7 (riparian meadow, Katzie Slough) – Minimize removal of native riparian vegetation; replant riparian zone on the east side of the Slough; plant trees and shrubs to provide pockets for wildlife; integrate wildlife enhancements with fishery habitat compensation designs (<i>e.g.</i>, plant trees for raptors and provide snags and coarse woody debris for wildlife).</p> <p>Area 8 (riparian shrub and woodland along Katzie Slough) – Minimize removal of native vegetation cover and replant with native species as soon a possible; manage trees for biodiversity and improved function of Katzie Slough.</p> <p>Species listed in Schedule 1 of the <i>Species at Risk Act</i> - Any adverse effects to species listed in Schedule 1 of the <i>Species at Risk Act</i> (SARA) will be avoided or lessened in compliance with Subsection 79(2) of that Act. A mitigation and monitoring plan for applicable Schedule 1 listed species will be developed and implemented. The mitigation/monitoring plan will be provided to CWS and WLAP for their review and comment prior to commencement of construction in relevant affected areas. Reasonable mitigation measures will be implemented as agreed with applicable regulatory agencies.</p> <p>Pacific Water Shrew (PWS) Habitat – Noting Figure 1-3 of Volume 1, Section C of the FRC</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Application for an Environmental Assessment Certificate (September 15, 2003), the FRC intersection with the 96th Avenue Connector and the proposed South Fraser Perimeter Road will be shifted approximately 30 m to the west to provide an approximately 100 m buffer zone (greenbelt) between the 96th Avenue Connector and the eastern (main) tributary of Unnamed Creek. The FRC mainline crossing of Unnamed Creek will be a bridge located at the existing Terasen (formerly Trans Mountain Pipe Line Company Ltd.) pipeline. Unless otherwise agreed to by DFO and CWS:</p> <p style="padding-left: 40px;">The bridge will have a minimum clear span of 55 m;</p> <p style="padding-left: 40px;">The minimum horizontal (<i>i.e.</i>, “setback”) distance between the wetted channel of Unnamed Creek and the FRC bridge substructure (<i>i.e.</i>, each bridge end abutment) will be 15 m;</p> <p style="padding-left: 40px;">The minimum vertical clearance of the bridge (<i>i.e.</i>, between bridge ends, the minimum distance from the underside of the bridge to existing ground level) will be 3 m;</p> <p style="padding-left: 40px;">Fill that may be required to achieve the vertical clearance will be contained at the abutment to reduce the area of the project footprint in the vicinity of the creek;</p> <p style="padding-left: 40px;">The bridge abutments will be vertical;</p> <p style="padding-left: 40px;">The bridge will include a minimum gap of 1.5 m between the eastbound and westbound lanes;</p> <p style="padding-left: 40px;">Irrigation under the bridge (<i>e.g.</i>, using bridge/roadway drainage) will be implemented as necessary to mitigate the rain shadow effect of the bridge. If bridge/roadway drainage is used for that purpose, measures will be implemented to address water quality.</p> <p>Pacific Water Shrew (PWS) Habitat – Appropriate mitigation measures (<i>e.g.</i>, fencing) will be developed and implemented to protect PWS during FRC operation. At a minimum, mitigation will include installation of a barrier or other measure(s) to prevent PWS-vehicle collisions. Proposed mitigation measures will be provided to CWS and WLAP for review and comment prior to implementation. Follow-up monitoring, as per guidelines issued by the Canadian</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Environmental Assessment Agency, will be undertaken to track the effectiveness of installed mitigation measures. Monitoring results will be provided to CWS and WLAP. Depending on monitoring results, additional mitigation may be added as agreed between relevant parties.</p> <p>Unauthorized motorized vehicle access to the Unnamed Creek crossing compensation area along the Terasen pipeline right-of-way will be restricted.</p>		
	<p>Operations/Maintenance:</p> <p>Establish tenure and management of the riparian zones of Unnamed Creek and Katzie Slough and manage these as fish and wildlife habitat.</p> <p>Manage riparian habitat by physical means only and avoid the use of chemicals.</p> <p>Develop specific maintenance procedures for vegetation adjacent to the roadways that maximize wildlife values (however, it is recognized that public safety, which cannot be compromised, would be the primary focus of such procedures).</p> <p>Subject to engineering, safety, land use and other constraints, vegetation management of roadsides will leave grassed areas as tall grass (resembling "old field" habitat) to provide habitat for small mammals (<i>e.g.</i>, species of voles and mice) thus providing foraging opportunities for raptors.</p> <p>Incidences of vehicle-wildlife collisions will be monitored during the operation stage using a system similar to the Wildlife Accident Reporting System currently used by MoT whereby the location, species, and other characteristics of vehicle-wildlife encounters are recorded to identify possible recurring patterns that would warrant implementation of site specific mitigation.</p>	Operations and Maintenance	WLAP, CWS, DFO
	<p>Measures specific to Abernethy Connector:</p> <p>Develop and implement a management plan for relocating the breeding pair of barn owls identified</p>	Design and Construction	WLAP, CWS, DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>on the Hughson Property. Explore alternative nesting structures and suitable locations where risk of owl-vehicle collision is minimized.</p> <p>A strategy will be developed to mitigate removal of larger trees along the Abernethy Connector. As feasible after taking into account traffic safety, farm operational needs, ALC requirements and other constraints or concerns, mitigation planting will occur on remnant parcels (<i>i.e.</i>, parcels resulting from severance effects) and/or on adjacent properties (subject to landowner acceptance). If local habitat mitigation does not prove feasible on those lands, then opportunities for mitigation planting on Crown, municipal or GVRD land located farther from the alignment will be investigated.</p>		
E	AGRICULTURAL RESOURCES		
E1	Property specific mitigation		
	<p>Bosa Property near 113B Avenue interchange:</p> <p>The owner/operator of the potentially affected horse boarding operation will be notified well in advance of construction to allow sufficient time for the property to be either vacated or altered.</p> <p>Issues involving the horse boarding operation will be resolved directly through property transaction or through agreement with the landowner and/or operator.</p>	Design and construction	
	<p>Meadow Gardens Golf Course</p> <p>Issues involving golf course operation will be resolved through agreement with the golf course owner/operator, subject to ALC requirements.</p>	Design, Construction and Operation	ALC
	<p>Bellingham Property:</p> <p>Subject to agreement between FBPL, ALC and the property owner:</p> <p>Integrate farm drainage and roadside drainage, subject to implementation of drainage controls and</p>	Design and Construction	ALC, MAFF

