Tabs

3 massey

4 Port mann Investigation

5 Ride Sharing

6 Tolls

7 Patullo

8 road pricing

9 Highway 1 - 8.x Lanes

10 Surrey Transit

11 Greyhound

12 Party buses

13 BC Ferries

14 E & N


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Note: There is no record of having received the original incoming.

Noreen McDonald
Chilcotin Towing
PO Box 28
2749 Chilcotin Highway 20
Riske Creek BC V0L 1T0

Reference: 271274

Dear Ms. McDonald,

Re: Riske Creek Wildfire

MLA Donna Barnett shared with me your letter regarding the clean-up of vehicles damaged in the Riske Creek wildfire. I am sorry it has taken me so long to respond.

I appreciated the opportunity to review your concerns. As you are aware, the vehicles in your impound facility were relocated there from Highway 20 over a period of years, based on an agreement between your towing company and the ministry. I understand your company was compensated for the costs incurred in towing the vehicles to your facility, at which point your company assumed possession of the vehicles.

You are aware that if a vehicle is left unclaimed by an owner after 14 days of being stored, the tow company can take possession of the vehicle and dispose of it under the Warehouse Lien Act to recover any additional costs they've incurred. I understand your company chose to store the vehicles described in your letter rather than dispose of them.

While I recognize you would like to be compensated for the cost to remove the damaged vehicles, they are an asset of the towing company to dispose of per the procedures set out in the Warehouse Lien Act. The ministry is not in position to financially support the disposal of the damaged vehicles.

.../2

Should you have further questions or concerns, please do not hesitate to contact the ministry's local District Manager, Todd Hubner. He is available by telephone at 250 398-4519 or by email at Todd.Hubner@gov.bc.ca and would be pleased to assist you.

Thank you for taking the time to write.

Yours sincerely,

Claire Trevena
Minister

Copy to: Donna Barnett
MLA, Cariboo-Chilcotin

Todd Hubner, District Manager
Cariboo District

Jackson, Lindsey B TRAN:EX

From: Harder, Derrick TRAN:EX
Sent: Monday, November 27, 2017 12:22 PM
To: Jackson, Lindsey B TRAN:EX
Subject: Fwd: TI Corp - media request: CTV - TI Corp values video
Attachments: IntegrityBC; ATT00001.htm

Can you print for minister
Thanks

Sent from my iPhone

Begin forwarded message:

From: "Jabs, Ryan GCPE:EX" <Ryan.Jabs@gov.bc.ca>
Date: November 27, 2017 at 11:29:45 AM PST
To: "Harder, Derrick TRAN:EX" <Derrick.Harder@gov.bc.ca>, "Perry, Alisma, TRAN:EX" <Alisma.Perry@gov.bc.ca>
Cc: "Machell, Aileen GCPE:EX" <Aileen.Machell@gov.bc.ca>, "Zaharia, Sarah GCPE:EX" <Sarah.Zaharia@gov.bc.ca>, "Robb, Katie GCPE:EX" <Katie.Robb@gov.bc.ca>, "Bowness, Lisanne GCPE:EX" <Lisanne.Bowness@gov.bc.ca>
Subject: TI Corp - media request: CTV - TI Corp values video

FYI on this one. I flagged last week, I believe, that CTV contacted TI Corp for information on a recent video they did about the organizations corporate values. TI Corp notes it was done last spring, before the tolling decision, as part of the recognition they received as a Top 100 employee.

They also have noted that Integrity BC have done a series of tweets on their spending in previous years (attached).

They had a budget when they were building the bridge and were operating as a tolled bridge (mostly focused on time saving to encourage people to use the bridge), but every once in a while would do one offs like the top 100 employee video that seems to have sparked this request.

The minister might get asked about it, although the reporter has not come our way yet.

- ? I have been made aware of a video that TI Corp produced in the Spring, after they were named one of B.C.'s top 100 employers.
- ? I understand this video was made before our government took power, and well before we made the decision to remove tolling.
- ? My expectation for TI Corp since tolls were removed is to focus any spending only on collecting outstanding tolls and rolling up their tolling operations.

We can chat a bit more on this one this morning.

From: Greg Johnson [mailto:gjohnson@ticorp.ca]
Sent: Monday, November 27, 2017 9:12 AM
To: Jabs, Ryan GCPE:EX; Lowe, Sonia GCPE:EX; Chambers, Craig GCPE:EX
Subject: Fwd: CTV - TI Corp values video

FYI - CTV is interested in doing a story about advertising spending, plus the Values Video.

Begin forwarded message:

> **From:** "Woodward, Jon" <Jon.Woodward@bellmedia.ca>
> **Date:** November 27, 2017 at 8:21:32 AM PST
> **To:** Greg Johnson <gjohnson@ticorp.ca>
> **Subject: Re: CTV - TI Corp values video**
>
> Good morning
>
> There is interest in doing a story on this today as part of a look at general and advertising spending at TI Corp.
>
> Let us know when you're available for an interview.
>
> Thanks,
>
> Jon
>
> Sent from my iPhone
>
> On Nov 22, 2017, at 12:58 PM, Greg Johnson <gjohnson@ticorp.ca> wrote:
>
> > Oh Boy Productions
> >
> > ---
> >
> > **From:** Woodward, Jon [mailto:Jon.Woodward@bellmedia.ca]
> > **Sent:** November 22, 2017 12:55 PM
> > **To:** Greg Johnson <gjohnson@ticorp.ca>
> > **Subject:** Re: CTV - TI Corp values video
> >
> > Sorry Greg, forgot to ask --- who produced the video? What company?
> >
> > Sent from my iPhone
> >
> > On Nov 22, 2017, at 12:12 PM, Greg Johnson <gjohnson@ticorp.ca> wrote:
> >
> > > Jon,
> > >
> > > TI Corp's values video was posted on our website in spring 2017 to celebrate our selection as one of BC's Top Employers (the YouTube post was updated in September 2017). The link to the Top Employers announcement is on Canada's Top 100 Employers website.
> > >
> > > Culture and team are very important at TI Corp. The video captures the talented people and good work in the organization.

The video cost about $11,000 to produce.

Greg

From: Woodward, Jon
[mailto:Jon.Woodward@bellmedia.ca]
Sent: November 21, 2017 9:30 AM
To: Greg Johnson <gjohnson@ticorp.ca>
Subject: questions from CTV news

Hi Greg

Just left you a message.

This video came to our attention here:

https://www.youtube.com/watch?v=3VLAAZL6ldc&t=5s

Given most of the functions it describes won't be TI corp's for long we wanted to know more about it including what it was commissioned for and how much it cost.

Can you give me a call at 604-351-1831?

Thanks,

Jon

Jackson, Lindsey B TRAN:EX

Subject: FW: IntegrityBC

From: Johnson, Greg TIC:EX
Sent: Monday, November 27, 2017 11:05 AM
To: Jabs, Ryan GCPE:EX; Robb, Katie GCPE:EX
Cc: Kozak, Madeline TIC:EX
Subject: IntegrityBC

Here are IntegrityBC's tweets. Assuming these are source material for CTV's interview request. We'll send our KM's along shortly.

PR, misc. spend: https://twitter.com/INTEGRITYBC/statuses/933192658905739265
Values Video: https://twitter.com/INTEGRITYBC/statuses/933189875926364160
Lawyer costs: https://twitter.com/INTEGRITYBC/status/933200730319548416/photo/1
Recruitment and staffing costs: https://twitter.com/INTEGRITYBC/status/934605918129373185

Greg Johnson
Director, Communication and Community Engagement
Transportation Investment Corporation
Direct: 778-783-1220

ISSUES REPORT – Updated November 20, 2017

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Legendary Quest Statement to Media:

When we formed government, we looked closely at this proposal and determined it was not in the best interest of British Columbians.

I want to be clear – this decision is not related to the film industry's use of public infrastructure.

Our creative industries are important to British Columbia and we are not contemplating any changes to the current permitting practice for film.

This is a private company requesting the ongoing use of a major piece of public infrastructure for commercial gain.

Our government has decided not to support this type s.13 of venture."

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Lion's Gate Bridge

Highlights:

- On Monday, November 27, the BC Liberal opposition asked about the government's decision not to approve a request by Legendworthy Quest Inc., a private tourism company, to use the Lion's Gate bridge for a for-profit bridge climb attraction.
- A letter sent from the Transportation Ministry to the company had rejected its proposal.
- The BC Liberals suggested the wording "the Ministry has decided not to pursue the commercialization of any public structures with any vendor." meant that this was a broad policy direction that would affect the film industry.

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Main Message:

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Background:

- Legendworthy Quest Inc., a private tourism company, approached the Transportation ministry in 2015 about a proposal to run a bridge climb tourist attraction on the Lions Gate Bridge. The ministry asked the company to do some technical work to demonstrate that his proposal could work, as well as to engage stakeholders to see if they would support the proposal.

- In 2016, the ministry validated the technical and safety aspects of the company's proposal and began to work with the company, as the Port and Vancouver Park Board will not approve the company's access until he gets approval from the ministry.

- In late 2016, the company requested a direct award to begin offering the service. Legal services, however, recommends the province issue a Notice of Intent to follow proper procurement policy and to reduce the province's liabilities and risk.

- In 2017, the ministry posted a Notice of Intent on BC bid to notify interested parties that the government was considering entering into an agreement with Legendworthy Quest to operate an adventure tourism business involving the Lions Gate Bridge. This proposal and posting garnered significant media attention at the time, as the proponent proactively went to media to advertise he'd have the service in place by Canada Day, 2017.

- Following the posting of the Notice of Intent, other vendors put forward a valid proposal after the ministry posted a Notice of Intent on BC Bid.

- After review and discussion, the ministry has decided not to pursue the commercialization of any public transportation structures for this type of venture.

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Ride-hailing

Highlights:

- On Tuesday, November 28, the legislature passed a motion to authorize the Select Standing Committee on Crown Corporations to examine, inquire into and make recommendations on ridesharing in British Columbia; for up to three days.
- An amendment to the motion proposed by the BC Liberals asked for the 3 day limit to be removed, and also to include a specific reference to those who work in the taxi sector, those who hold taxi licences.
- The amendment did not pass. The BC Liberal caucus voted against the main motion.

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Background on Uber – operations in other jurisdictions

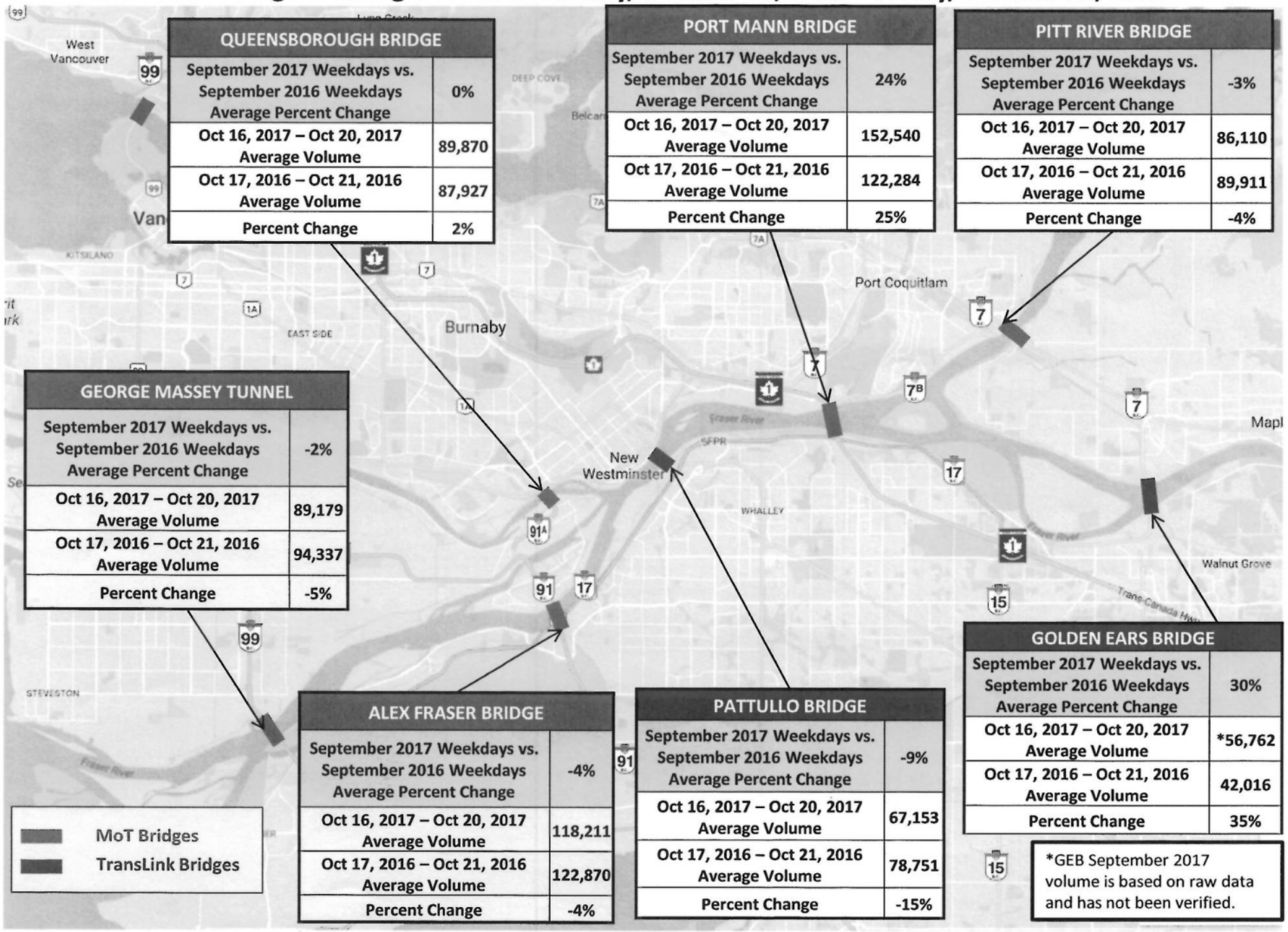
- Uber operations:
    - Uber operates in over 300 cities across the world, including at least 15 communities in Canada. Calgary, Waterloo and Edmonton approved updated regulations or Uber operations in 2016.
- Restrictions/does not operate:
    - In Quebec, a pilot project that allows Uber to operate legally has been extended for a second year but Uber has threatened to leave the Province in protest over the increased training requirement for their drivers.
    - In Denmark, regulators were concerned that Uber's presence created an unfair playing field with existing taxi drivers. Their regulations forced Uber to pull out of this market a year after operating there since 2014.
    - In Italy, Uber will soon be completely banned from the country, after its business practices were found to "constitute unfair competition". The company is permitted to continue operating until a final court ruling is made.

- In 2015, Uber suspended its UberPOP commercial rideshare service in France following riots by taxi drivers. UberPOP is Uber's cheapest type of service (UberX in North America), charging a base fare of just 1 euro, threatening the taxi industry as the Uber fare was often cheaper than a licensed taxi.
- In Hungary, the government passed legislation preventing Uber from operating after they claim the company breached regulations for over two years. The new law permits a Hungarian authority to block internet access to illegal dispatcher services.
- Bulgaria says if Uber wants to return to the Bulgarian market, it will have to meet the minimum requirements of legislation and register as a taxi service.
- Uber has also faced suspensions in Finland, Spain and the Netherlands, primarily over its UberPOP commercial rideshare service. Barcelona's main taxi operator accused the company of running an illegal taxi service and is currently awaiting a ruling from the European Court of Justice.
- The City of London, England announced that it is not renewing Uber's licence in that city because Uber "demonstrate[s] a lack of corporate responsibility in relation to a number of issues which have potential public safety and security implications".
- In Asia, Uber pulled out of the Chinese market, and was bought out by a local Chinese competitor. In Taiwan, the government imposed fines on the ridesharing company, and they subsequently suspended their service.
- Closer to home, Uber pulled operations from Austin, Texas after the city required Uber to fingerprint and background check all prospective and current drivers.
- In Alaska, Uber pulled out after six months in the state, after a dispute over whether drivers were independent contractors or registered taxi drivers - which would mean they are entitled to workers' compensation insurance. Uber paid a hefty fine to the Government of Alaska, before abandoning the Alaskan market.