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>other measures to protect fisheries and aquatic resources as well as water quality in any existing farm irrigation ditches;</p> <p>Explore various options to mitigate severance effects and implement appropriate measures; and</p> <p>Fence both sides of the right-of-way through the property.</p>		
	<p>Formosa Nursery Property:</p> <p>Within the corridor agreed prior to Certification, the exact alignment through this property will be resolved after Certification, based on input from the Districts of Maple Ridge and Pitt Meadows, the Agricultural Land Commission and the landowner.</p> <p>Mitigation measures will include:</p> <p>Integrate farm drainage and roadside drainage, subject to implementation of drainage controls and other measures to protect fisheries and aquatic resources as well as water quality in any existing farm irrigation ditches.</p> <p>If feasible after considering flood hazard and other constraints, drainage design will avoid connection of roadside drainage ditches to the two existing east-west ditches that respectively flow through the center of the property and along the north side of the 126th Ave. right-of-way. If such avoidance is not feasible, implement special measures (<i>e.g.</i>, biofiltration and/or flow detention) as required to protect existing water quality in the two ditches.</p> <p>Explore various options to mitigate severance effects and implement appropriate measures.</p> <p>Maximize the width of the vegetative buffer, up to as much as 8 m, between the proposed road surface of the Abernethy Connector and the right-of-way edges, to minimize need for organic farming buffers on the remainder of this property.</p> <p>Replace intercepted farm buildings and services.</p> <p>Fence both sides of the right-of-way through this property.</p>	Design and Construction	ALC, MAFF, DFO

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	Accommodate the passage of wide farm machinery (up to 4.27 m or 14 ft.) across the Abernethy Connector at 203 rd Street to allow crossing of the right-of-way. For example, make the 203 rd Street intersection light-controlled when peak hour traffic conditions no longer provide safe opportunities for slow-moving farm machinery to cross the roadway, or, in any event, at such time as the Abernethy Connector is expanded to 4 lanes.		
	<p>Hughson Property:</p> <p>Subject to agreement with the property owner, the south side of the right-of-way will be fenced through this property (assuming the property is still leased to the Veinotte Morgan Farm at the time of project implementation).</p>	Design and Construction	ALC, MAFF
	<p>Pelton Reforestation:</p> <p>Subject to agreement between FBPL, ALC and the property owners:</p> <p>Integrate farm drainage and roadside drainage, subject to implementation of drainage controls and other measures to protect fisheries and aquatic resources as well as water quality in any existing farm irrigation ditches.</p> <p>Explore various options to mitigate the small severance effect and implement appropriate measures.</p> <p>Adjust the intercepted solid-set irrigation system so that function is restored and all functional parts of the system have been re-located to remaining Pelton lands on the north side of the right-of-way.</p> <p>Adjust the intercepted perimeter road system to restore function.</p>	Design and Construction	ALC, MAFF

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Adjust the intercepted growing compound area, and associated aisle working area, to restore function.</p> <p>Install light screens/fences along the north side of the right-of-way from about Station 22+200 to approximately Station 23+025 to prevent possible light impacts on dark compound growing areas. For light screens/fences installed adjacent to the Hampton severance, orient the screens so as to maximize visual monitoring of nearby lands from the Hampton headquarters area.</p> <p>Monitor the ability of Pelton’s work force to enter and leave the main driveway to 203rd Street during shift beginning and ending periods and install any remedial measures that are warranted, if any.</p>		
	<p>Hampton and Laity “Century Farms”:</p> <p>Subject to agreement between FBPL, ALC and respective property owners:</p> <p>Design and construct an overpass across the Hampton Farm to allow movement of farm equipment under the Connector. The resulting farm underpass should have the following minimum specifications:</p> <ul style="list-style-type: none"> Positive drainage from underpass floor to adjacent field areas; Lighted; Able to pass machinery that has a point height of up to 4.27 m (14 ft.), with little width at this height; Able to pass machinery that is up to 4.27 m (14 ft.) wide, at or near ground level; Able to pass machinery that is up to 3.66 m (12 ft.) high and up to 3.20 m wide (10.5 ft.) throughout its height; and <p>The above height specifications are based on expected maximum machinery heights for any</p>	Design and Construction	ALC, MAFF

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>forage operation conducted on the Hampton lands in the future.</p> <p>Subject to agreement with directly affected landowners and the ALC, design and construct a service road link along the south side of the Connector between 209th St. and 210th St. to create a 4-way intersection at 210th St.</p> <p>Install traffic signals at the intersection at a future date when warranted by increased traffic volumes. Monitor traffic volumes to determine when the intersection should become signalized.</p> <p>Other commitments:</p> <p>Integrate Abernethy Connector drainage with farm drainage, subject to implementation of drainage controls and other measures to protect fisheries and aquatic resources as well as water quality in any existing farm irrigation ditches.</p> <p>Fence both sides of the right-of-way through these properties; tie-in any intercepted perimeter or cross-fences.</p> <p>Restore and allow for passage across the right-of-way of two farm water pipelines intercepted by the right-of-way immediately west of the end of 128th Avenue; install these pipelines in an through-right-of-way culvert, insulated as necessary, to allow for eventual replacement of these lines.</p> <p>Restore the intercepted water connection and livestock watering facility at Laity.</p> <p>Restore intercepted farm power and telephone lines.</p>		
E 2	Operations and Maintenance Commitments		
	No herbicide use for vegetative control along those sections of right-of-way that are adjacent to operations engaged in certified organic farming or are in process of applying for organic farming certification.	Design and Construction	ALC, MAFF, Katzie First Nation

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>No herbicide use for vegetative control along those sections of right-of-way that are near areas subject to First Nations traditional plant gathering.</p> <p>Maintenance and cleaning of any right-of-way ditches forming part of the regional agricultural drainage system, subject to DFO requirements to protect fish and fish habitat.</p> <p>Regular maintenance and repair of right-of-way fences.</p> <p>Regular maintenance and repair of light screens.</p> <p>Regular maintenance and upkeep of the drainage and lighting systems, if any, at the Hampton Farm underpass, subject to agreement with the farm owner/operator.</p>		
E 3	Net Agricultural Benefit		
	<p>Explore the option of providing off right-of-way flood mitigation along McKenney Creek through related investigation and planning, followed by appropriate channel enhancements and ongoing maintenance.</p> <p>Initiate and lead related consultation between relevant authorities (including, but not limited to, ALC and DFO) and stakeholders.</p>	Design and Construction	ALC, MAFF, Katzie First Nation
F	ARCHAEOLOGY		
F1	Impact Management (General)		
	<p>Continue consultation with Katzie First Nation and other interested First Nations during the project contracting phase and subsequent project implementation phase, for the purpose of defining possible additional studies and refining impact management objectives.</p> <p>Continue consultation with First Nations to define direct participation of First Nation members in field crews and in specific impact management activities (<i>e.g.</i>, archaeological monitoring).</p>	Pre-construction, Design and Construction	MSRM, First Nations

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	All archaeological remains, whether recorded or not, will be managed in accordance with the requirements of the <i>Heritage Conservation Act</i> (HCA).		
	<p>Found Human Remains:</p> <p>Police, Archaeology and Registry Services Branch, Katzie First Nation and other applicable First Nations or parties will be notified immediately if human remains are discovered during pre-construction assessment or encountered during construction.</p> <p>The Archaeology and Registry Services Branch’s operational procedure on Found Human Remains will apply to all facets of project development and related archaeological investigations, with disposition of such remains to be determined in consultation with affected parties.</p> <p>A protocol regarding the management of any KFN ancestral remains, including cultural and ceremonial aspects, will be determined through consultation with KFN (and/or other applicable First Nation). The protocol will be consistent with the Archaeology and Registry Services Branch’s policy on “Found Human Remains”.</p>	Pre-construction and Construction	MSRM, First Nations, applicable police
F 2	Additional Archaeological Impact Assessment		
	<p>Prior to construction, archaeological impact assessment (AIA) will be completed on approx. 1.0 km of undeveloped (“green field”) FRC mainline right-of-way and approx. 2.0 km of Abernethy Connector right-of-way that could not be surveyed archaeologically during the AIA conducted in support of the Application for an Environmental Assessment Certificate (because of prohibited</p>		MSRM, First Nations

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>access to private property and other constraints that existed at the time of the initial AIA).</p> <p>Based on the findings of the additional AIA, appropriate impact mitigation measures (<i>e.g.</i>, site protection, systematic data recovery, surveillance, monitoring, etc.) for identified sites protected under the <i>Heritage Conservation Act</i> (HCA) will be determined and implemented in consultation with Katzie First Nation and as directed by the Manager, Archaeological Permitting, Ministry of Sustainable Resource Management.</p> <p>Deep testing by machinery to depths ranging from 2 m to 5 m below the surface will be undertaken on the project right-of-way in Fraser River shoreline areas built up by fill and in specific portions of the Katzie Slough. The specific areas, timing and other aspects of deep testing will be determined in consultation with Katzie First Nation.</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	Archaeological site locational data arising from ongoing or future archaeological investigations associated with FRC will not be publicly available. FBPL/TransLink and Katzie First Nation will negotiate a confidentiality protocol with respect to archaeological data that will be consistent with the requirements of Archaeology and Registry Services Branch.		
F 3	Archaeological Contingency Plan		
	<p>The EMS will require preparation of an Archaeological Contingency Plan (ACP) to manage the possibility of encountering previously unidentified archaeological resources during construction.</p> <p>The ACP will specify that if archaeological materials are exposed during construction in an area not previously identified as an archaeological site, activity on or in the immediate vicinity of those materials must be suspended. The ACP will provide for immediate notification of relevant parties including, but not limited to: FBPL, Archaeology and Registry Services Branch of the Ministry of Sustainable Resource Management (MSRM), Katzie First Nation and other relevant First Nations. Activity will remain suspended pending assessment by a qualified archaeologist, a decision by relevant authorities regarding management of the encountered resources, and determination of the conditions under which construction at or in the vicinity of that location can recommence.</p>	Design and Construction	MSRM, First Nations
F 4	Archaeological Monitoring		
	<p>General:</p> <p>The EMS will require preparation of an Archeological Monitoring Plan (AMP).</p>	Design and Construction	MSRM, First Nations