Additional Background:

- The consultant hired to conduct the consultation with the taxi industry and other stakeholders is Dr. Dan Hara.
- Dr. Dan Hara of Ottawa-based Hara Associates has 21 years of experience advising government agencies on regulatory and transportation policy. A specialist in industrial organization, his work has covered many regulatory environments, including taxi regulation.
- Dr. Hara is an expert on the taxi industry in Canada and has undertaken a number of reviews and initiatives for cities and governments across Canada concerning the entry of commercial rideshare services.
- He has consulted in this capacity for the cities of Calgary, Edmonton, Ottawa and Halifax, to name a few.
- The previous government had engaged in some stakeholder engagement around what was needed in terms of a regulatory and economic environment to fairly bring ride-sharing into B.C.
- This process led to a report: Ride Sourcing in BC: A Stakeholder Engagement Summary released September 22, 2016.
- This report was used to guide the previous administration in developing its proposed economic and regulatory framework for ride sharing in B.C.
- The previous government announced its plans for ride sharing on March 7, 2017 and committed to bringing its model into place by December 2017. In response to this announcement, the Vancouver Taxi Association issued an open letter to the previous government on March 9th, criticizing the plan by saying the proposed insurance model was unfair and that not restricting the number of taxi licenses issued would create destructive competition in the taxi industry.
- In its letter, the VTA expressed a desire to work with the NDP government to come up with a model that meets the interests of taxi users while protecting the existing industry.
- In 2012, Uber entered the B.C. market with an app-based black car service, but was forced to suspend service following an order from the Registrar of Passenger Transportation.

Fraser River Bridge Crossing Volumes: Monday, October 16, 2017 – Friday, October 20, 2017



QUEENSBOROUGH BRIDGE	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	0%
Oct 16, 2017 – Oct 20, 2017 Average Volume	89,870
Oct 17, 2016 – Oct 21, 2016 Average Volume	87,927
Percent Change	2%

PORT MANN BRIDGE	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	24%
Oct 16, 2017 – Oct 20, 2017 Average Volume	152,540
Oct 17, 2016 – Oct 21, 2016 Average Volume	122,284
Percent Change	25%

PITT RIVER BRIDGE	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	-3%
Oct 16, 2017 – Oct 20, 2017 Average Volume	86,110
Oct 17, 2016 – Oct 21, 2016 Average Volume	89,911
Percent Change	-4%

GEORGE MASSEY TUNNEL	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	-2%
Oct 16, 2017 – Oct 20, 2017 Average Volume	89,179
Oct 17, 2016 – Oct 21, 2016 Average Volume	94,337
Percent Change	-5%

ALEX FRASER BRIDGE	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	-4%
Oct 16, 2017 – Oct 20, 2017 Average Volume	118,211
Oct 17, 2016 – Oct 21, 2016 Average Volume	122,870
Percent Change	-4%

PATTULLO BRIDGE	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	-9%
Oct 16, 2017 – Oct 20, 2017 Average Volume	67,153
Oct 17, 2016 – Oct 21, 2016 Average Volume	78,751
Percent Change	-15%

GOLDEN EARS BRIDGE	
September 2017 Weekdays vs. September 2016 Weekdays Average Percent Change	30%
Oct 16, 2017 – Oct 20, 2017 Average Volume	*56,762
Oct 17, 2016 – Oct 21, 2016 Average Volume	42,016
Percent Change	35%

*GEB September 2017 volume is based on raw data and has not been verified.

	ALL VEHICLES							
	GMT	AFB	QB	PB	PMB	PRB	GEB	TOTAL
September 2017 Weekdays vs September 2016 Weekdays Average Percent Change	-2%	-4%	0%	-9%	24%	-3%	30%	4%
Oct 3, 2016 - Oct 7, 2016 Weekday Average	96,125	127,700	90,413	78,147	123,229	90,531	42,016	648,162
Oct 2, 2017 - Oct 6, 2017 Weekday Average	93,089	121,207	92,780	69,145	157,495	88,749	55,901	678,367
Volume Change	-3036	-6493	2367	-9002	34266	-1782	13885	30205
Percent Change	-3%	-5%	3%	-12%	28%	-2%	33%	5%
Oct 11, 2016 - Oct 14, 2016 Weekday Average	92,701	123,935	87,226	77,229	116,709	89,360	42,016	629,177
Oct 10, 2017 - Oct 13, 2017 Weekday Average	92,553	119,325	91,563	69,888	155,958	89,230	56,596	675,112
Volume Change	-148	-4610	4336	-7341	39249	-131	14580	45935
Percent Change	0%	-4%	5%	-10%	34%	0%	35%	7%
Oct 17, 2016 - Oct 21, 2016 Weekday Average	94,337	122,870	87,927	78,751	122,284	89,911	42,016	638,096
Oct 16, 2017 - Oct 20, 2017 Weekday Average	89,179	118,211	89,870	67,153	152,540	86,110	56,762	659,825
Volume Change	-5158	-4659	1943	-11598	30256	-3801	14746	21729
Percent Change	-5%	-4%	2%	-15%	25%	-4%	35%	3%

	TRUCKS							
	GMT	AFB	QB	PB	PMB	PRB	GEB	TOTAL
September 2017 Weekdays vs September 2016 Weekdays Average Percent Change		6%		0%	17%	-7%	52%	9%
Oct 3, 2016 - Oct 7, 2016 Weekday Average		15,856		6,742	15,011	7,548		45,157
Oct 2, 2017 - Oct 6, 2017 Weekday Average		16,525		6,580	17,712	7,366		48,183
Volume Change		669		-162	2701	-182		3026
Percent Change		4%		-2%	18%	-2%		7%
Oct 11, 2016 - Oct 14, 2016 Weekday Average		15,692		6,926	14,356	7,331		44,305
Oct 10, 2017 - Oct 13, 2017 Weekday Average		16,655		6,797	17,562	7,230		48,243
Volume Change		963		-130	3206	-102		3938
Percent Change		6%		-2%	22%	-1%		9%
Oct 17, 2016 - Oct 21, 2016 Weekday Average		15,174		7,430	14,519	7,323		44,447
Oct 16, 2017 - Oct 20, 2017 Weekday Average		15,813		6,266	16,811	6,997		45,888
Volume Change		639		-1164	2292	-326		1441
Percent Change		4%		-16%	16%	-4%		3%

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MMK CONSULTING

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GEORGE MASSEY TUNNEL REPLACEMENT PROJECT

EVALUATION OF CROSSING SCENARIOS

MARCH 2014

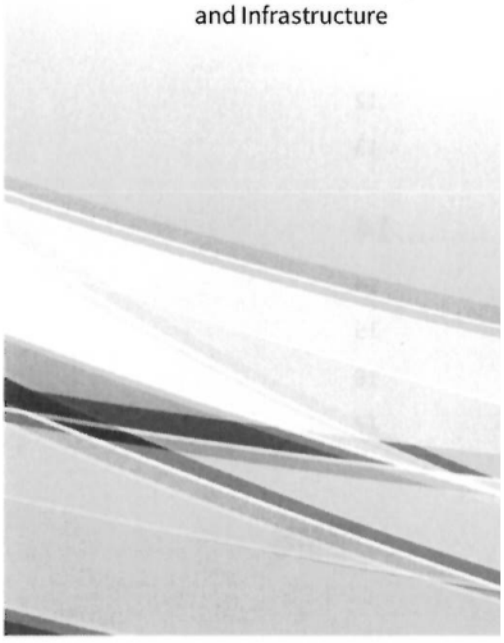
Prepared for:

BC Ministry of Transportation
and Infrastructure

s.13

Prepared by: s.13

MMK Consulting Inc.



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MMK

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1. Introduction and Summary

This paper evaluates five potential crossing scenarios for the George Massey Tunnel Replacement Project, as identified in the Ministry of Transportation and Infrastructure's *Consultation Discussion Guide: Planning for the Future – Phase 2: Exploring the Options (March-April 2013).*

This report has been prepared by MMK Consulting (MMK) for the BC Ministry of Transportation and Infrastructure, based on research and analysis undertaken by the Ministry's planning team. The draft report was initially completed by MMK in February 2014, with subsequent planning team review and input.

Background

Project goals

The 2013 Phase 2 Consultation Discussion Guide identified six draft project goals, including:

- **Relieve congestion** – Reduce congestion and travel times for all users.
- **Improve safety** – Improve traffic and seismic safety, as well as emergency response capabilities.
- **Support trade and commerce** – Improve access to local businesses and gateways.
- **Support objectives for regional people movement** – Increase transit ridership and protect the Highway 99 corridor for future rapid transit and provide cyclist and pedestrian access.
- **Protect the existing land base** – Minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts.
- **Involve community** – Involve communities, businesses and stakeholders in the project.

Crossing scenarios considered

The Phase 2 Consultation Discussion Guide identified five potential crossing scenarios:

- **Scenario 1 – Maintain existing Tunnel ("Maintain Tunnel").** Scenario 1 would rehabilitate the existing Tunnel's mechanical systems, improve its ability to withstand future earthquakes (although not to new-construction standards), and make improvements to the existing interchanges at Steveston (to the north) and Highway 17A (to the south). It would not increase the existing Tunnel's capacity.
- **Scenario 2 – Replace existing Tunnel with new bridge ("Replacement Bridge").** Scenario 2 would construct a new bridge along the existing right-of-way, after which the existing Tunnel would be decommissioned.

- **Scenario 3 – Replace existing Tunnel with new tunnel ("Replacement Tunnel").** Scenario 3 would construct a replacement tunnel along the existing right-of-way, likely upstream from the existing Tunnel, after which the existing Tunnel would be decommissioned.

- **Scenario 4 – Maintain existing Tunnel and build new crossing along existing Highway 99 Corridor ("Maintain Tunnel, Add In-Corridor Crossing").** The new crossing could be either a bridge (Option 4a) or tunnel (Option 4b), to provide a similar increase in capacity as Scenarios 2 and 3.

- **Scenario 5 – Maintain existing Tunnel and build new crossing in a new corridor ("Maintain Tunnel, Add New-Corridor Crossing").** The new crossing would be a bridge located in the Tilbury Area, between the existing Tunnel and the Alex Fraser Bridge, and accessed via the South Fraser Perimeter Road on the south side and via a newly constructed connection to Highway 91 on the north side.

Evaluation areas

The Phase 2 Consultation Discussion Guide identified 19 draft criteria, in six categories, for evaluating potential crossing scenarios:

- **Efficient transportation for all users** – including traffic congestion; transit capability; travel time reliability; and pedestrian and cycling accessibility.

- **Safety** – including incident response capability; earthquake protection; and traffic safety.

- **Agriculture** – including agricultural land effects; and access to/from agricultural areas.

- **Environment** – including local and regional air quality; wildlife and terrestrial habitat; and marine life and habitat.

- **Jobs and the economy** – including access to gateways and trade corridors; access to business and industrial land; and marine access for goods movement.

- **Social and community considerations** – including community access (including across the highway within communities); private property effects; noise effects; and visual effects.

The results of the Phase 1 and Phase 2 public consultation programs are detailed in the *Consultation Summary Report,* posted on the Ministry's George Massey Tunnel Replacement Project website.

Evaluation of Scenarios

Basis for evaluations

The following evaluation of scenarios addresses all of the evaluation criteria identified in the Phase 2 Consultation Discussion Guide. In addition, capital costs and risks are important factors in comparing scenarios, and thus have also been considered in the following evaluation. A few additional technical criteria (e.g. risks of disturbing contaminated sites) have also been added to the analysis. In total, 28 individual criteria have been evaluated, within seven major categories.

Most of the evaluations have been performed on a four-point scale, based on the degree to which each scenario is assessed as potentially achieving the relevant project goals, relative to the other scenarios. Capital costs and operating and maintenance (O&M) costs have been compared on a three-point scale, since the scenarios are high-level concepts for which detailed cost information is not yet available. Further details of the basis for each of the individual ratings are contained in the following chapters.

Unless otherwise indicated, the individual assessments, and the overall comparison of scenarios, represent the combined results of (1) the preliminary planning and technical work undertaken by the Ministry and its engineering, environmental, and economic/financial advisors and (2) the public feedback and input received through the Phase 1 and Phase 2 consultation and review processes.

Evaluation of scenarios

The five scenarios have been compared according to 28 individual criteria within seven evaluation areas, as summarized in the table below and detailed in the balance of this report.

Summary comparison of scenarios

Evaluation Area	Scenarios				
	1. Maintain Tunnel	2. Replacement Bridge	3. Replacement Tunnel	4. Maintain Tunnel, Add In-Corridor Crossing	5. Maintain Tunnel, Add New-Corridor Crossing
Transportation efficiency	✖✖	✓✓	✓✓	✓✓	✓
Safety	✖✖	✓✓	✓✓	✓	✓
Agriculture	✓	✓	✖	✖	✖✖
Environment	✖	✓	✖✖	✖✖	✖✖
Jobs and the economy	✖✖	✓✓	✓	✓	✓
Social and community considerations	✓	✓	✖	✖	✖✖
Financial costs and risks	✖	✓	✖	✖✖	✖✖
Overall evaluation	**Preferred**				

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Preferred scenario

Scenario 2 (Replacement Bridge) is the preferred scenario. Its overall rating is similar to or preferred to the four other scenarios in each evaluation area.

Scenario 2's comparative ratings, for each evaluation area, are as follows:

- **Transportation efficiency** – Scenario 2's benefits in terms of congestion relief, transit capability, and travel time reliability are similar to those of Scenarios 3 and 4, greater than those of Scenario 5, and much greater than those of Scenario 1. Scenario 2 is also preferable (along with the Scenario 4 bridge option) in terms of the potential to improve pedestrian and cyclist accessibility.

- **Safety** – Scenarios 2 and 3 are preferable in terms of both traffic safety and seismic (earthquake) safety. An all-new crossing would be designed to significantly higher standards than what is achievable through maintaining the existing Tunnel.

- **Agriculture** – Scenario 2 is preferable to all other scenarios in improving the connectivity between agricultural areas on either side of the corridor, because of the ability to provide access underneath the bridge for agricultural traffic. Scenario 2 would require more properties to be acquired than Scenario 1, where acquisition requirements would be minimal.

- **Environment** – Scenario 2 is preferable or similar to all other scenarios in terms of marine life, wildlife, shorelines, habitat, and regional air quality. Under Scenario 2, bridge piers can be situated outside of the river, while all other scenarios would involve significant in-river disturbance. Scenario 2 is also preferable to all other scenarios in terms of local air quality, because particulates can naturally disperse in the open air, minimizing local concentrations.

- **Jobs and the economy** – Scenario 2's longer-term effect on jobs and the economy is preferable to Scenario 1, and is similar to or higher than every other scenario. Scenario 2 would have the least effect on marine traffic during construction, and would make it possible to lower the water draft at the existing Tunnel.

- **Social and community considerations** – Scenario 2 has the greatest ability to improve access across the highway between communities, because of the potential for local road connections underneath the bridge abutments on either side of the crossing. Scenario 2 also provides the capacity to serve the existing and future transportation needs of the population targets for the adjacent communities (Richmond, Delta, Tsawwassen, Surrey, White Rock) established by the Regional Growth Strategy. Scenario 2 would introduce new above-ground visual and noise effects at the existing crossing that would require mitigation.

- **Financial costs and risks** – Based on discussions with international tunnel and bridge construction experts, Scenario 2's capital costs are expected to be similar to those of Scenarios 3 and 4, and to be significantly lower than those of Scenario 5. While capital costs are much higher for Scenario 2 than Scenario 1, Scenario 1 does not achieve the project's key safety and congestion relief goals, and is only a medium term option due to the existing Tunnel's age and condition.

  With regard to risks, Scenario 2 is assessed as having lower risks during both construction and operation than any other scenario, due to (1) avoiding the need to undertake seismic improvements to the existing Tunnel that would be required under Scenarios 1, 4 and 5, and (2) avoiding the significant in-river work that would be required under Scenario 3.

Further details on the comparative evaluations of individual criteria are contained in the balance of this report.

2. Transportation Efficiency

Traffic congestion

***Relevant Goal** – Relieve congestion: reduce congestion and travel times for all users*

The relative ability of each scenario to address current and future traffic congestion is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would improve the Highway 17A[1] and Steveston interchanges, but would not increase the current Tunnel capacity, which is the main source of congestion.