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>The AMP will reflect agreements with First Nations and will comply with the HCA, standards of the Archaeological Branch of MSRM, and other currently accepted codes of practice.</p> <p>The AMP will address both site specific and project-wide archaeological monitoring requirements, and will be integrated with the Archaeological Contingency Plan.</p> <p>Excavation and/or removal of existing structures (<i>e.g.</i>, pavement, buildings, etc.) from “capped” (<i>i.e.</i>, currently developed and impervious) sections of the right-of-way (a total of approx. 6.5 km of right-of-way) will be monitored by qualified archaeologist(s). Archaeological monitor(s) will have the authority to suspend development activities where the project is found to be in conflict with a previously unidentified archaeological site, subject to the provisions of the <i>Heritage Conservation Act</i>.</p> <p>The Manager, Archaeological Permitting, Ministry of Sustainable Resource Management and Katzie First Nation will be notified of any identified sites resulting from archaeological monitoring. Related impact management measures will be determined and implemented in consultation with Katzie First Nation and as directed by the Manager, Archaeological Permitting, and Ministry of Sustainable Resource Management.</p>		
F 5	Site Specific Commitments		
	<p>Identified Sites Located Within the Footprint:</p> <p>Sites 2002-365-06 (DhRq46), 2002-365-24 (DhRq50), and 2002-365-27 (DhRp51):</p> <p>Mitigation will be completed under a Heritage Investigation Permit prior to construction. The mitigation will occur prior to any land alteration associated with construction.</p> <p>An Alteration Permit will be obtained prior to construction.</p> <p>Construction in and around the site will be monitored.</p>	Pre-construction, Design, Construction and Operation	MSRM, First Nations

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Identified Sites Located Near the Footprint:</p> <p>Sites 2002-365-05 (DhRq45), 2002-365-07 (Undateable CMT), 2002-365-19 (part of DhRp17), 2002-365-28 (DhRp52):</p> <p>These sites will be avoided. The sites will be protected during construction. Construction near the sites will be monitored. Archaeological site information and related management requirements will be integrated in FRC operation.</p>	Preconstruction, Design, Construction and Operation	MSRM, First Nations
	<p>Possible Sites Located Near the Footprint:</p> <p>Sites 2002-365-13, 2002-365-17:</p> <p>The possible sites will be avoided. The possible sites will be protected during construction. Construction near the possible sites will be monitored. Archaeological site information and related management requirements will be passed on to the operating authority.</p>	Preconstruction, Design, Construction and Operation	MSRM, First Nations
G	SOCIO-COMMUNITY AND SOCIO-ECONOMIC (SCSE)		
G1	Continuing Consultation on SCSE Matters		
	<p>Consultation and liaison will continue through or with at least the following:</p> <p>Community Liaison Committee</p> <p style="padding-left: 40px;">To provide a forum for issue identification as well as community and stakeholder input to the communications program.</p> <p style="padding-left: 40px;">To obtain input and advice on identifying and managing project construction issues.</p>	Contracting Phase	Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Municipalities Liaison</p> <p>Ongoing communications will take place with municipalities in the project area (Surrey, Langley, Maple Ridge and Pitt Meadows) to integrate planning and construction of the new Fraser River Crossing with community planning and development initiatives.</p> <p>Key Stakeholder Groups (<i>e.g.</i>, emergency services, trucking association, commercial businesses, marine users).</p> <p>Ongoing communications will take place to provide information on changes in traffic patterns due to construction.</p> <p>The Katzie First Nation and Traditional Use Areas</p> <p>See commitments listed in Section G3.</p>		
G 2	General Mitigation Measures		
	<p>Prepare and implement a Construction Traffic Management Plan designed to facilitate the movement of people and goods during the construction period.</p> <p>Develop a Communications Plan to convey information to the local communities, businesses and road users. The Plan will use a variety of communication techniques to:</p> <p>Provide up-to-date information to communities on construction related activities and on the project schedule.</p> <p>Manage and resolve issues in consultation with communities.</p> <p>Communication techniques will include:</p> <p>Maintaining the project information line and website;</p> <p>Use of publications, presentations and open houses; and</p>	Design and Construction	Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Community events.</p> <p>Develop and operate an Information Centre during construction.</p>		
G 3	Specific Mitigation		
	<p>Businesses:</p> <p>Include the maintenance of access to businesses as a crucial component of the Construction Traffic Management Plan.</p> <p>Provide for safe access and egress for all properties affected by the project, particularly for roads experiencing modifications to traffic patterns as a result of the project. Provide safety audits of road design, pre- and post construction.</p> <p>Include business representatives for south side and north side commercial districts on the Community Liaison Committee.</p> <p>Convey information on business access through the project's Communications Plan and through temporary signage.</p> <p>Implement night-time construction where feasible and practicable, in commercial and industrial areas, to reduce impacts on businesses.</p> <p>Minimize visual impact on Meadow Gardens Golf Club by providing visual screening where feasible and as required through agreement with the property owners.</p>	Design and Construction	Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Communities and Neighbourhoods:</p> <p>Include access to residential areas in the overall Construction Traffic Management Plan.</p> <p>Communicate the times and duration of construction activity to area residents.</p> <p>Minimize the effects of noise, dust, and views of construction.</p> <p>Provide information to affected neighbourhoods on routing/detour options resulting from project related road closures (if any).</p> <p>Install shielding on street lighting where necessary to direct light spill away from residential areas.</p>	Design and Construction	Local Municipalities
	<p>Community Facilities:</p> <p>Maintain access to Anniedale Traditional School throughout the school year.</p> <p>Accommodate the surge of vehicles coming to drop-off and pick-up students during the beginning and end of the school day.</p>	Design and Construction	Local Municipalities
	<p>Visual, Shadow and Privacy:</p> <p>Prepare a Landscape Design Plan that addresses visual, shadow and privacy issues.</p> <p>Where applicable, develop procedures to screen or otherwise shield construction from affected neighbourhoods.</p>	Design and Construction	Local Municipalities
	<p>Commuters:</p> <p>Restrict construction activity at the intersection with Highway 15 and at the Lougheed Highway interchange during the morning and evening commute periods, subject to requirements from MoT.</p> <p>Minimize the use of construction related traffic detours.</p>	Design and Construction	MoT

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Develop and institute a communications as part of the Construction Traffic Management Plan to advise the traveling public about closures, detours and construction schedules.</p> <p>Post this information on the project web site and publish notices in the local newspapers.</p> <p>Provide project information relevant to commuters to local municipalities for posting on their websites.</p> <p>Consider nighttime construction in non-residential areas to accelerate construction.</p>		
	<p>Local Economy:</p> <p>Incorporate a policy of local procurement of goods and services, where practical.</p> <p>Encourage local hiring for the project, where feasible.</p>	Design and Construction	
	<p>Commercial Vehicles:</p> <p>Use the Community Liaison Committee to address business and trucking industry concerns. This Committee will include representatives from the commercial/industrial areas, from the four municipalities, and the BC Trucking Association.</p> <p>Restrict construction activity at the FRC intersection with Highway 15 and Lougheed Highway during the morning and evening commute periods, subject to requirements from MoT.</p> <p>Minimize the use of construction related traffic detours.</p> <p>Include notification to commercial users about closures, detours and construction schedules, and post this information on the project websites as part of the Communication Plan.</p> <p>Provide project information relevant to commercial vehicles to local municipalities for posting on their websites.</p>	Design and Construction	MoT

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Emergency Service Vehicles:</p> <p>Include representatives of the four municipal fire departments, the RCMP, and the BC Ambulance Service on the Community Liaison Committee.</p> <p>Include the emergency service providers to advise on closures, detours and construction schedules as part of the Communication Plan.</p>	Design and Construction	Local Municipalities
	<p>Katzie First Nation (KFN):</p> <p>Jointly with KFN, develop a KFN – FBPL/TransLink Project Agreement, including a benefits package, that will address contracting of KFN services, construction and operational phase employment and other benefits and opportunities for KFN.</p> <p>Consistent with the KFN – FBPL/TransLink Project Agreement, meetings and discussions with KFN will continue through the design, construction and operation phases of the project for the purpose of resolving issues raised in the August 2003 “Katzie Land Use, Occupancy, and Impact Assessment Study” (KUS) or other issues affecting KFN principles and interests (<i>e.g.</i>, hunting). Such FRC consultation efforts will be made on a best efforts basis and will be dependent upon the willingness of KFN to engage in such consultation. This over-arching commitment applies to all references to consultation with KFN listed in this Table for specific issues.</p> <p>Cooperation with KFN during the course of project implementation will be consistent with the terms of written agreements in place with KFN. Based on input from KFN, the Contractor/Operator will be required to develop and implement a Katzie First Nation Communications Plan applicable to the design and construction phase of the project.</p> <p>Disruption of the Katzie First Nation fishery will be avoided during in-river staging and construction of the Project through effective scheduling of in-river construction activity. Subject to discussion and agreement between KFN, FBPL and the Contractor/Operator, further</p>	Design, Construction and Operation	KFN, HC, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>restrictions may be imposed on construction when the KFN fishery is active. (<i>B1, Bridge Design, and B4, Navigable Waters, also provide information relevant to minimizing impacts to the Katzie First Nation fishery.</i>)</p> <p>Construction traffic will not use roads within Katzie IR#1, including the portion of Wharf Street running through Katzie IR#1, unless otherwise agreed to by Katzie First Nation.</p> <p>Access to Katzie IR#1 and to the area of the KFN longhouses on IR#1 will not change as a result of the FRC.</p> <p>Riparian habitat compensation planting works and terrestrial revegetation in the vicinity of Fraser River, Katzie Slough and Unnamed Creek will take place on lands owned by FBPL/TransLink or on lands where FBPL/TransLink has established tenure and will include the planting of species (<i>e.g.</i>, wapato) that have traditional use value to KFN. KFN's role in developing and implementing related planting plans, as well as KFN access to those lands for the purpose of exercising gathering and cultural practices, will be defined through agreement between KFN and FBPL/TransLink. Access to, and harvesting/cultural practices in, compensatory habitats will comply with terms and conditions of the DFO Authorization issued under Subsection 35(2) of the <i>Fisheries Act</i>.</p> <p style="padding-left: 40px;">At a minimum, revegetation will respect KFN traditions regarding provenance of biological materials, preferred biophysical setting and ceremonial aspects of planting.</p> <p style="padding-left: 40px;">An environmental effects monitoring program will be implemented prior to, during and after construction to track potential adverse effects of the project on the planted traditional use species.</p> <p style="padding-left: 40px;">The monitoring program will be developed in consultation with KFN.