  Scenario 1 not only fails to address the traffic congestion associated with current volumes, but also raises the probability of significantly increased future congestion costs as throughput capacity falls further behind population growth.[2] Rating: ✖✖

- **Scenarios 2 (Replacement Bridge), 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would address the current congestion levels through the existing Tunnel, by increasing the throughput capacity of the existing corridor.[3] The new crossing could be designed (number of lanes, HOV/transit priorities, etc.) to handle future traffic demand for decades to come. Initial traffic studies estimate that under Scenarios 2 through 4, peak-hour traffic levels would be able to increase significantly more than under Scenario 1. Rating: ✓✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would not increase capacity through the existing Tunnel, but would attract some traffic from the existing Tunnel to the new crossing. Scenario 5 would achieve most of the benefits of Scenarios 2 through 4, but to a somewhat lesser extent because of the more circuitous routing for through traffic. Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Traffic congestion	✖✖	✓✓	✓✓	✓✓	✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

[1] The Highway 17 interchange became the Highway 17A interchange in December 2013, following opening of the South Fraser Perimeter Road.

[2] The Regional Growth Strategy envisages population growth of 64% (1.4% annually) in adjacent communities for 2006-2041.

[3] Comparisons of Scenarios 2 through 5 are based on similar levels of vehicle, transit, and pedestrian/cyclist capacity.

Transit capability

Relevant Goals *– Regional people movement, support commerce, relieve congestion, improve safety*

The relative ability of each scenario to provide transit capability is assessed as follows:

- **Scenario 1 (Maintain Tunnel) –** would enable minor improvements in transit service capability, to the extent that upgrades to the Steveston and Highway 17A interchanges are able to improve transit's priority access to the Tunnel. However, transit buses would still be required to travel on non-designated lanes through the Tunnel, merging with general traffic. As traffic grows, the benefit of existing HOV queue-jumper lanes will be diminished, increasing transit times and reducing transit's travel time reliability relative to the automobile. Rating: ✖

- **Scenarios 2 (Replacement Bridge), 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing) –** would result in the greatest improvement in transit capability. Initial conceptual work on Scenarios 2, 3 and 4 contemplates having one lane in each direction dedicated for transit/HOV use – not only for the new crossing, but also on other portions of the Highway 99 corridor. Rating: ✓✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing) –** would also enable improvements in transit capability along Highway 99, by diverting some passenger vehicles to the new-corridor crossing. However, dedicated transit/HOV lanes would be not be possible at the existing Tunnel, so the benefit to transit capability would be lower than for Scenarios 2 through 4. Scenario 5 would also require significant planning by TransLink to integrate the new-Corridor crossing within its existing transit service network. Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Transit capability	✖	✓✓	✓✓	✓✓	✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Travel time reliability

Relevant Goals *– Regional people movement, support commerce, relieve congestion*

Travel time reliability is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would involve limited improvements to the Highway 17A and Steveston interchanges, resulting in some travel time reliability improvements, particularly for local traffic that is not travelling through the Tunnel. However, the variability of waiting times to access the Tunnel would not be significantly reduced. Rating: ✖✖

- **Scenarios 2 (Replacement Bridge), 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would result in the greatest improvement in travel time reliability, because of the congestion relief achieved at the crossing and along the Highway 99 corridor. Rating: ✓✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would also result in significant improvements in travel time reliability, especially for drivers whose origins/destinations would make it more convenient to use the new corridor as an alternative to the Highway 91 and/or Highway 99 corridors. Rating: ✓✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Travel time reliability	✖✖	✓✓	✓✓	✓✓	✓✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Pedestrian and cyclist accessibility

***Relevant Goal** – Regional people movement*

Pedestrian and cyclist accessibility is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would require continuation of the existing shuttle service through the existing Tunnel. Scenario 1 would not address the expectation of many members of the public of pedestrian/cyclist access being introduced on the existing corridor. Rating: ✖✖
- **Scenario 2 (Replacement Bridge)** – would provide above-ground pedestrian and/or cycling paths on the replacement bridge. The grade would be similar to the Alex Fraser Bridge, and the walking/cycling experience would be preferable to Scenario 3. Rating: ✓✓
- **Scenario 3 (Replacement Tunnel)** – would provide below-ground pedestrian and/or cycling paths, as part of the new tunnel. The below-ground pedestrian/cyclist tunnel route would provide a less desirable walking/cycling experience (noise, visual, air quality, etc.) than above-ground facilities because of the confined environment. Rating: ✓
- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would provide new pedestrian and/or cycling paths on the new crossing. Option 4a (bridge) is assessed as for Scenario 2, while Option 4b (tunnel) is assessed as for Scenario 3. Rating (bridge option): ✓✓
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would provide a new pedestrian and/or cyclist crossing along the new corridor, a more circuitous route for most pedestrian/bicycle traffic. If the current shuttle service in the existing Tunnel was discontinued upon opening of the new crossing, some current shuttle service users would be negatively affected; and even if the current shuttle service was maintained, some stakeholders' expectations of pedestrian/cyclist access through the existing Tunnel would not be realized. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Pedestrian and cyclist accessibility	✖✖	✓✓	✓	✓✓	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

3. Safety

Incident response capability

***Relevant Goal** – Improve safety*

Incident response capability is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would enable limited improvements to same-side incident response capability, through the upgrading of the Steveston and Highway 17A interchanges for emergency vehicle access. These upgrades could also incorporate some improvements in emergency vehicles' priority access to the Tunnel. However, these gains would be minor relative to those associated with Scenarios 2 through 5. Rating: ✖✖

- **Scenario 2 (Replacement Bridge)** – would achieve much greater gains in incident response capability, by improving emergency vehicle access in emergency situations (congestion relief, additional lanes, emergency vehicle turnarounds, etc.). Scenario 2 was strongly preferred by the emergency responders participating in the Phase 2 consultation process. Rating: ✓✓

- **Scenarios 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would be similar to Scenario 2 in terms of incident response capability on either side of the crossing. For incidents occurring on the crossing (e.g., car fires), the tunnel-based operations associated with Scenarios 3 and 4 would generally involve greater incident response challenges than Scenario 2. Rating: ✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would be less effective than Scenarios 2 through 4 in increasing incident response capability along the existing corridor, because of the inability to improve emergency vehicle access through the existing Tunnel. However, Scenario 5 would provide a new alternate routing for emergency vehicles, which would be a significant improvement over Scenario 1 in responding to many types of incidents. Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Incident response capability	✖✖	✓✓	✓	✓	✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Earthquake protection

***Relevant Goal** – Improve safety*

Earthquake protection is assessed as follows:

- **Scenario 1 (Maintain Tunnel) –** would involve a significant capital program to upgrade the geotechnical stability of the existing Tunnel during seismic events. (The Tunnel's structural stability has been upgraded in previous work undertaken in 2006, but not to the same standard as for new construction.)

  Geotechnical studies have identified risks in attempting to improve the existing Tunnel's geotechnical stability, including risk of destabilizing the existing tunnel-bed. In addition, quantifying the gains in earthquake risk reduction would be difficult to estimate with confidence.

  Based on discussions with engineering experts, the best-case scenario is that the earthquake risk could be reduced from the current 1-in-275-years[4], to about 1-in-475-years. (This would still fall far short of the engineering standard for new construction, which is 1-in-2,475-years.) Rating: ✖✖

- **Scenarios 2 (Replacement Bridge) and 3 (Replacement Tunnel) –** would be preferable to Scenario 1 in terms of earthquake protection levels, since the new infrastructure would be engineered to current standards.

  There would also be some risk of destabilizing the existing Tunnel during construction – especially for Scenario 3, where a new tunnel would be built into the riverbed, likely just upstream from the existing Tunnel.

  While Scenarios 2 and 3 would be engineered to equally high levels of earthquake resistance, the Phase 2 public consultation process found that the perceived earthquake risk for some members of the public is lower for Scenario 2 than for Scenario 3. Rating: ✓✓

- **Scenarios 4 (Maintain Tunnel, Add In-Corridor Crossing) and 5 (Maintain Tunnel, Add New-Corridor Crossing) –** would have higher levels of earthquake risk reduction for the new crossing (1-in-2,475-years), and would provide an alternate routing in the case of failure of the existing Tunnel. However, even in the best-case scenario, Scenarios 4 and 5 would not be capable of improving the existing Tunnel's earthquake risk beyond 1-in-475-years. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Earthquake protection	✖✖	✓✓	✓✓	✖	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

[4] A 1-in-275-year risk, for example, means that in any given year there is 1 chance in 275 that an earthquake will occur that is of sufficient intensity and proximity to cause major damage to the Tunnel.

Traffic safety

***Relevant Goal** – Improve safety*

Traffic safety is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have the lowest level of traffic safety. While improvements would be made, particularly at the Highway 17A and Steveston interchanges, the Tunnel portion of the corridor would still reflect the lower design standards (clearances, lane widths, etc.) of the 1950s. In addition, a review of traffic accident data indicates that rear-end collisions are particularly frequent for northbound traffic approaching the Tunnel, due in part to drivers encountering Tunnel-related traffic congestion after having driven several kilometers at freeway speeds. Rating: ✖✖

- **Scenarios 2 (Replacement Bridge) and 3 (Replacement Tunnel)** – would be designed to modern-day traffic safety standards, and would address the current safety issues associated with current congestion levels at the existing Tunnel. Rating: ✓✓

- **Scenarios 4 (Maintain Tunnel, Add In-Corridor Crossing) and 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would be designed to modern-day traffic safety standards for the newly constructed portion of the crossing. However, safety improvements to the existing Tunnel would continue to be limited by the lower construction and clearance standards of the 1950s. For Scenario 4, safety levels on the new portion of construction could also be affected by the need to integrate portions of the new infrastructure with the existing infrastructure. Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Traffic safety	✖✖	✓✓	✓✓	✓	✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

4. Agriculture

Agricultural land effects

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Agricultural land effects are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have the smallest effect on agricultural land. Based on a preliminary analysis, the limited improvements to the north and south end interchanges would require little or no additional use of agricultural land. Rating: ✓✓

- **Scenario 2 (Replacement Bridge)** – would be constructed on the existing right-of-way. Based on preliminary analysis, the expected agricultural land requirements would be somewhat higher than for Scenario 1, with most of the effects at the adjacent interchanges. Rating: ✓

- **Scenario 3 (Replacement Tunnel)** – would be constructed mainly along the existing right-of-way, likely upstream from the existing Tunnel. Agricultural land requirements could be slightly higher for Scenario 3 than for Scenario 2, because of the required separation from the current alignment to avoid damaging the existing Tunnel during construction, and also because of the extensive approach cuts that would be required. Rating: ✖

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would likely have higher agricultural land requirements than Scenario 2, because of the challenges in routing traffic using two separate crossing facilities. Based on a preliminary analysis, the expected net effect is similar to Scenario 3. Rating: ✖

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would have much higher agricultural land requirements than any of the other scenarios, because of the need to create a new crossing corridor. Based on a preliminary analysis, Scenario 5 would have the greatest expected use of agricultural land. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Agricultural land effects	✓✓	✓	✖	✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Access to and from agricultural areas

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Access to and from agricultural areas is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would not significantly improve access to and from agricultural areas, since it would only involve limited improvements to the Steveston and Highway 17A interchanges. Rating: ✖
- **Scenario 2 (Replacement Bridge)** – would potentially achieve the greatest improvements in linking agricultural areas on either side of the corridor, since the bridge clearances on either side of the crossing and at the upgraded interchanges would facilitate the provision of local connector roads between agricultural areas. Rating: ✓
- **Scenarios 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would not be able to achieve Scenario 2's improvements in accessibility, because of the continued existence of a new or replacement tunnel. However, either scenario would achieve some accessibility improvements through interchange improvements. Rating: ✖
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would introduce a new set of local barriers associated with the construction of a new corridor, and would not significantly improve agricultural access along the existing corridor. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Access to and from agricultural areas	✖	✓	✖	✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

5. Environment

Local air quality

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

The comparative assessment of local air quality, relating primarily to air particulates, is summarized as follows:

- **Scenario 1 (Maintain Tunnel)** – would involve substantial replacement of existing mechanical ventilation systems to manage the particulates generated by vehicle traffic. However, local air quality in the Tunnel would still not be as good as on an above-ground bridge. Air particulates would also be particularly concentrated in areas adjacent to tunnel venting outlets. Rating: ✖

- **Scenario 2 (Replacement Bridge)** – would have much better natural dispersion of air particulates for travellers than any of the tunnel-based scenarios. In addition to providing better air quality for travellers, Scenario 2 would also result in greater dispersion of air particulates for developments in adjacent areas, because of the height of the bridge. Rating: ✓

- **Scenario 3 (Replacement Tunnel)** – would require substantial investment in new mechanical ventilation systems, and would not achieve the same levels of local air quality achieved by Scenario 2, both for travellers and for adjacent developments. Rating: ✖

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing) and Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing** – would be similar to Scenario 1 in terms of requiring substantial replacement of mechanical ventilation systems in the existing Tunnel, and would not achieve the same improvements in local air quality as Scenario 2. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Local air quality	✖	✓	✖	✖	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Regional air quality

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

For regional air quality, the comparative analysis includes greenhouse gas emissions, which will vary with total fuel consumption. The scenarios are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – is projected as having the lowest levels of traffic, because of the dampening effect of congestion on traffic volumes. Preliminary traffic studies indicate that total peak-hour traffic demand will increase less under Scenario 1 than under other scenarios.

  Under Scenario 1, average fuel economy for peak-hour traffic through the Tunnel will worsen as congestion continues to increase. However, Scenario 1 will have less overall traffic than the other scenarios. On balance, total levels of emissions under Scenario 1 are expected to be similar to those under Scenarios 2 through 4. Rating: ✖

- **Scenarios 2 (Replacement Bridge), Scenario 3 (Replacement Tunnel), and Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – are projected as having higher levels of traffic growth than Scenario 1, but also resulting in reduced congestion and improved per-trip fuel economy. On balance, total emissions are expected to be similar to those for Scenario 1. Rating: ✖

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – is projected to have similar levels of traffic growth as Scenarios 2 through 4, and to achieve similar improvements in per-kilometre fuel consumption, but also to lead to some travellers taking more circuitous routings, with longer trip lengths. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Regional air quality	✖	✖	✖	✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Wildlife and terrestrial habitat

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Wildlife and terrestrial habitat are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would not result in new interaction with natural areas and wildlife, but would not provide benefits in terms of reconnecting or restoring terrestrial and wildlife habitat. Rating: ✓
- **Scenario 2 (Replacement Bridge)** – would allow for re-connection of the two portions of Deas Island Park that are currently separated by the Tunnel portal. Scenario 2 would not result in new interactions with protected areas, although the construction program and new infrastructure could introduce some potential for increased interaction with wildlife. Rating: ✓
- **Scenario 3 (Replacement Tunnel)** – would result in riparian area disturbances on both sides of Deas Slough, within the existing right-of-way, with limited opportunity to repatriate habitat or to provide compensation by reconnecting currently separated natural areas. No interaction would be expected with protected areas, although the works would be close to Deas Island Park. The construction program and new infrastructure could introduce some potential for increased interaction with wildlife. Rating: ✖
- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would not achieve the Tunnel decommissioning reconnection/reclamation benefits associated with Scenario 2. Otherwise, Scenario 4 would have similar impacts as Scenario 2 (if an additional bridge) or Scenario 3 (if an additional tunnel). Rating ✖
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would result in disturbances to riparian areas on both sides of the River in the new corridor – in particular the natural shoreline on the north side. Construction activity and the resulting infrastructure could also result in interaction with protected areas on the south side at the east end of Tilbury Island. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Wildlife and terrestrial habitat	✓	✓	✖	✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Marine life and habitat