</p> <p style="padding-left: 40px;">Planting, monitoring and protection of traditional use species in compensatory habitats will be subject to DFO authorization under Subsection 35(2) of the <i>Fisheries Act</i>.</p> <p>Additional assessment of potential noise impacts to KFN communities will be completed during</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>final design to determine possible noise mitigation measures that may be warranted to protect KFN communities from adverse noise impacts during construction and/or operation of the project. Additional baseline noise monitoring will be undertaken in KFN communities as part of the assessment. Related noise mitigation measures will be implemented as agreed between FBPL/TransLink and KFN. Noise mitigation measures will not necessarily be limited to those defined in the 1993 MoT Noise Mitigation Policy.</p> <p>To mitigate noise impacts from construction, FRC night-time construction affecting KFN communities will be prohibited from 9:00 p.m. to 7:00 a.m. in accordance with the most restrictive local municipal bylaw unless otherwise agreed among KFN, FBPL and the Contractor/Operator.</p> <p>Lands in the vicinity of the longhouses on KFN IR#1 are of special significance to KFN and serve an important KFN need. In consultation with KFN, mitigation measures (<i>e.g.</i>, earth berms, walls, wall-berm combinations, vegetation screens, etc.) will be implemented in close proximity to the longhouses on IR#1 to limit noise levels resulting from the FRC during periods when outdoor events are regularly held. Noise monitoring will be conducted to track the performance of implemented noise mitigation. Corrective measures will be implemented if noise monitoring demonstrates that a 57 dBA L_{eq} (h) limit is exceeded and the exceedance is related to FRC operations.</p> <p>Noise monitoring will be conducted at regular intervals during construction and operation of the project to track the continuing applicability of assessment findings to KFN communities and to track that any noise mitigation implemented in the vicinity of KFN communities continues to perform as intended to mitigate adverse marginal noise effects attributable to the project. Monitoring results will be provided to KFN.</p> <p>Air quality monitoring will be conducted at regular intervals during construction and operation of the project to track the continuing applicability of assessment findings to KFN communities. Monitoring results will be provided to KFN.</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>A landscape plan will be developed and implemented specifically to mitigate visual, privacy, air quality and noise effects of the project on Katzie IR#1 and provide aesthetically pleasing, natural visual barriers between the FRC and residences and culturally-significant locations on Katzie IR#1. Subject to agreement between FBPL/TransLink and KFN, opportunities will be provided to KFN to participate in the development and implementation of the plan, including long-term maintenance and monitoring.</p> <p>Where necessary, shielding will be installed on road/bridge lighting to direct light spill away from KFN communities.</p> <p>Traditional Use Areas:</p> <p>The entire study area is regarded as a First Nations TUA, regardless of the specific location of archaeological/heritage resources identified in this Table.</p> <p>Further consultation will be undertaken with First Nations to assess related potential project impacts and reach agreement on corresponding impact management measures.</p>		
H	AIR QUALITY		
H1	<ul style="list-style-type: none"> Construction Phase 		
	<p>Air Quality Management/Monitoring Plan (AQMP):</p> <p>Appropriate measures for controlling and monitoring air quality and dust emissions will be provided in the EMP.</p> <p>An Air Quality Management/Monitoring Plan (AQMP) to control fugitive dust and other airborne</p>	Design and Construction	HC, GVRD, and Katzie First Nation

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>emissions during construction will be included in the EMP.</p> <p>Data from air quality monitoring programs and related compliance reports will be made available to relevant authorities as required or requested by them.</p> <p>A protocol for addressing road dust issues, if any, will be developed for implementation during the operating phase of FRC.</p>		
	<p>Training/Orientation:</p> <p>Construction personnel will be made aware that emissions from construction equipment and fugitive dust can potentially affect local air quality and that fumes, odours and smoke from construction activities may negatively affect human health and the environment.</p>		HC, GVRD
	<p>Best Management Practices:</p> <p>BMPs to be implemented for FRC include:</p> <p>Equipment emissions will be minimized by:</p> <ul style="list-style-type: none"> Operating equipment at optimum rated loads; Following routine equipment maintenance procedures; Turning off equipment, if practical, when not in use; and Using particle traps for exhaust systems. <p>Haul trucks will combine materials delivery and removal in a single trip where feasible to minimize materials handling and stockpiling. The load of haul/dump trucks that are hauling finer grained materials over larger distances will be covered during transport.</p> <p>Use of unpaved surfaces for hauling and other vehicle/truck movements will be minimized.</p> <p>Watering will be used to control dust on unpaved surfaces. Sediment control measures will be</p>		HC, GVRD

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>implemented to prevent resultant sediment laden run-off from entering any watercourses or storm sewers.</p> <p>The application of chemical dust suppressants to control fugitive dust and other airborne emissions will be prohibited unless expressly listed in the EMP and approved by relevant authorities. Chemical dust suppressants will not be used in proximity to watercourses.</p> <p>Paved surfaces subjected to accumulation of debris, sand, and/or gravel and dust from hauling will be cleaned (<i>e.g.</i>, by sweeping) on a regular basis.</p> <p>Tire-wash facilities will be provided as necessary to minimize tracking of dirt onto paved municipal and provincial roadways.</p> <p>Burning of refuse or other materials is prohibited unless authorized by an air discharge permit from the relevant authorities.</p> <p>Prior to commencing construction, the Contractor/Operator will obtain any permits, licenses or approvals necessary for operation of any equipment or machinery with point-source air emissions.</p> <p>All on-road (<i>i.e.</i>, licensed) haul trucks must be the latest models feasible and preferably model year 1998 or newer, and meet a maximum exhaust opacity requirement of 10%.</p> <p>All off-road haul trucks and other construction equipment must be fitted with catalyzed particulate traps, to filter out particulate matter emissions, and to reduce diesel odour emissions.</p> <p>All off-road haul trucks and other construction equipment will use the lowest sulfur diesel fuel commercially available within the GVRD market that is compatible with the Contractor/Operator's equipment.</p>		

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
H 2	Operational Phase		
	<ul style="list-style-type: none"> The Contractor/Operator will be required to prepare and implement an AQMP applicable to the operational phase of the project. 	Operations	HC, GVRD
I	NOISE		
I1	Design Mitigation		
	GVTA commits to using B.C. MoT's Revised Noise Policy of 1993 as a guide to determining design mitigation for the project. According to the policy, design mitigation (<i>e.g.</i> , noise barriers) will be provided where, in subsequent design stages, it is confirmed that mitigation is warranted, feasible, effective, generally within the policy's cost guidelines and widely supported by the directly affected community.	Design, Construction and Operation	HC, Local Municipalities
	<p>Areas Where Mitigation is Certain:</p> <p>Using the policy, FRC mainline traffic noise impacts were found to be clearly mitigable near Wildwood Crescent area in Pitt Meadows.</p> <p>Abernethy Connector traffic noise impacts were found to be clearly mitigable near the neighbourhood represented by Site 1A at 12251 201st Street near Telep Avenue.</p> <p>Noise mitigation measures will be implemented in the above two areas that meet the requirements of the MoT Revised Noise Policy (1993).</p>	Design, Construction and Operation	HC, Local Municipalities
	<p>Areas Requiring Further Assessment:</p> <p>The assessment identified several other areas where mitigation may be justified depending on subsequent design and other factors. Mitigation is potentially warranted at the following locations along the FRC Mainline:</p>	Design, Construction and Operation	HC, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Western end of Ospring Street in the Port Hammond area of Maple Ridge; Hammond Road at Maple Meadows Way and Fairfield Avenue in Pitt Meadows; 202nd Street at 98A Avenue in the Walnut Grove area of Langley; and Along 96th Avenue and 94th Avenue between the western extremity of the FRC near 176th Street and the Trans Canada Highway in Surrey.</p> <p>Mitigation is potentially warranted at the following locations along the Abernethy Connector:</p> <p>203rd Street north of Powell Avenue; and 20635 Brooks Avenue.</p> <p>Areas for which potential mitigation has been identified will undergo more detailed noise assessment during the design/build phase to finalize noise mitigation design. Mitigation will be implemented in those areas if warranted under the B.C. MoT Revised Noise Policy of 1993.</p>		
I 2	Construction Noise Management/Monitoring Plan		
	<p>The Contractor/Operator will be required to prepare and implement a Construction Noise Management/Monitoring Plan (CNMP) for review and acceptance by relevant authorities prior to construction.</p> <p>The Environmental Management Plan will specify the Quality Assurance/Quality Control processes that will be followed to track compliance with contract requirements. The plan will also detail the parameters (<i>i.e.</i>, working hours, noise levels, etc.) that must be met during road and bridge construction. The CNMP will comply with applicable noise regulations, bylaws, standards and guidelines including, but not limited to, municipal noise bylaws and worker noise protection requirements and guidelines established by the Workers Compensation Board.</p> <p>The CNMP will summarize working hours, noise levels, and other requirements that must be met</p>	Pre-construction	HC, KFN, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>during construction. For example, the plan will comply with: the District of Maple Ridge By-law No. 5122-1994 and the District of Pitt Meadows By-law No. 1612 which prohibit construction activities between the hours of 9:00 pm and 7:00 am; the City of Surrey By-law No. 7044 prohibits construction between 10:00 pm and 7:00 am.</p> <p>Under the CNMP, the Contractor/Operator will obtain any relevant municipal noise bylaw permits as well as any variances required to operate machinery at noise levels that may exceed those established by the relevant noise bylaws (<i>e.g.</i>, for undertaking operations outside normal working hours).</p> <p>The Contractor/Operator will provide notification of the type and likely duration of particularly noisy, impending operations (<i>e.g.</i>, pile driving) and when it will be necessary to work outside daytime and early evening hours.</p> <p>The CNMP will address procedures to control noise at source through the selection, appropriate operation, modification/enhancement or maintenance of equipment or processes.</p> <p>The CNMP will outline a proposed noise monitoring program to measure and monitor noise levels of high decibel activity. The Contractor/Operator will be required to provide related noise monitoring data and other information as required to obtain noise Permits and/or variances.</p> <p>The CNMP will also summarize and/or reference BMPs to mitigate construction noise.</p>		
I 3	Construction Noise Mitigation – Best Management Practices		
	<p>Timing and Coordination of Construction Activity:</p> <p>Activities will be coordinated and scheduled to minimize overall noise levels.</p> <p>Construction activities will be restricted to normal weekday daytime or early evening hours as much as possible. When working in residential areas, the noisiest activities (such as pile driving) will be limited to daytime.</p>	Construction	HC, KFN, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	Speed limits that are consistent with minimum noise generation will be enforced on the work site.		
	<p>Temporary Noise Barriers:</p> <p>Noisy stationary equipment (<i>e.g.</i>, compressors, generators) will be located and/or oriented so as to take advantage of any inherent noise shielding available from the natural terrain, roadway fill or shoulder or other large objects (equipment, buildings, material piles) and to direct as little noise as possible towards nearby noise sensitive areas.</p> <p>The Contractor/Operator will implement temporary construction noise barriers when working in close proximity to noise sensitive areas where no inherent shielding elements are available (<i>e.g.</i>, near noise sensitive areas situated at an elevation similar to or below the elevation of the construction zone).</p> <p>Temporary barriers will use solid material lined with sound absorptive material such as 25 mm to 50 mm semi-rigid fiberglass insulation. As feasible, barriers will be made wider and higher than the noise source.</p> <p>Temporary (<i>e.g.</i>, portable) noise barriers will be located close to fixed sources of noise such as compressors and generators.</p>	Construction	HC, KFN, Local Municipalities
	<p>Construction Methods and Equipment:</p> <p>Use methods/equipment that, by nature or design, produce less noise while doing equivalent work (<i>i.e.</i>, where more than one type/model of equipment or construction technique is available to do a particular job with similar efficiency, then use the quietest).</p> <p>Use standard equipment or processes that have had additional noise control features added (<i>e.g.</i>, better mufflers and enclosures on diesel or gas powered equipment, exhaust silencers on air tools, etc.).</p>	Construction	HC, Local Municipalities