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Marine life and habitat are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would not change the overlap with productive shoreline habitats. However, the geotechnical upgrading of the existing Tunnel would require in-stream work around the existing four-lane structure, with the opportunity to limit activity to the least-risk work window from a seasonal perspective. Rating: ✖
- **Scenario 2 (Replacement Bridge)** – would not overlap with productive shoreline habitats at the new bridge, and there would be a potential net gain in productive shoreline habitat at Deas Slough because of restoration of marsh habitat. The in-stream work to decommission the existing Tunnel would be less invasive than the in-stream geotechnical upgrade under Scenario 1, with the opportunity to limit activity to the least-risk work window. Rating: ✓
- **Scenario 3 (Replacement Tunnel)** – would change the overlap with productive shoreline habitats, and would have effects on existing riparian vegetation near the existing corridor. There would be extensive in-stream work, for both the construction of the replacement tunnel and the decommissioning of the existing Tunnel. The duration of the work would be longer than for Scenario 1 or 2, with the opportunity to limit activity to the least-risk work window. Rating: ✖✖
- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would not overlap with productive shoreline habitats, but would have the potential for riparian effects near the existing corridor. The in-stream work would be for geotechnical upgrading of the existing Tunnel, plus possibly the addition of a new tunnel. The duration of in-stream work would be longer than for Scenario 1 or 2, with the opportunity to limit activity to the least-risk work window. Rating (tunnel option): ✖✖
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would have a high potential for effects on red-coded habitat, assuming that a new-corridor bridge crosses the southern shoreline of the Fraser River at or near Tilbury Slough. In-stream work would also be required for geotechnical upgrading of the existing Tunnel, with the opportunity to limit activity to the least-risk work window. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Marine life and habitat	✖	✓	✖✖	✖✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Contaminated sites

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Contaminated sites are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have the least potential to disrupt any contaminated sites, with the risks being limited to any currently-unknown contaminated sites that were discovered during future seismic upgrading programs. Rating: ✓
- **Scenario 2 (Replacement Bridge)** – would have a somewhat higher potential of disrupting any currently-unknown contaminated sites that might be discovered within the existing right-of-way. These risks would be associated both with the construction of the new bridge, and with the decommissioning of the existing Tunnel. Scenario 2 would have little or no risk of disrupting contaminated sites located outside the existing right-of-way. Rating: ✖
- **Scenario 3 (Replacement Tunnel)** – would have significantly higher risks of disruption to contaminated sites, because of the significant excavations required at both ends of the new Tunnel and in the Fraser River. Rating: ✖✖
- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would also have a relatively high risk of disrupting contaminated sites, especially if the additional crossing is a tunnel. Rating (tunnel option): ✖✖
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would introduce additional risks associated with the possible disruption of contaminated sites outside of the existing right-of-way. There are numerous potentially contaminated sites near the proposed new-corridor crossing, as well as along the new corridor route as it passes through existing industrial neighbourhoods. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Contaminated sites	✓	✖	✖✖	✖✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

6. Jobs and the Economy

Economic and employment impacts

Relevant Goal *– Support trade and commerce: improve access to local businesses and gateways*

Construction employment and longer-term economic/employment growth is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would not provide any additional capacity, extending the current congestion-related impediment to economic growth. As the population and economic base grow over time, so will the size of the impediment represented by the increasing levels of congestion-related traffic delays, for both commuter traffic and commercial goods movements. Rating: ✖✖

- **Scenarios 2 (Replacement Bridge), 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would address the current congestion-related impediments to economic growth (e.g., access to workplaces, commercial goods movements), leading to faster rates of economic growth and job creation than Scenario 1.

  Scenarios 2 through 4 would generate much greater levels of construction employment than Scenario 1. Rating: ✓✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would also overcome the current congestion-related impediments to economic growth, and would have similar longer-run economic impacts as Scenarios 2 through 4.

  Scenario 5 would generate the most construction employment, because of the need to create an entire new corridor. Rating: ✓✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Economic and employment impacts	✖✖	✓✓	✓✓	✓✓	✓✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Marine traffic effects during construction

Relevant Goal *– Support trade and commerce: improve access to local businesses and gateways*

Marine traffic effects during construction are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have some effects on marine traffic during a future geotechnical strengthening program. These effects would likely be more significant than the marine traffic effects associated with decommissioning the existing Tunnel. Rating: ✖

- **Scenario 2 (Replacement Bridge)** – would have the least effect on marine traffic during construction, since the new bridge could be constructed from each bank of the River with limited work in the River itself. Decommissioning the existing Tunnel would require some marine traffic interruptions, but to a lesser extent than the geotechnical strengthening program associated with Scenarios 1, 4 and 5. Rating: ✓

- **Scenario 3 (Replacement Tunnel)** – would have very significant negative effects on marine traffic during the construction of the new tunnel, as well as having additional negative effects during decommissioning of the existing Tunnel. Rating: ✖✖

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would have relatively moderate effects (as for Scenario 1) if the additional crossing was a bridge, but would have very significant effects (as for Scenario 3) if the additional crossing was a tunnel. Rating (bridge option): ✖

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would have relatively moderate effects on marine traffic during construction, similar to Scenario 1, since the new bridge could be constructed from both sides of the River. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Marine traffic effects during construction	✖	✓	✖✖	✖	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Road access to gateways and trade corridors

Relevant Goal *– Support trade and commerce: improve access to local businesses and gateways*

Access to gateways and trade corridors is assessed as follows:

- **Scenario 1 (Maintain Tunnel) –** would provide some minor improvements for local traffic using the Steveston and Highway 17A interchanges. However, Scenario 1 would not address the current congestion issues at the Tunnel, nor the long-term negative effect of congestion on local businesses and communities on either side of the Tunnel.

  Scenario 1 would also not address the current congestion issues for international goods and services in accessing the international gateways along the Highway 99 corridor – for example, Vancouver International Airport, Deltaport's container terminal facilities, and the United States border and interstate highway network. Rating: ✖✖

- **Scenarios 2 (Replacement Bridge), 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing) –** would address the current congestion issues at the Tunnel, and would significantly improve the connectivity to major international gateways. Rating: ✓✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing) –** would provide some traffic congestion relief at the Tunnel, attracting some international traffic to the new corridor and crossing. However, the improvement in road access to international gateways would be lower than for Scenarios 2 through 4, because of the lower congestion relief benefit and the more circuitous routing for international goods in accessing some gateways (e.g., Deltaport). Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Road access to gateways and trade corridors	✖✖	✓✓	✓✓	✓✓	✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Marine access to gateways and trade corridors

***Relevant Goal** – Support trade and commerce: improve access to local businesses and gateways*

Marine access to gateways and trade corridors is assessed as follows:

- **Scenario 1 (Maintain Tunnel), Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing), and Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would not change the current water draft at the existing Tunnel. Rating: ✖

- **Scenario 2 (Replacement Bridge)** – would decommission the Tunnel, providing port and terminal operators with the flexibility to explore future opportunities for addressing other marine traffic impediments. Rating: ✓

- **Scenario 3 (Replacement Tunnel)** – would construct a new tunnel in place of the existing one, making it possible to create a deeper water draft. As for Scenario 2, a deeper replacement tunnel would provide port and marine terminal operators with the flexibility to explore future opportunities for addressing other marine traffic impediments. Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Marine access to gateways and trade corridors	✖	✓	✓	✖	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Access to business and industrial land

Relevant Goal *– Support trade and commerce: improve access to local businesses and gateways*

Access to business and industrial land is assessed as follows:

- **Scenario 1 (Maintain Tunnel) –** would achieve minor improvements in traffic conditions for the local businesses and industries using the Steveston and Highway 17A interchanges for same-side trips (i.e. not crossing the River). However, it would not significantly relieve the current and future congestion-related delays associated with accessing business and industrial land on both sides of the crossing. Rating: ✖

- **Scenario 2 (Replacement Bridge), Scenario 3 (Replacement Tunnel), and Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing) –** would each greatly improve access to business and industrial land, by relieving the congestion-related delays currently being experienced through the Tunnel. Rating: ✓✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing) –** would create a new access corridor to and from the Tilbury Island and Richmond/Delta industrial areas, but would be less effective than Scenarios 2 through 4 in addressing the existing corridor's congestion-related barriers to accessing business and industrial land. Rating: ✓

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Access to business and industrial land	✖	✓✓	✓✓	✓✓	✓

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

7. Social and Community Considerations

Access across the highway, within communities

Relevant Goals *– Support objectives for regional people movement*

Access across the highway, within South Richmond and North Delta, is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would continue to restrict across-the-highway access for all traffic (auto, truck, cyclist, pedestrian) on either side of the crossing. Pedestrians and cyclists would continue to be prohibited from using the Tunnel, requiring passage to continue to be made via shuttle bus. Rating: ✖✖

- **Scenario 2 (Replacement Bridge)** – would improve across-the-highway access on either side of the replacement bridge, by providing new interchanges and bridge underpasses on either side of the crossing. The new replacement bridge would improve Richmond-Delta connectivity through the dedicated cyclist/pedestrian pathway and the dedicated transit/HOV lane. Rating: ✓✓

- **Scenarios 3 (Replacement Tunnel) and 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would also significantly improve across-the-highway access, but to a lesser extent than Scenario 2 because of the approach cuts required and the continued existence of tunnel portals in close proximity to the shorelines. Rating: ✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would be constructed with access across the Fraser River South Arm for all traffic, including cyclists and pedestrians, but only at the new-corridor crossing. Across-the-highway access would not be improved at the existing Tunnel, and cyclist and pedestrian access would continue to be prohibited. Along the new access route and crossing, new community severance would be created. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Access across the highway within communities	✖✖	✓✓	✓	✓	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Private-property effects

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Based on preliminary analysis, private property effects may include commercial, industrial, limited mixed-use and agricultural. Private-property effects are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have minor private-property effects, since this scenario involves only small additional amounts of land at the existing Steveston and Highway 17A interchanges, mainly within the existing right-of-way. Rating: ✓✓

- **Scenario 2 (Replacement Bridge) and Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would have greater private-property effects than Scenario 1. While most of the construction would be undertaken within the existing right-of-way, some private properties (especially those adjacent to the Highway 17A interchange) would be affected. Rating: ✓

- **Scenario 3 (Replacement Tunnel)** – would have greater private-property effects than Scenarios 2 or 4, particularly on the north shoreline, because of the need to maintain more separation between the existing Tunnel and the replacement tunnel during the construction period. Rating: ✖

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would have greater private-property effects than any other scenario, since the new corridor would intersect with agricultural parcels along Number 8 Road in Richmond, industrial parcels on both sides of the Fraser River, and industrial parcels in the Tilbury area of Delta. Rating: ✖✖

For any acquisition or lease, the Ministry of Transportation and Infrastructure would negotiate with property owners in accordance with terms set out in the Expropriation Act, including assessment of fair market value.

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Private-property effects	✓✓	✓	✖	✓	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Compatibility with community and regional planning

Relevant Goals *– Protect the existing land base and support trade and commerce*

Community and regional planning initiatives relevant to the George Massey Tunnel include:

- **Regional Growth Strategy (RGS) –** The RGS has established a number of goals to support Metro Vancouver's sustainability framework, including: create a compact urban area; support a sustainable economy; protect the environment and respond to climate change impacts; develop complete communities; and support sustainable transportation choices. For the Highway 99 communities of Richmond, Delta, Tsawwassen, Surrey and White Rock, the RGS projects a population increase from 714,400 in 2006 to 1,173,000 in 2041 (plus 64%).

- **Regional Transportation Strategy (RTS) –** TransLink's RTS initiative released its Strategic Framework in 2013. The Strategic Framework's broad targets include: (1) reducing the distances people drive by one-third, and (2) increasing the walk/bike/transit mode share to 50%. Target RTS benefits include:

  - *"making travel more reliable;*
  - *increasing transportation options;*
  - *making it easier and less stressful to get to work and school;*
  - *giving us more time for doing the things we love;*
  - *ensuring businesses continue to prosper with better access to more workers and more markets;*
  - *making living, working and doing business in this region more affordable;*
  - *giving people better access to more jobs and more opportunities;*
  - *making our roads safer;*
  - *helping us live healthier and more active lives;*
  - *reducing the burden on the healthcare system;*
  - *helping us get out on the sidewalk to meet our neighbours and deter crime;*
  - *making the air we breathe cleaner;*
  - *protecting our climate by reducing our greenhouse gas emissions."*

- **Official Community Plans (OCPs) –** The land adjacent to the Tunnel falls under the City of Richmond's OCP to the north, and under the Corporation of Delta's OCP to the south.

Each scenario's compatibility with community and regional plans is assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – is consistent with the RGS' goal of creating compact and complete communities, as well as the RTS' target of reducing distances driven in the region. However, Scenario 1 does not appear to be consistent with the future transportation needs associated with RGS' projected 2006-41 population growth of 64 per cent, nor with most of the target benefits identified by the RTS.

  Scenario 1 also does not support the specific growth and maintenance goals for transportation in the Delta OCP, and is not supported by the Corporation of Delta. The Richmond OCP does not include a formal position regarding improvements at the Tunnel. Rating: ✖

- **Scenario 2 (Replacement Bridge)** – is more consistent than Scenario 1 with RGS' projected population growth for the local communities. Scenario 2 is also more consistent with most RTS target benefits (easier and more reliable travel to work and school, etc.).

  Scenario 2 is consistent with the Delta OCP, and is supported by the Corporation of Delta. While the Richmond OCP does not include a formal position on tunnel replacement/improvements, upgrades to the Steveston Highway interchange are consistent with the Richmond OCP. Rating: ✓

- **Scenario 3 (Replacement Tunnel) and Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – is similar to Scenario 2 in terms of compatibility with RGS and RTS, except that Scenarios 3 and 4 would not have the same level of benefits in terms of local air quality (air particulates).

  Scenarios 3 and 4 are similar to Scenario 2 in terms of consistency with the OCPs, except that local connectivity across Highway 99 is not facilitated by these scenarios to the same extent as Scenario 2 because of the continued existence of the Tunnel and its portals in close proximity to the river shoreline. Rating: ✓

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – is similar to Scenario 2 in terms of compatibility with the RGS and RTS – except that Scenario 5 would not have the same level of benefits in terms of improving walk/cycle mode share, since the improved pedestrian/cyclist access would be provided along a new corridor rather than the existing one.

  Scenario 5 is not contemplated by the Delta or Richmond OCP and related plans. The Delta OCP has designated the Tilbury area for industrial use, and the Richmond portion of the new corridor (running north-south through southeast Richmond to connect with Highway 91) is not consistent with the City of Richmond's transportation or agricultural plan. The City of Richmond has formally opposed Scenario 5. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Regional Growth Strategy	✖	✓	✓	✓	✓
Regional Transportation Strategy	✖	✓	✓	✓	✓
Delta/Richmond OCPs	✖	✓✓	✓	✓	✖✖
Overall rating	✖	✓	✓	✓	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Noise effects

***Relevant Goal** – Protect the existing land base: minimize impacts on agricultural, park and industrial lands, and minimize environmental impacts*

Noise effects are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would not result in any significant change in noise levels. Rating: ✓✓
- **Scenario 2 (Replacement Bridge)** – would increase surface noise levels at the crossing. Noise reduction initiatives during design (sound barriers, bridge surface design) could mitigate noise effects to some extent. Rating: ✖
- **Scenario 3 (Replacement Tunnel)** – would increase current noise levels at the crossing in proportion to changes in traffic levels. Rating: ✖
- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would also increase current noise levels, with the level of increase depending on whether the new crossing was a bridge or a tunnel. Rating (bridge option): ✖
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would result in additional road noise, both at the new bridge and along the new access corridor. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Noise effects	✓✓	✖	✖	✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

Visual effects

***Relevant Goal** – Involve communities, businesses and stakeholders in the project.*

Visual effects are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would not result in a significant change to the visual appearance of the existing corridor and Tunnel. Rating: ✓
- **Scenario 2 (Replacement Bridge)** – would change the appearance of the existing crossing, with the new bridge being highly visible at Deas Island, as well as at the marina and nearby residences. A viewing platform would be provided on the bridge for cyclists and pedestrians. Rating: ✖
- **Scenario 3 (Replacement Tunnel)** – would have limited visual effects, with a somewhat larger tunnel portal on either side of the crossing. Rating: ✓
- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would depend on whether the additional crossing was a bridge or a tunnel. For the bridge option, visual effects would be similar to those for Scenario 2. For the tunnel option, visual effects would be similar to Scenario 3. Rating (bridge option): ✖
- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would be highly visible at the new crossing from both sides of the bridge, in particular at Tilbury Island and at the industrial areas on the Richmond side of the Fraser River. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Visual effects	✓	✖	✓	✖	✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals.