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Noise Controls on Equipment:</p> <p>All equipment involved in any necessary night-time construction work near residential areas will be fitted with better-than-standard (<i>i.e.</i>, "residential-rated") mufflers/silencers.</p> <p>All gas or diesel-powered equipment will be fitted with intake (if appropriate) and exhaust silencers (mufflers) that meet manufacturers' recommendations for optimal attenuation.</p> <p>Fit air-powered equipment with mufflers on the compressed air ports as per manufacturer's recommendations; consider using hydraulic-powered equipment, particularly hydraulic rock drills.</p> <p>Supply and operate all equipment with appropriate covers, hoods, shields etc. in place and latched shut.</p> <p>Carry out regular maintenance on all equipment, including lubrication and replacement of worn parts, especially exhaust systems.</p> <p>Operate all equipment at minimum engine speeds consistent with effective operation.</p>	Construction	HC, Local Municipalities
	<p>Noise Awareness Training:</p> <p>Construction personnel (site supervisors, foremen, equipment operators, etc.) will be educated regarding particular noise issues and trained to operate equipment as quietly as possible.</p> <p>Personnel will be trained to avoid unnecessary idling or revving of engines, using airbrakes and banging tail gates and front end loader buckets.</p> <p>Backing-up beepers will be used only when and where required for safety and when other quieter options (strobe lights, radio transmitters) are inappropriate.</p> <p>Signage will be placed on the worksite near residential areas reminding worker personnel of these practices.</p>	Construction	HC

	COMMITMENTS AND ASSURANCES	APPROX. TIMING	OTHER RELEVANT PARTIES¹
	<p>Community Liaison:</p> <p>Noise affected communities/residents will be communicated with on a regular basis to advise them in timely fashion of future noisy activities and to notify them of changes in the estimated start and/or completion dates for the various noisy phases of construction.</p> <p>The Contractor/Operator will participate in special meetings with affected communities/residents to address site-specific noise issues in the event that late evening or night-time construction work proves necessary in the vicinity of residential areas.</p> <p>The Contractor/Operator will identify the noisiest construction activities that must be conducted within each community and discuss the extent to which these activities can be conducted during normal daytime working hours.</p> <p>For activities that must be carried out at night, the Contractor/Operator will propose, discuss and agree on measures to minimize the noise produced by the activity and/or received in the community. For example, the Contractor/Operator will discuss options for conducting the noisiest night-time activities as early as possible, <i>i.e.</i>, within the first few hours of the night shift rather than between midnight and 05:00 am.</p> <p>FBPL commits to fully assess the impact of construction on sleep as part of the design-build contract for the FRC. These findings will be communicated to Health Canada and the Fraser Health Authority.</p>	Construction	HC, Local Municipalities
I 4	Commitments during Post-Construction Phase		
	As per the requirements of the MoT Revised Noise Policy (1993), follow-up noise monitoring will be conducted within a year following project completion in order to verify the accuracy of traffic noise projections and to assess the effectiveness of all mitigation measures.	Operation	HC, KFN, Local Municipalities