8. Financial Costs and Risks

Capital costs

Capital costs are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have the lowest capital costs among the options, at least for the remaining life of the Tunnel. Rehabilitation and other capital expenditures would include (1) limited-scope upgrades to the Steveston and Highway 17A interchanges, (2) periodic replacement of the Tunnel's mechanical and electrical systems (ventilation, lighting, pumping, etc.), and (3) possible geotechnical strengthening to reduce the level of geotechnical risk in case of a seismic event.[5] Rating: **$**

- **Scenarios 2 (Replacement Bridge) and Scenario 3 (Replacement Tunnel)** – would have much higher capital costs than Scenario 1. Based on discussions with major international bridge and tunnel contractors, the capital costs of both scenarios are assessed as likely to be similar. Rating: **$$**

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would potentially have a somewhat lower level of new construction expenditures than Scenario 2 or 3 because of fewer number of lanes to be added, but would also require the Tunnel rehabilitation expenditures associated with Scenario 1. Scenario 4's overall capital costs are assessed as likely to be similar to Scenarios 2 and 3. Rating: **$$**

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would involve additional capital costs associated with maintaining the existing Tunnel (Scenario 1), the costs of constructing a new bridge, and the additional costs of constructing new access routes from Highways 99/17 in Delta and from Highway 91 in Richmond. Scenario 5 is assessed as likely to have construction costs significantly greater than those associated with Scenarios 2, 3 and 4. Rating: **$$$**

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Capital costs	**$**	**$$**	**$$**	**$$**	**$$$**

Legend: $$$ relatively higher cost; $$ mid-range relative cost; $ relatively lower cost.

[5] As previously discussed, the geotechnical strengthening program would carry risk of destabilizing the Tunnel, causing a reduction in seismic stability. A successful geotechnical strengthening program would still result in a much higher level of seismic risk for Scenarios 1, 4 and 5 than for Scenarios 2 and 3.

Capital cost risks – construction phase

Capital cost risks during the construction phase are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – the main capital cost risk during construction is associated with the geotechnical program to strengthen the riverbed. The expected cost and likelihood of success of such a program would be uncertain. There is also a possibility that the attempt to strengthen the existing riverbed could create a less stable structure. Rating: ✖✖

- **Scenario 2 (Replacement Bridge)** – capital cost risks are assessed as lower than for other scenarios, because of the ability to undertake construction primarily by extending the span from the main bridge piers on either bank, reducing the need to work in the River. Rating: ✓

- **Scenario 3 (Replacement Tunnel)** – the capital cost risks for Scenario 3 relate primarily to the significant uncertainties associated with in-river tunnel construction. Rating: ✖

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing)** – would have the capital cost risks associated with Scenario 1, in addition to the risks associated with Scenario 2 or 3. Rating (tunnel option): ✖✖

- **Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would have the capital cost risks associated with Scenario 1, in addition to the risks associated with constructing a new crossing in an industrialized area. Rating: ✖✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Capital cost risks (construction)	✖✖	✓	✖	✖✖	✖✖

Legend: ✓✓ very low risk; ✓ relatively low risk; ✖ relatively high risk; ✖✖ high risk.

Capital cost risks – operations phase

Capital cost risks during the operations phase are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would somewhat reduce capital cost risks during operations, by improving the ability of the existing infrastructure to withstand an earthquake. However, the upgraded infrastructure would still have higher risks of unexpected capital costs arising during operation, relative to the all-new scenarios. Rating: ✖

- **Scenario 2 (Replacement Bridge) and Scenario 3 (Replacement Tunnel)** – would have the lowest level of exposure to future capital cost risks during operations, because of the all-new construction. Based on discussions with major bridge and tunnel construction firms, the capital cost risks during operations are assessed as similar for Scenarios 2 and 3. Rating: ✓

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing) and Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would also have higher capital cost risks during construction than for Scenarios 2 and 3, because of the requirement to continue operating the existing Tunnel as well as the new-corridor crossing. Rating: ✖

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Capital cost risks (operations)	✖	✓	✓	✖	✖

Legend: ✓✓ very low risk; ✓ relatively low risk; ✖ relatively high risk; ✖✖ very high risk.

Operating and maintenance (O&M) costs

Future operating and maintenance (O&M) costs are assessed as follows:

- **Scenario 1 (Maintain Tunnel)** – would have relatively low overall O&M costs. While tunnels are generally more expensive to operate and maintain than equivalent-capacity bridges, Scenario 1 would involve a smaller level of infrastructure to be operated and maintained relative to all other scenarios. Rating: **$**

- **Scenario 2 (Replacement Bridge)** – would have the lowest O&M costs among Scenarios 2 through 5. While bridge O&M costs are generally lower than tunnel operating costs for equivalent-capacity infrastructure, Scenario 2 would represent a significant increase in infrastructure size and capacity. Rating: **$**

- **Scenario 3 (Replacement Tunnel)** – would likely have significantly higher O&M costs than Scenario 2, due to the more complex and expensive mechanical systems associated with tunnel operations. Rating: **$$**

- **Scenario 4 (Maintain Tunnel, Add In-Corridor Crossing) and Scenario 5 (Maintain Tunnel, Add New-Corridor Crossing)** – would have significantly higher O&M costs than Scenarios 1 through 3, because of the need to operate and maintain two separate crossing infrastructures. Rating: **$$$**

Summary assessment

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Operating and maintenance costs	$	$	$$	$$$	$$$

Legend: $$$ relatively higher cost; $$ mid-range relative cost; $ relatively lower cost.

9. Summary of Comparative Evaluations

The following table summarizes the comparative evaluations for each of the 28 individual criteria, and illustrates the overall assessment within each of the seven major evaluation areas. A discussion of the results, for each evaluation area, is contained in Chapter 1.

Evaluation Area	Specific Criterion	Scenarios				
		1. Maintain Tunnel	2. Replacement Bridge	3. Replacement Tunnel	4. Maintain Tunnel, Add In-Corridor Crossing	5. Maintain Tunnel, Add New-Corridor Crossing
Transportation efficiency	– Traffic congestion	✖✖	✓✓	✓✓	✓✓	✓
	– Transit capability	✖	✓✓	✓✓	✓✓	✓
	– Travel time reliability	✖✖	✓✓	✓✓	✓✓	✓✓
	– Pedestrian and cyclist accessibility	✖✖	✓✓	✓	✓✓	✖
	Overall assessment	✖✖	✓✓	✓✓	✓✓	✓
Safety	– Incident response capability	✖✖	✓✓	✓	✓	✓
	– Earthquake protection	✖✖	✓✓	✓✓	✖	✖
	– Traffic safety	✖✖	✓✓	✓✓	✓	✓
	Overall assessment	✖✖	✓✓	✓✓	✓	✓
Agriculture	– Agricultural land effects	✓✓	✓	✖	✖	✖✖
	– Access to and from agricultural areas	✖	✓	✖	✖	✖✖
	Overall assessment	✓	✓	✖	✖	✖✖
Environment	– Local air quality	✖	✓	✖	✖	✖
	– Regional air quality	✖	✖	✖	✖	✖✖
	– Wildlife and terrestrial habitat	✓	✓	✖	✖	✖✖
	– Marine life and habitat	✖	✓	✖✖	✖✖	✖✖
	– Contaminated sites	✓	✖	✖✖	✖✖	✖✖
	Overall assessment	✖	✓	✖✖	✖✖	✖✖
Jobs and the economy	– Economic and employment impacts	✖✖	✓✓	✓✓	✓✓	✓✓
	– Marine traffic effects during construction	✖	✓	✖✖	✖	✖
	– Road access to gateways and trade corridors	✖✖	✓✓	✓✓	✓✓	✓
	– Marine access to gateways and trade corridors	✖	✓	✓	✖	✖
	– Access to business and industrial land	✖	✓✓	✓✓	✓✓	✓
	Overall assessment	✖✖	✓✓	✓	✓	✓
Social and community considerations	– Access across the highway within communities	✖✖	✓✓	✓	✓	✖
	– Private-property effects	✓✓	✓	✖	✓	✖✖
	– Compatibility with community/regional planning	✖	✓	✓	✓	✖
	– Noise effects	✓✓	✖	✖	✖	✖✖
	– Visual effects	✓✓	✖	✓	✖	✖
	Overall assessment	✓	✓	✖	✖	✖✖
Financial costs and risks	– Capital construction costs	$	$$	$$	$$	$$$
	– Capital cost risks (construction)	✖✖	✓	✖	✖✖	✖✖
	– Capital cost risks (operations)	✖	✓	✓	✖	✖
	– Operating and maintenance costs	$	$	$$	$$$	$$$
	Overall assessment	✖	✓	✖	✖✖	✖✖

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ✖ relatively limited achievement of goals; ✖✖ low/no achievement of goals. $$$ relatively higher cost; $$ mid-range relative cost; $ relatively lower cost.

WSP | MMM GROUP

PREPARED FOR: MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

GEORGE MASSEY TUNNEL REPLACEMENT PROJECT

REVIEW OF REPLACEMENT OPTIONS

JULY 2016

PURPOSE OF THIS REPORT

As part of WSP|MMM Group's role as Owner's Engineer for the replacement of the George Massey Tunnel (the Tunnel), independent technical and engineering analyses were carried out to determine if a bridge is indeed the preferred replacement option. The results of this independent analysis are provided in this report.

J. Meyboom

Joost Meyboom, Dr.sc.tech., P.Eng.

EXECUTIVE SUMMARY

Congestion at the George Massey Tunnel (the Tunnel) has been of concern for decades and causes significant delays to the public and the movement of goods and services on a daily basis. In addition, there are a number of safety issues associated with the Tunnel including substandard geometry, poor access for first responders and vulnerability to earthquakes. In 2007 it was recognized that the Tunnel's seismic vulnerability could not be fully addressed with a retrofit. As such the Ministry completed sufficient structural upgrades to the Tunnel to protect public safety and installed an early warning system to prevent access to the Tunnel during seismic events greater than the 1-in-275 year event.

Planning for the replacement of the Tunnel commenced in 2012 and, based on the analysis of five replacement options, a public consultation process was completed which identified a new bridge on the same alignment as the Tunnel as the preferred replacement option. As part of WSP|MMM Group's role as Owner's Engineer for the replacement of the Tunnel (the Project), independent analyses were carried out to determine if a bridge is indeed the best replacement option. The results of this independent analysis are provided in this report.

Five replacement scenarios were evaluated:

Scenario 1 – Retrofit Tunnel

Scenario 2 – Replace Tunnel with a bridge

Scenario 3 – Replace the existing Tunnel with a new tunnel

Scenario 4 – **(a)** Retrofit Tunnel and build new adjacent six-lane bridge

(b) Retrofit Tunnel and build new adjacent six-lane tunnel

Scenario 5 – Maintain Tunnel and build a new six-lane crossing in a new corridor

Each Scenario was analyzed from a technical perspective to establish feasibility, scope and an all-inclusive cost. Costs include construction, engineering, project management, property, escalation, risks, contingencies and financing. In addition, each scenario was evaluated by comparing it with the project goals as established during public consultation. These goals were:

1. Reduce congestion
2. Improve safety
3. Support trade and commerce including protection of the Lower Mainland's agricultural land base
4. Support increased transit on the Highway 99 corridor
5. Support options for pedestrians and cyclists
6. Enhance the environment

The results of this evaluation are summarized as follows:

	SCENARIO				
	1 Existing Tunnel	2 New Bridge	3 New Tunnel	4[2] (a) New Bridge +Existing Tunnel (b) New Tunnel + Existing Tunnel	5
Achievement of Project Goals	20%	90%	80%	60%	40%
Risk Profile	High	Medium	High	Medium - High	Medium-High
Cost in $ millions[1]	590	3,500	4,300	3,550 (a) 4,050 (b)	5,800
Assessment	Least cost; high risk associated with geotechnical works adjacent to the Tunnel; very poor achievement of project goals including poor seismic performance.	Second lowest cost; risks associated with bridge construction and traffic management; high achievement of project goals; Minimal property impacts; minimal environmental impacts.	Second highest cost; high risks associated with tunnel construction adjacent to the existing Tunnel; reasonable achievement of project goals; significant property impacts; significant environmental impacts.	Medium to high cost and risk; marginal achievement of project goals; significant property impacts; significant environmental impact (for tunnel option); poor seismic performance of existing Tunnel.	Highest cost; high risks associated with tunnel construction and retrofit of existing Tunnel; poor achievement of project goals; Significant property impacts including ALR; significant environmental impacts from tunnel construction; poor seismic performance of existing Tunnel.

Notes:

[1] Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing

[2] Scenario 4(a) is a new six lane bridge adjacent to the Tunnel and Scenario 4(b) is a new six lane immersed tube tunnel adjacent to the Tunnel.

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1. DEVELOPMENT OF TUNNEL REPLACEMENT OPTIONS

As part of WSP|MMM Group's role as Owner's Engineer for the replacement of the George Massey Tunnel (the Tunnel), independent analyses were carried out to determine if a bridge is indeed the preferred replacement option. The results of this independent analysis are provided in this report. In this regard WSP | MMM Group undertook independent evaluation and a review of the documents and reports listed in the reference section of this report and which include:

- Transportation planning studies from the 1990s
- Traffic data collected between 2013 and 2015
- Traffic forecasts to 2045
- Structural and geotechnical engineering reports, studies and designs produced between 1989 and 2009 addressing the seismic vulnerability of the Tunnel
- Extensive geotechnical data collected at the Tunnel site since the 1950s and including seismic cone penetration testing and boreholes taken since 2013 to establish foundation conditions for the Project
- Documents produced by the Ministry for Phase 1 and 2 Project consultation and for the Project Definition Report
- Opinions, presentations and recommendations from international Tunnel and bridge engineering experts (Buckland &Taylor, COWI, TEC) that have been presented at workshops between 2012 and 2014
- Conceptual highway and interchange designs for alternative solutions presented in the March 2014 report by CH2M
- An evaluation of crossing scenarios presented in the March 2014 report by MMK Consulting Inc.

1.1 BACKGROUND

Congestion at the Tunnel has been of concern for decades. Studies of options to address the problem date back to the "Freedom to Move" initiative in 1989. The first comprehensive planning study, by Ward Consulting on behalf of the Ministry of Transportation and Infrastructure (the Ministry), was completed in 1991. [1]

In parallel with these planning studies the Tunnel's seismic vulnerability was the focus of intensive engineering investigations starting in the late 1980's. [2, 3, 4, 5, 6] In 2007 it was recognized that the Tunnel's seismic vulnerability cannot be fully addressed with a retrofit. [7, 8] As such the Ministry completed sufficient structural upgrades to the Tunnel to increase public safety, installed an early warning system to prevent access to the Tunnel for seismic events greater than the 1-in-275 year event [9] and commenced planning for a long-term solution.

In 2012 the Ministry launched a three-phase technical analysis and consultation program to establish a long-term solution for the Tunnel (the Project). This included:

Phase 1: Understanding the Need – Problem identification and understanding of public and stakeholder interests and concerns with respect to the Tunnel. [13]

Phase 2: Exploring the Options – Current analysis of potential options for solving the problem, the criteria to evaluate the options, technical feasibility review, and identification of a preferred solution. [14]

Phase 3: Project Definition – Refinement of the preferred solution including a reference concept and business case, and due diligence review of the preferred solution as compared with the other Phase 2 alternatives. [15, 16]

1.2 PHASE 1 – UNDERSTANDING THE NEED

Phase 1 confirmed that safety and congestion are significant concerns at the Tunnel and that congestion continues to worsen. Key concerns identified during the Phase 1 consultation include: [13]

- An average of 80,000 vehicles use the Tunnel every day. This is more than the capacity of the Tunnel and a counterflow system is used to manage the resultant congestion in the peak direction. Even with a counterflow, the congestion at the Tunnel results in significant delays that can range up to 30 minutes on a typical weekday, and can be several hours if there is an incident at the Tunnel or adjoining Highway 99 corridor.
- The Tunnel is at its capacity and as such significant traffic is diverted to the Alex Fraser Bridge. This additional traffic pressure on the Alex Fraser Bridge results in its capacity being "used up" faster.
- The Tunnel was designed to the very limited seismic design considerations of the 1950s. Even with extensive seismic retrofit work, it is not practical to bring the Tunnel to current seismic standards.
- The Tunnel has substandard highway geometrics including narrow lanes, virtually no shoulders and a substandard vertical clearance. These deficiencies contribute to the Tunnel having a high accident rate and also restricts the movement of goods through the Tunnel.
- Cyclists and pedestrians must take a shuttle through the Tunnel. Walking or cycling through the Tunnel would be very dangerous and is not permitted.
- Although the Tunnel has some of the highest transit usage in the Province and significant efforts have been made to increase transit reliability and use along Highway 99 over the past 15 years, remaining opportunities to improve transit on Highway 99 are limited without providing additional traffic capacity at the Tunnel.
- If there is an incident in the Tunnel, traffic congestion often makes access for first responders slow and difficult, causing unnecessary additional risk to the lives of injured people.

- The Tunnel's electrical and mechanical systems are at the end of their useful life and complete replacement is required in the next few years.

The following project goals were established using the results of the Phase 1 public consultation [13]:

1. Reduce congestion
2. Improve safety
3. Support trade and commerce including protection of the Lower Mainland's agricultural land base
4. Support increased transit on the Highway 99 corridor
5. Support options for pedestrians and cyclists
6. Enhance the environment

1.3 PHASE 2 – EXPLORING THE OPTIONS

Drawing on work referenced at the end of this report, as well as technical workshops and meetings held with international experts in tunnel and bridge engineering, [10, 11] the Ministry developed and evaluated five scenarios to address the issues identified in Phase 1. Experts consulted in this regard included Buckland &Taylor (Vancouver), COWI (USA) and TEC (Netherlands).

The five scenarios were:

Scenario 1 – Maintain Tunnel. The Tunnel's electrical and mechanical systems would be replaced and work would be undertaken to improve the Tunnel's ability to withstand earthquakes, but the Tunnel's traffic capacity would not be changed and modern seismic standards would not be met.

Scenario 2 – Replace Tunnel with new bridge: A new bridge would be constructed within the existing right-of-way, after which the Tunnel would be decommissioned.

Scenario 3 – Replace the existing Tunnel with a new tunnel. A new tunnel would be constructed alongside the Tunnel, after which the Tunnel would be decommissioned.

Scenario 4 – Maintain Tunnel and build new six-lane crossing along Highway 99 Corridor. The new crossing could be either (a) a bridge or (b) a tunnel to provide a similar traffic capacity as Scenarios 2 and 3.

Scenario 5 – Maintain Tunnel and build a new six-lane crossing in a new corridor. The new crossing could be a bridge or tunnel located in the Tilbury area of Delta between the Tunnel and the Alex Fraser Bridge. The crossing would be accessed via the new Highway 17 on the south side and via a newly constructed connection to the Highway 91 East-West Connector on the north side.

Based on the results of the Phase 2 consultation and concurrent technical analyses, a new bridge on the same alignment as the Tunnel was identified as the most suitable solution. The evaluation of the five solution scenarios was developed and summarized by MMK (2014)[12] and CH2MHill (2013)[11] . The results of this evaluation are summarized in the following table.[12]

Evaluation Area	Specific Criterion	Scenarios 1	2	3	4	5
Transportation efficiency	– Traffic congestion	¤¤	✓✓	✓✓	✓✓	✓
	– Transit capability	¤	✓✓	✓✓	✓✓	✓
	– Travel time reliability	¤¤	✓✓	✓✓	✓✓	✓✓
	– Pedestrian and cyclist accessibility	¤¤	✓✓	✓	✓✓	¤
	Overall assessment	¤¤	✓✓	✓✓	✓✓	✓
Safety	– Incident response capability	¤¤	✓✓	✓	✓	✓
	– Earthquake protection	¤¤	✓✓	✓✓	¤	¤
	– Traffic safety	¤¤	✓✓	✓✓	✓	✓
	Overall assessment	¤¤	✓✓	✓✓	✓	✓
Agriculture	– Agricultural land effects	✓✓	✓	¤	¤	¤¤
	– Access to and from agricultural areas	¤	✓	¤	¤	¤¤
	Overall assessment	✓	✓	¤	¤	¤¤
Environment	– Local air quality	¤	✓	¤	¤	¤
	– Regional air quality	¤	¤	¤	¤	¤¤
	– Wildlife and terrestrial habitat	✓	✓	¤	¤	¤¤
	– Marine life and habitat	¤	✓	¤¤	¤¤	¤¤
	– Contaminated sites	✓	¤	¤¤	¤¤	¤¤
	Overall assessment	¤	✓	¤¤	¤¤	¤¤
Jobs and the economy	– Economic and employment impacts	¤¤	✓✓	✓✓	✓✓	✓✓
	– Marine traffic effects during construction	¤	✓	¤¤	¤	¤
	– Road access to gateways and trade corridors	¤¤	✓✓	✓✓	✓✓	✓
	– Marine access to gateways and trade corridors	¤	✓	✓	¤	¤
	– Access to business and industrial land	¤	✓✓	✓✓	✓✓	✓
	Overall assessment	¤¤	✓✓	✓	✓	✓
Social and community considerations	– Access across the highway within communities	¤¤	✓✓	✓	✓	¤
	– Private-property effects	✓✓	✓	¤	✓	¤¤
	– Compatibility with community/regional planning	¤	✓	✓	✓	¤
	– Noise effects	✓✓	¤	¤	¤	¤¤
	– Visual effects	✓✓	¤	✓	¤	¤
	Overall assessment	✓	✓	¤	¤	¤¤
Financial costs and risks	– Capital construction costs	$	$$	$$	$$	$$$
	– Capital cost risks (construction)	¤¤	✓	¤	¤¤	¤¤
	– Capital cost risks (operations)	¤	✓	✓	¤	¤
	– Operating and maintenance costs	$	$	$$	$$$	$$$
	Overall assessment	¤	✓	¤	¤¤	¤¤

Legend: ✓✓ very high achievement of goals; ✓ relatively high achievement of goals; ¤ relatively limited achievement of goals; ¤ ¤ low/no achievement of goals. $$$ relatively higher cost; $$ mid-range relative cost; $ relatively lower cost.

2. REVIEW OF TUNNEL REPLACEMENT OPTIONS

2.1 SCENARIO 1 – MAINTAIN THE TUNNEL

In 1989 the Ministry undertook a study to investigate the Tunnel's seismic vulnerability. [2] The study concluded that unacceptable elastic stresses would develop in the Tunnel cross section with a 1-in-100-year earthquake. It was also noted that there would be a high probability of major movements and buoyancy of the Tunnel caused by liquefaction of the surrounding and founding sands. These results were confirmed in a subsequent investigation carried out in 1991. [3]

In 1996 the Ministry commissioned a study to further understand the effects of liquefaction-induced deformations on the Tunnel. [3] Retrofit concepts were presented in this report including structural modifications to increase the Tunnel's ductility and geotechnical interventions to control liquefaction induced ground movements.

Detailed design for the seismic upgrade started in 2000 [5, 6, 9] as documented in a number of reports, drawings and presentations produced between 2000 and 2007. The scope of the seismic retrofit works included the following:

Stage 1 (Completed in 2006)

- Structural modifications to allow the instream elements of the Tunnel to hold together during a 1-in-475-year seismic event and provide for a ductile structure with crack widths that minimize the rate of water ingress after an earthquake.
- Installation of emergency pumps to manage the water that would flow into the Tunnel as a result of damage caused by an earthquake.

Stage 2 (Not Implemented)

- Installation of stone columns and seismic drains along the side of the Tunnel to control liquefaction-induced deformations (see **Figure 1**). This would require removing the existing riprap, concrete mattress and fill on and beside the Tunnel. Upon completion of stone column work, locking fill and riprap would be re-installed.

In 2003 the Ministry undertook a value engineering review of the proposed Stage 1 and Stage 2 works [7] and, based on the level of uncertainty and risk around the proposed Stage 2 works, it was decided to proceed with only the Stage 1 works and that more geotechnical data and engineering work should be carried out before proceeding with the Stage 2 work.

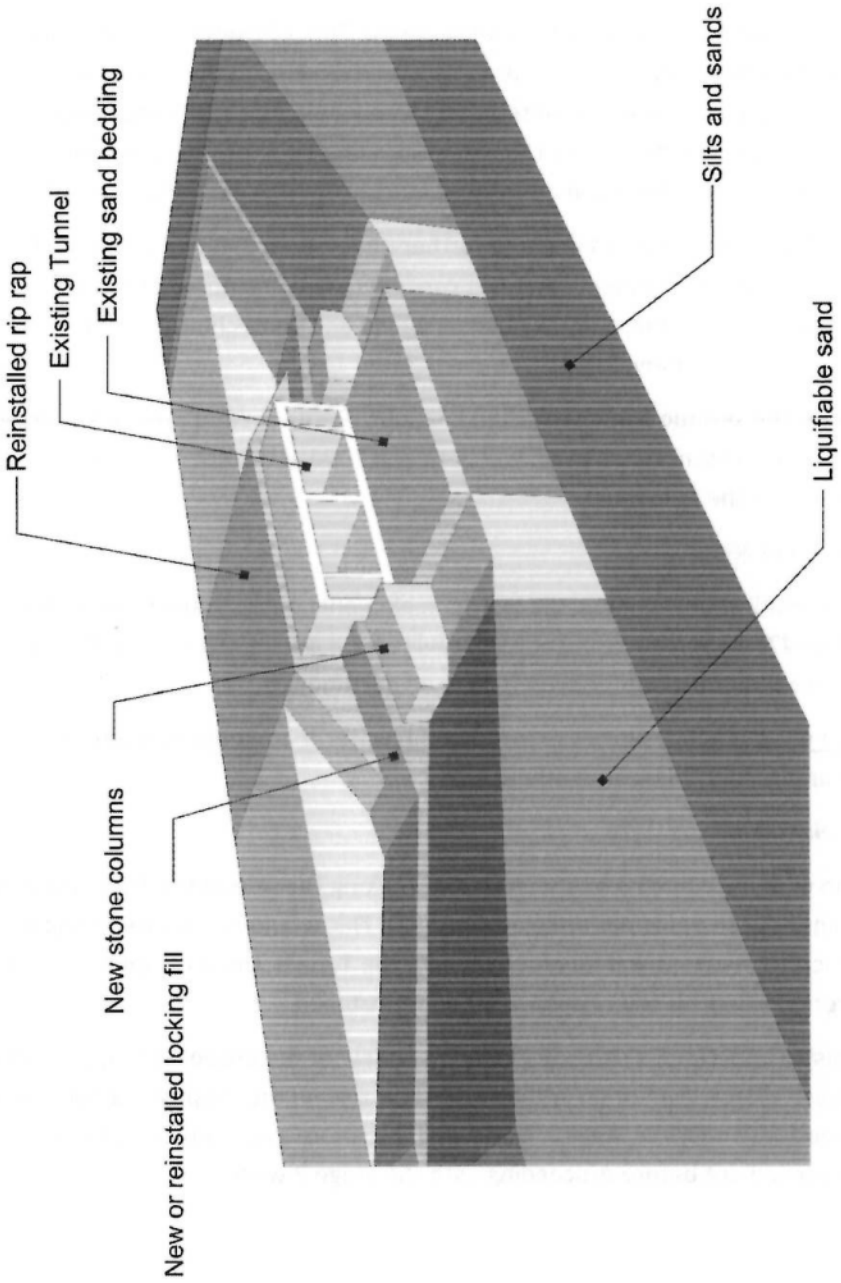

Figure 1 – Schematic showing Stage 2 Seismic Retrofit of existing Tunnel

Based on additional site investigations carried out in 2006, the design for the Stage 2 works was revisited in a second value engineering review in 2007. [8] This review highlighted the following:

- An earthquake greater than a 1-in-475-year event could result in "fatalities due to drowning" if the "public is unable to exit the Tunnel in a timely manner due to reasons such as vehicle blockage, minor injury, darkness, confusion or panic". [8]
- There is a high risk that the specified ground improvements may not be achievable because of probe refusal or damage if coarse gravel, cobbles and boulders are encountered.
- To protect the integrity of the Tunnel during construction, ground densification directly beside the Tunnel may not be achievable and as such there is a risk that the Stage 2 works would be less effective than intended.

Even if Stage 2 works were completed, there would be permanent damage to the Tunnel after the 1-in-475-year earthquake, which would make it unavailable for immediate use. In this event, repairs, if even practical, or replacement would need to be carried out on an emergency basis at a premium cost and likely over a period of several months.

The extensive ground improvements required for the Stage 2 works could affect the integrity of the Tunnel. Similar retrofit work carried out in San Francisco resulted in the tunnel moving laterally. At the Massey tunnel, movement could result in leakage and it may be necessary to close the Tunnel during the retrofit works.

Given the uncertainty of the effectiveness of the Stage 2 retrofit works, they were abandoned, and an Emergency Road Closure System (ERCS) was installed. The ERCS prevents access to the Tunnel in seismic events greater than 1-in-275-year. Today the Tunnel remains estimated as being able to withstand a 1-in-275-year earthquake [9] – far below today's 1-in-2475-year standard.

In addition to its seismic vulnerability, the Tunnel is now almost 60 years old and in need of a major refit. Such a refit would require significant investment to manage water ingress, upgrade electrical and ventilation systems, repair spalling concrete, replace lighting and surfaces showing significant wear, and to undertake other less significant upgrades. This retrofit work would not address the safety challenges associated with the Tunnel's narrow lanes and substandard vertical clearances, achieve modern seismic standards for a life line crossing or address current congestion challenges.

The following provides a summary of Scenario 1 including its cost and risk profile. Scoring is based on the assumption that the Stage 2 retrofit works are completed.

TABLE 1 - EVALUATION OF SCENARIO 1

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE
Reduce Congestion	Does not change the level of service provided on Highway 99 at the Tunnel. Congestion will become worse over time. During seismic retrofit works it is likely that the Tunnel wil need to be closed to traffic. This will result in an extended period of time with very significant congestion.	0
Improve Safety	The Tunnel cannot be brought up to modern seismic standards and safety issues associated with its outdated highway geometrics cannot be addressed. Without completion of the Stage 2 retrofit scope, this score would be 0. First responders will continue to have problems accessing the Tunnel.	0 to 2
Support Trade and Commerce	No congestion relief is anticipated resulting in continued impacts to existing trade and severely limiting economic growth.	0
Support Increased Transit on Hwy 99	The effectiveness of the existing queue jumper lanes will continue to diminish over time as congestion on Highway 99 continues to grow. This does not support increased transit.	0
Support Options for Cyclists/Pedestrians	Cyclists and pedestrians will continue to use a shuttle service and there will be no improvements in this regard.	0
Enhance the Environment	Completion of the Stage 2 seismic retrofit program would require considerable excavation and construction in the Fraser River. There are limited opportunities for environmental enhancements if Highway 99 is kept in its current configuration.	2
	TOTAL SCORE (out of 30)	2 to 4
Risk Profile	Excavation and stone column installation adjacent to the Tunnel is a risk to the integrity of the Tunnel and the Tunnel may need to be closed during the retrofit work. Detours and substantial travel time delays are expected during construction. There is a risk that the densification required directly adjacent to the Tunnel may not be achievable and as such, the benefits of the Stage 2 works is questionable.	HIGH
Cost	Costs include some upgrades to the Highway 99 corridor between Bridgeport and Highway 91 in Surrey to replace aging infrastructure. Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing.	**$590 million**

2.2 SCENARIO 2 – NEW BRIDGE ON EXISTING TUNNEL ALIGNMENT

This option has been developed over the past two years [15, 16] and is characterized by the following (see **Figures 2 and 3**):

- A 658 metre clear span would be provided over the Fraser River and an overall length of 3.3 kilometers. This is a significant span but shorter than the world's longest cable stayed spans, some of which are longer than 1,000 metres.
- No permanent works would berequired in the Fraser River.
- The bridge would have a total of 10 lanes – six lanes of general purpose traffic, two dedicated transit/HOV lanes and two lanes to more safely and effectively manage slow moving and merging traffic.
- Multi-use pathways for cyclists and pedestrians would be provided on either side of the bridge.
- The new crossing would be constructed on the existing Ministry right-of-way, with no net impact to agricultural land.
- The new bridge would remain centered over the current Highway 99 alignment but would provide sufficient space to maintain traffic on Highway 99 during construction.
- The new bridge would meet modern seismic requirements for lifeline structures.
- The new bridge would have deep foundations similar to those used for the Alex Fraser, Pitt River, Golden Ears Bridge and Port Mann bridges. These types of foundations are cost effective and constructible using local resources. Installing stone columns in advance of foundation construction will control soil liquefaction effects. This foundation concept has been confirmed with the results of the extensive geotechnical investigations carried out between 2013 and 2016. [15]
- A dedicated southbound off ramp from the new bridge would provide direct access to Ladner along River Road South.
- The new bridge would provide the same navigation clearance as the Alex Fraser Bridge and will improve navigability at Deas Slough.
- Connectivity across Highway 99 would be improved by eliminating the Tunnel approaches and the at-grade sections of Highway 99 between Steveston Highway and River Road South.

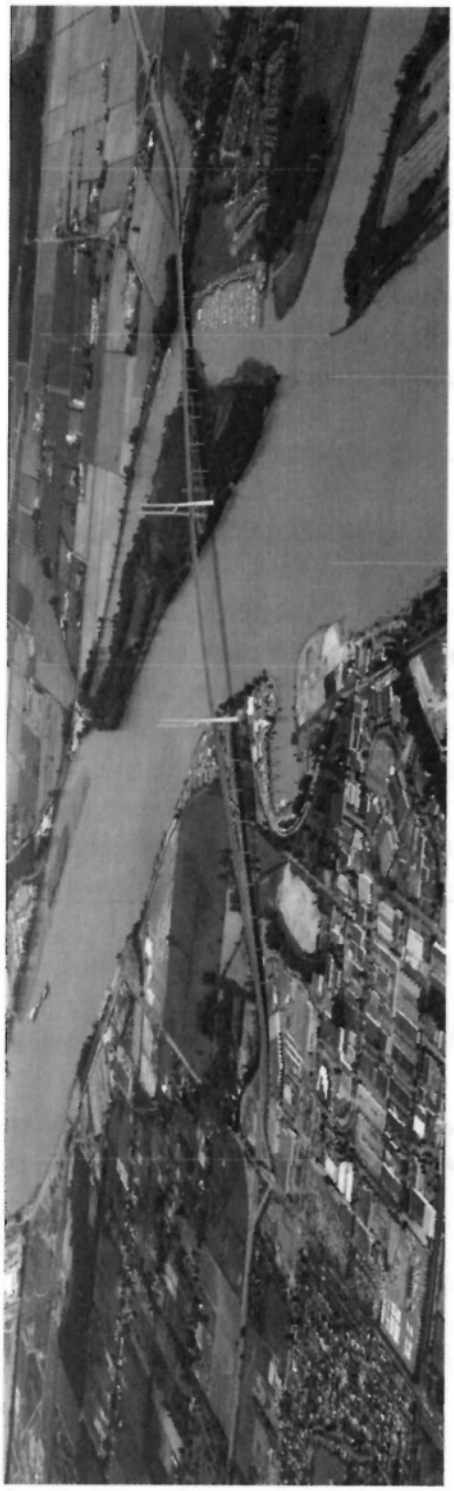

Figure 2 – Overview of Scenario 2 bridge

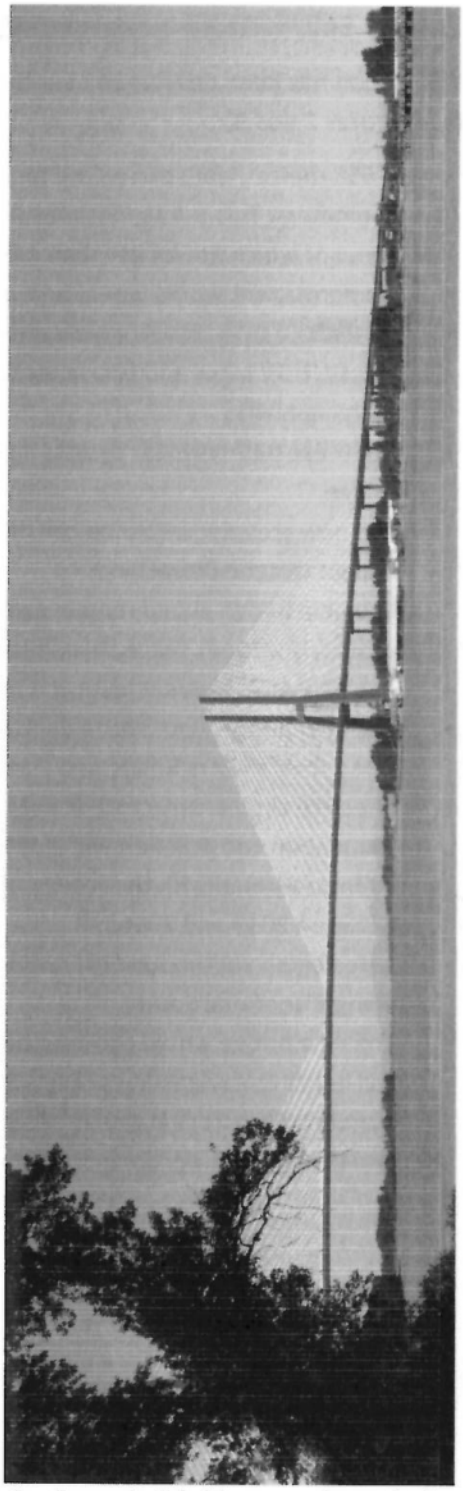

Figure 3 – Scenario 2 bridge seen from the Fraser River

- Cables would be configured to be vertical and not be over the travelled road. In addition, snow and ice management methods such as used on the new Port Mann Bridge would be included to address ice build-up on cables.
- Environmental enhancement opportunities can be achieved in sensitive areas such as on Deas Island and at Green Slough.
- The Tunnel will be decommissioned at the completion of the bridge construction.
- Bridge construction is estimated to take four to five years; Tunnel decommissioning is estimated to take an additional one to two years, after the new bridge is open for use.

The following table provides a summary of this scenario as well as its cost and risk profile.

TABLE 2 - EVALUATION OF SCENARIO 2

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE
Reduce congestion	This scenario provides significant enhancements for all modes of transportation including pedestrians, cyclists, transit, car pools and trucks. Free flow traffic is predicted beyond 2045.	5
Improve safety	A new bridge would be designed as a lifeline structure to provide the highest practical post-earthquake performance. Modern highway design standards will be used to improve clearances and geometrics leading to a safer facility. First responder access and incident management along the highway will be significantly improved making the facility safer than it is today. Snow and ice issues are a concern with a cable stayed bridge. This can be mitigated by avoiding cables over the road and by installing snow/ice removal devices as used on the new Port Mann Bridge.	5
Support trade and commerce	In addition to the benefits of congestion relief for access to key gateway facilities like YVR, Deltaport and terminal facilities along both sides of the Fraser River, there is opportunity to add land through a reduced footprint at interchanges to the agricultural land reserve, to support enhanced farm operations. Cross-highway access and accessibility including for local goods movement will be improved.	5
Support transit on Highway 99	Dedicated transit lanes will be provided across the bridge with integrated connections to transit stops at the Steveston and Highway 17A interchanges with potential future conversion to rail transit.	5
Support options for pedestrians and cyclists	Multi-use pathways on both sides of the new bridge will integrate with the municipal trail systems on either side of the Fraser River.	5

TABLE 2 - EVALUATION OF SCENARIO 2

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE
Enhance the environment	There are no permanent works in the Fraser River and therefore only limited, temporary effects to the river. There are a number of environmental enhancement opportunities including restoring Green Slough to its historic alignment and reconnecting Deas Island Regional Park across Highway 99. Removing the Tunnel will require dredging and excavation in middle parts of the river to remove the four central segments (with temporary effects) Construction of a new bridge would restrict access across Deas Island Regional Park for four years during construction and would have in-river effects for one to two seasons.	3
	TOTAL SCORE (out of 30)	28
Risk Profile	Generally the Project is similar in scope to other recent major highway projects delivered in the Lower Mainland such as the Port Mann/Highway 1 Project, Golden Ears Bridge, Pitt River Bridge and the South Fraser Perimeter Road. As such it has a relatively well understood risk profile. Key technical risks include dealing with soft compressible soils where highway widening is required, risks associated with deep piled foundations and traffic management during construction. Risks associated with working in close proximity to the existing Tunnel are restricted to on shore construction.	MEDIUM
Cost	Costs include rebuilding interchanges and widening Highway 99 between Bridgeport and Highway 91 in Surrey. Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing.	$3,500 million

2.3 SCENARIO 3 – NEW TUNNEL

An immersed tube tunnel is a reasonable solution for a replacement tunnel. A bored tunnel, on the other hand, would be very expensive and is not considered practical given the prevailing geotechnical and topographic conditions of the site.

Designing and building an immersed tube tunnel to meet today's seismic standards is feasible and there are a number of precedents in this regard including recent immersed tube tunnels in Turkey, Greece, Mexico, PRC and South Korea. [10] As done in these reference projects, strengthening of the adjacent and underlying soils to prevent liquefaction during an earthquake would be required. Rather than installing stone columns it may be practical to remove all liquefiable material from under the new tunnel and to backfill with a non-liquefiable material such as gravel. As discussed

under Scenario 1, excavation and construction in close proximity to the existing Tunnel is a risk to the integrity of the Tunnel and construction may require closures of the Tunnel.

To manage transverse bending stresses during construction, tunnel segments are normally limited to a width of less than 40 metres. Two tubes have therefore been assumed – one five-lane southbound tube and one five-lane northbound tube, each with a width of approximately 30 metres.

Property impacts at the Tunnel approaches can be minimized by installing a cut-off wall between the existing Tunnel and the new tunnel (see **Figure 4**). This was done for the Coentunnel in the Netherlands where a 25-metre spacing was achieved between a new and existing tunnel.

A 14.5 metre draft has been assumed in the river to maintain and protect the navigability of the river. As such the new tunnel would be placed in a channel that is dredged to a depth of approximately -23.5 metres. If four-to-one (4H:1V) slopes can be achieved, the excavation required for the new Tunnel would be approximately 150 metres wide.

Special operational precautions would be required to deal with fire, explosions, accidents and flooding in the new tunnel. A level of protection against these types of emergencies can be provided with fire suppression and fire retarding systems, ventilation systems, pumps and emergency egress provisions. Emergency egress for tunnel users would be provided on either side of the river. Security for pedestrians and cyclists in the tunnel would need to be addressed with cameras and lighting.

Sufficient vertical and horizontal clearance inside the new tunnel would be required for ventilation jet fans. Ventilation buildings such as those used for the existing Tunnel would not be required although an operations building located on either side. Ventilation would have to be sufficient for use by cyclists and pedestrians. In stream work would be constrained by fish window and marine traffic access requirements. This would result in an extended overall construction timeline relative to bridge construction. The required in stream excavation and dredging works would also cause considerable disturbance of the river bed and the impact of the resulting turbidity on fish and downstream deposits of sediments would need to be considered. Other instream works would include graving dock construction, tunnel segment fabrication, partial excavation of the existing Tunnel and cut-off wall construction, channel dredging including removal of liquefiable material under the new Tunnel, stone columns installation on either side of the new tunnel alignment, river bed leveling, tunnel segment preparation and lowering into place, sand bedding installation under the Tunnel, backfilling, placing rip rap, and interior finishing including electrical/mechanical installation and paving.

Cut-and-cover construction at the tunnel portals would allow for better connectivity across Highway 99 and help mitigate negative property impacts. Other on shore works (tunnel approaches) would include excavation, slurry wall and tremie plug installation, dewatering, cut-and-cover and retaining wall construction and operations building construction.

Because a new tunnel would be constructed on an alignment beside the existing Tunnel, there would be a greater impact to private property and the agricultural land reserve than with Scenario 2, see **Figure 5**.

A new tunnel would provide better protection for the snow and ice issues experienced by cable supported bridges.

Based on the above, the following assumptions were made for a new tunnel *(see* Figures 4 and 5*)*:

- The total length of tunnel and approaches would be approximately 1.5 km.
- Two lengths of approximately 600-metre long immersed tube tunnel in 100-metre length segments. Each tube would be approximately 30 metres wide and carry five lanes of traffic and a multi-use pathway.
- Negative impacts to connectivity across the Highway 99 corridor and elimination of useable land would be mitigated using cut-and-cover construction.
- Cut-off walls would be installed adjacent to the existing Tunnel to allow the separation between the new and existing tunnels to be minimized and therefore minimize property impacts.
- An approximately 450-metre long low-level bridge would be required across Deas Island.
- Temporary walls and tremie plugs could be used to construct the approaches as a means to minimize the extent of excavation and dewatering.
- The existing Tunnel would be decommissioned after completion of the new tunnel.
- Tunnel segment installation, including fabrication, river bed preparation, segment lowering, backfilling and riprap placement is estimated to take approximately six years.
- Existing tunnel decommissioning once the new tunnel is open for use is estimated to take between one and two years.

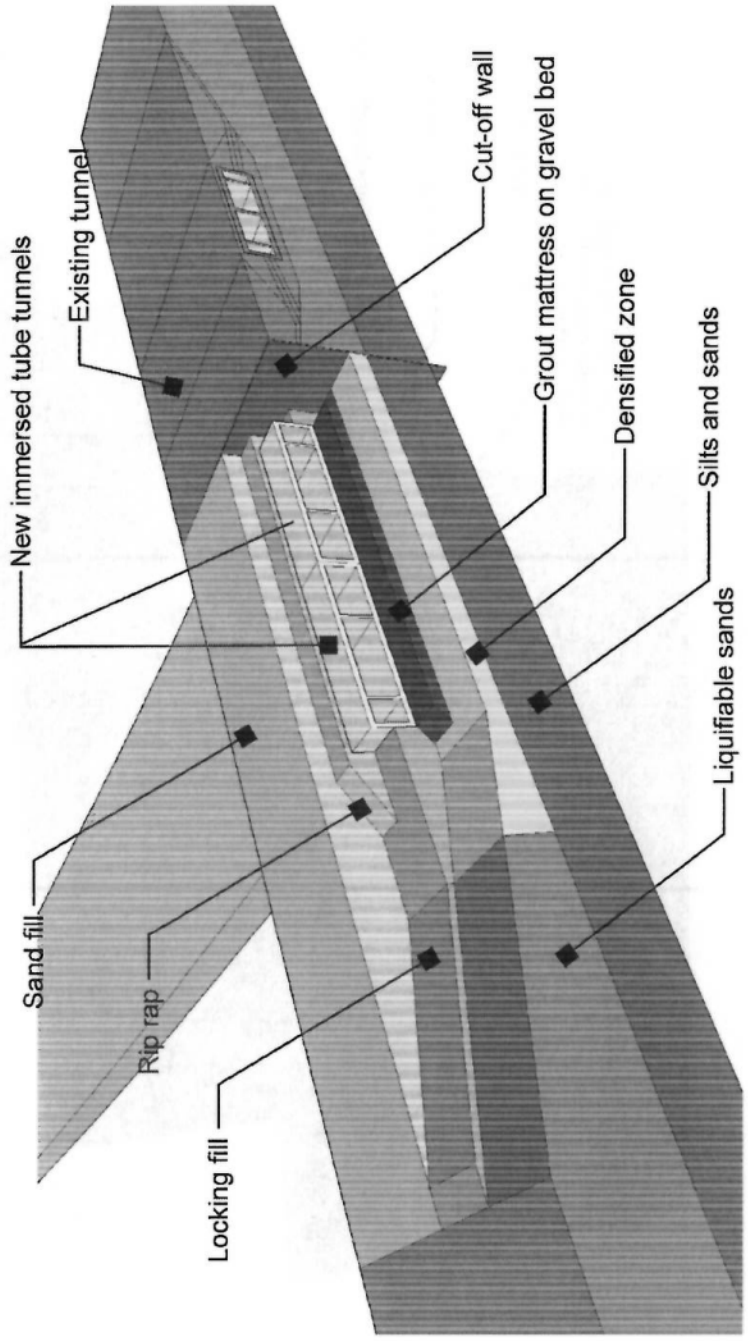

Figure 4 – Section showing Scenario 3 tunnel

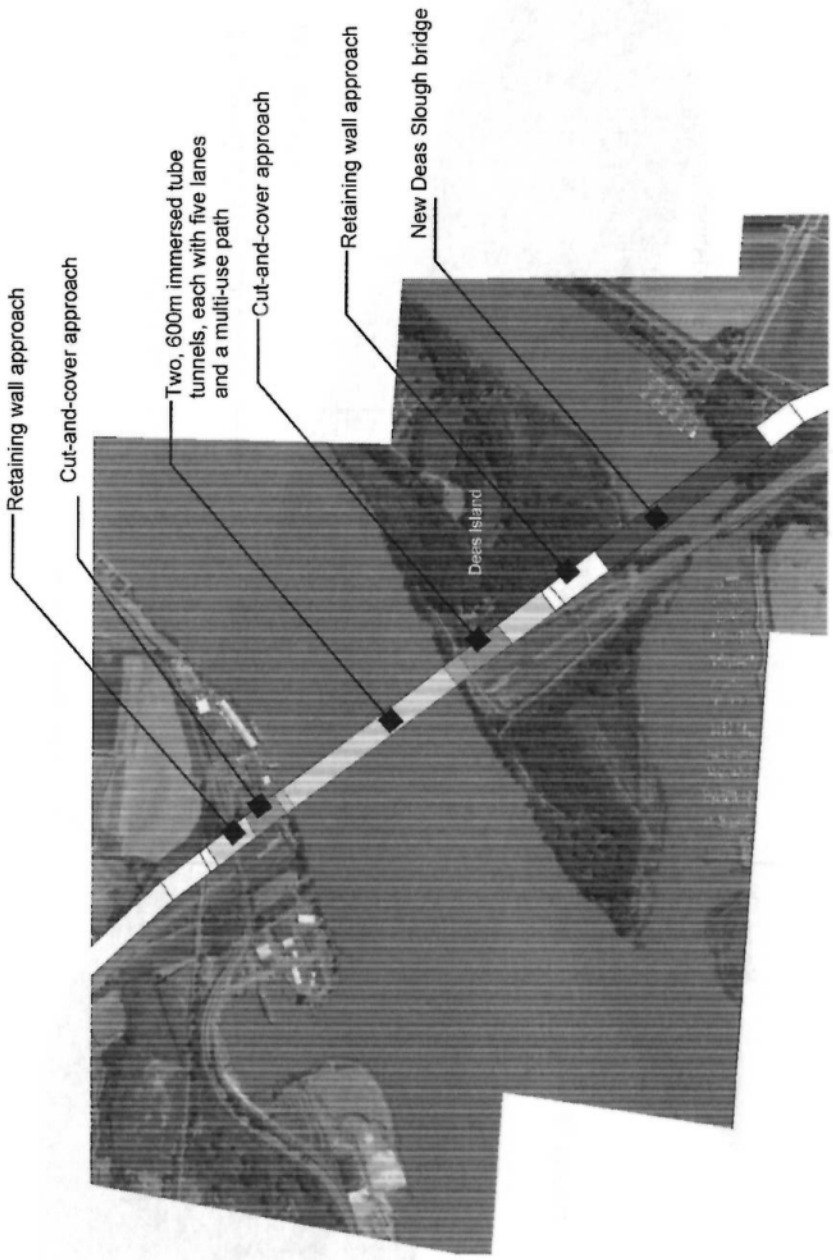

Figure 5 –Scenario 3 alignment

The following table summarizes this scenario as well as its cost and risk profile.

TABLE 3 - EVALUATION OF SCENARIO 3

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE
Reduce congestion	This scenario provides significant enhancements for all modes of transportation including pedestrians, cyclists, transit, car pools and trucks. Free flow traffic is predicted for traffic volumes beyond 2045.	5
Improve safety	A new tunnel would be designed as a lifeline structure to provide the highest practical post-earthquake performance. Modern highway design standards will be used to improve clearances and geometrics leading to a safer facility. First responder access and incident management along the highway will be challenged with regard to access between the northbound and southbound tunnel tubes. Fire and explosions are a serious consideration and pose significant risks. This type of risk does not occur with a bridge. A new tunnel would be protected from the snow and ice issues that affect a cable stayed bridge.	4
Support trade and commerce	The alignment of a new tunnel will significantly impact agricultural lands in Richmond and Delta, reducing overall farm production. The approaches to the new tunnel would create a barrier to crossing Highway 99, although this can be mitigated to some extent with cut-and-cover construction. Congestion relief will support trade and commerce.	3
Support transit on Highway 99	Dedicated transit lanes would be provided through the new tunnel, with integrated connections to transit stops at the Steveston and Highway 17A interchanges.	5
Support options for pedestrians and cyclists	The new tunnel would have a multi-use pathway on either side. This trail would be integrated with the municipal trail systems on either side of the Fraser River; however, the travel experience would be inferior to that of a bridge. CPTED principles would need to be considered in the design, to ensure a safe and appropriate cyclist and pedestrian experience through a tunnel. The total elevation change for a tunnel would be about half that on a bridge.	5

TABLE 3 - EVALUATION OF SCENARIO 3

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE
Enhance the environment	Construction of a new tunnel would have a significant impact on the Fraser River and Deas Island Regional Park for several years during construction and several seasons in the river. Air quality monitoring at the tunnel portals would need to be carefully considered to ensure that contaminant levels are within acceptable ranges.	2
	TOTAL SCORE (out of 30)	24
Risk Profile	Experience with immersed tube Tunnel construction in the Lower Mainland is limited. Constrained construction windows in the Fraser River could amplify the impacts of a schedule delay – a one-month delay could easily become a year delay if an in-stream construction window is missed. Marine works are inherently riskier than land-based work. There is a risk to the integrity of the existing Tunnel as a result of excavation for the new tunnel. There is considerable risk to the integrity of the new tunnel during decommissioning of the existing Tunnel.	HIGH
Cost	Costs include rebuilding interchanges and widening Highway 99 between Bridgeport and Highway 91 in Surrey. Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing.	$4,300 million

2.4 SCENARIO 4 – MAINTAIN EXISTING TUNNEL AND ADD ADDITIONAL LANES

A 10-lane crossing of the Fraser River could be provided by keeping the Tunnel and adding either a:

a) A new six-lane bridge over top, directly upstream or directly downstream of the Tunnel.

b) A new six-lane tunnel directly upstream or directly downstream of the Tunnel.

In either case, the Tunnel would be retrofitted to extend its life, including completion of the Stage 2 seismic works.

Although different laning configurations can be envisaged for Scenario 3 the following has been assumed:

- Four southbound general purpose lanes in the existing Tunnel.

- One southbound transit/HOV lane on/in the new bridge/tunnel.
- Four northbound general purpose lanes and one transit/HOV lane on/in the new bridge/tunnel.
- A multi-use pathway on the new crossing.

The seismic and highway geometry considerations described under Scenario 1 apply to this scenario given that the existing Tunnel would be maintained. However, unlike under Scenario 1, the new six-lane facility would provide a significant lifeline connection across the Fraser River and remove congestion. Also, given that the counterflow system would be eliminated with this Scenario, a reduction in traffic incidents can be expected with this Scenario.

The existing Tunnel retrofit could be carried out when the new bridge or tunnel is open to traffic, which would allow closure of the Tunnel while ground densification adjacent to the Tunnel is completed.

The interaction between a new bridge or tunnel and the existing Tunnel during seismic events is a serious risk and the required mitigation introduces additional costs and complexities to this Scenario.

a) New Six-Lane Bridge

A new six-lane bridge could be constructed on either side or over top of the existing Tunnel. An off-set alignment (upstream or downstream) would have the advantage of reducing impacts to Highway 99 traffic during construction. A new six-lane bridge located over top of the Tunnel would have similar characteristics as the bridge described in Scenario 2 including the complexities of building over live traffic. This arrangement would have the additional challenge of more complex approach structures.

b) New Six-Lane Tunnel (See Figure 6)

Twinning the existing Tunnel with a new tunnel would have a similar arrangement as described for Scenario 3 including the need for a new 450-metre-long, low level bridge over Deas Slough. Whereas in Scenario 3, two new tubes would be required, in this scenario a single, wider tube could be constructed to accommodate all six lanes.

It has been assumed that the new six-lane tunnel would be installed at a lower depth than the existing Tunnel, to protect for future navigation requirements in the Fraser River. Additional right-of-way would be required on both sides of the river, and an impact to agricultural land reserve is expected.

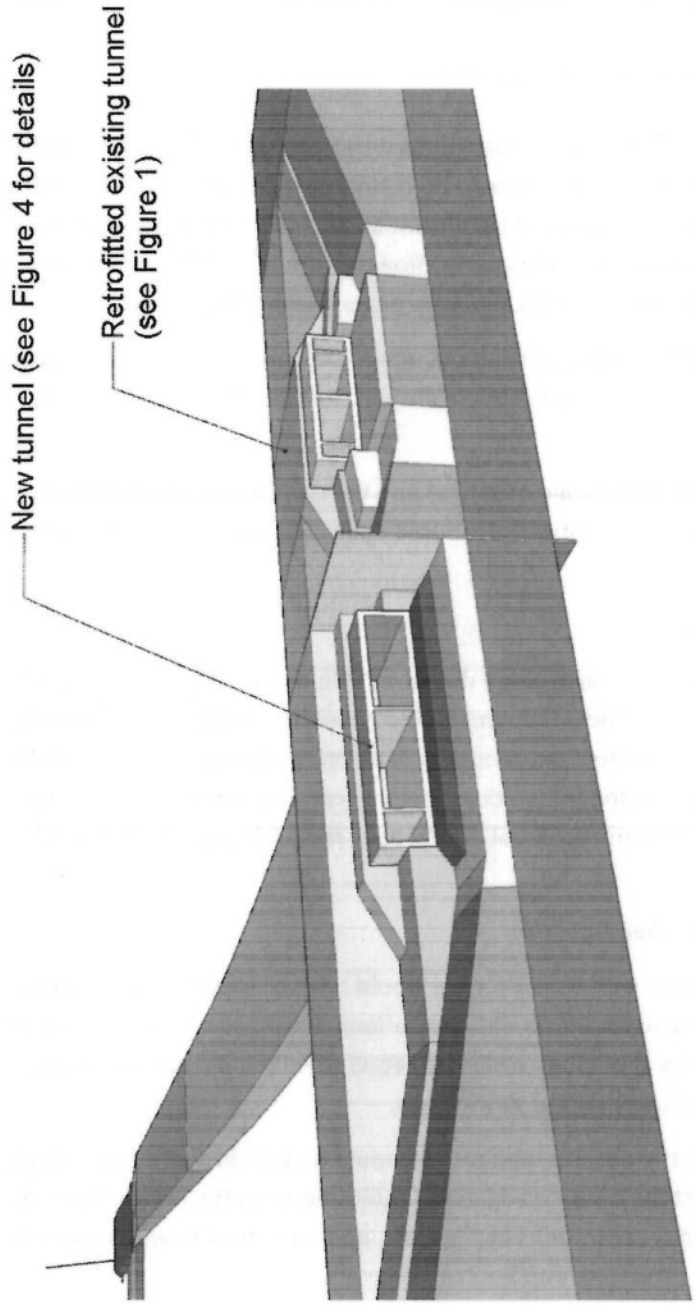

Figure 6 – Scenario 4(b), Twinned tunnel

The following table summarizes this scenario as well as its cost and risk profile.

TABLE 4 - EVALUATION OF SCENARIO 4

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE	
		(a) (bridge +Tunnel)	(b) (tunnel +Tunnel)
Reduce congestion	This scenario provides significant enhancements for all modes of transportation including pedestrians, cyclists, transit, car pools and trucks. Free flow traffic is predicted for traffic volumes beyond 2045.	5	5
Improve safety	A lifeline crossing would be achieved for the new six-lane crossing; however, the existing Tunnel would still not meet modern seismic standards, meaning that modern standards for highway geometry would not be achieved for some traffic lanes. Safety issues associated with the Tunnel's substandard geometry and challenges for first responders trying to access the Tunnel cannot be addressed. A tunnel solution would provide better protection from the snow and ice issues that affect a cable stayed bridge.	1	1
Support trade and commerce	The alignment of the new bridge or tunnel on an offset alignment would have significant impact to agricultural lands in Richmond and Delta. Congestion relief will support trade and commerce.	2	2
Support transit on Highway 99	Dedicated transit/HOV lanes with integrated transit stops at both the Steveston and Highway 17A interchanges could be provided.	5	5
Support options for pedestrians and cyclists	A multi-use pathway for pedestrians and cyclists can be provided with either a twinned bridge or tunnel.	5	5
Enhance the environment	Construction of a new tunnel would have a significant impact on the Fraser River during construction. A new tunnel or bridge that is offset from the existing alignment will have a permanent impact on Deas Island Regional Park.	4	2
	TOTAL SCORE (out of 30)	22	20
Risk Profile	The interaction between a new structure and the existing Tunnel in a seismic event is a risk that will need to be mitigated. Completion of the Stage 2 Seismic works is considered to be high risk. Experience in the Lower Mainland with immersed tube tunnel construction is limited. Constrained construction windows in the Fraser River would amplify the impacts of a schedule delay and a month delay could easily become a year delay if an instream construction window is missed.	HIGH	HIGH

TABLE 4 - EVALUATION OF SCENARIO 4

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE	
		(a) (bridge +Tunnel)	(b) (tunnel +Tunnel)
Cost	Costs include rebuilding interchanges and widening Highway 99 between Bridgeport and Highway 91 in Surrey. Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing.	$3,550 million	$4,050 million

2.5 SCENARIO 5 – MAINTAIN EXISTING TUNNEL AND ADD NEW UPSTREAM BRIDGE

A new bridge or tunnel on a new alignment in the vicinity of No. 8 Road was considered during the Phase 2 public consultation for the Project (see **Figure 7**).[11] A similar concept was considered in the early 1990s[1]. Based on the analyses carried out for Scenarios 2 and 3, a bridge crossing has been assumed for Scenario 5.

From traffic data and analyses [19, 20] carried out for the Project, the following origin/destination patterns are known for northbound morning traffic:

- 54 percent of Tunnel users come from North Delta/Surrey/White Rock/U.S. Border
- 38 percent of Tunnel users come from Tsawwassan/Ladner/Deltaport
- eight percent of Tunnel users come from Tilbury
- 60 percent of Tunnel users are destined for Richmond in the morning. Of these 20 percent leave Highway 99 at the Steveston Interchange.
- 40 percent of Tunnel users are destined for Vancouver in the morning.

This pattern is reversed for evening southbound traffic. Based on these traffic patterns, it has been assumed for the purposes of estimating laning requirements for Scenario 5 that northbound traffic will be evenly split between the existing Tunnel and a new upstream crossing and that the same traffic distribution is true for southbound traffic in the evening.

The Design Hourly Volume (DHV) for the combined crossings can be assumed to be the same as the total for Scenario 2 [x]. As such the Tunnel and the new upstream crossing would each have a DHV in the order of 4,000 vehicles per hour during peak periods in 2045. To accommodate this DHV as well as HOV and transit, it is estimated that six lanes would be required at both the existing Tunnel crossing and the new upstream crossing.

Based on the above assumptions a six lane upstream crossing would be required consisting of two general purpose lanes in each direction and one transit/HOV lane in each direction. To eliminate counterflow and provide transit/HOV lanes at the Tunnel, two additional lanes at the Tunnel would be required with this scenario.

Access to the new crossing would require adding lanes to Highway 91, Highway 99 and Highway 17. The laning assumed for this scenario is shown in **Figure 7**. This highway widening work will require upgrading and/or reconstruction of a number of major interchanges. These are indicated in **Figure 7**.

It can be seen from **Figure 7** that the Scenario 5 alignment would have a significant impact to both agricultural lands and industrial lands, and potentially to Burns Bog. These impacts would make this alignment very expensive and do meet the Project's goal of supporting trade and commerce or enhancing the environment.

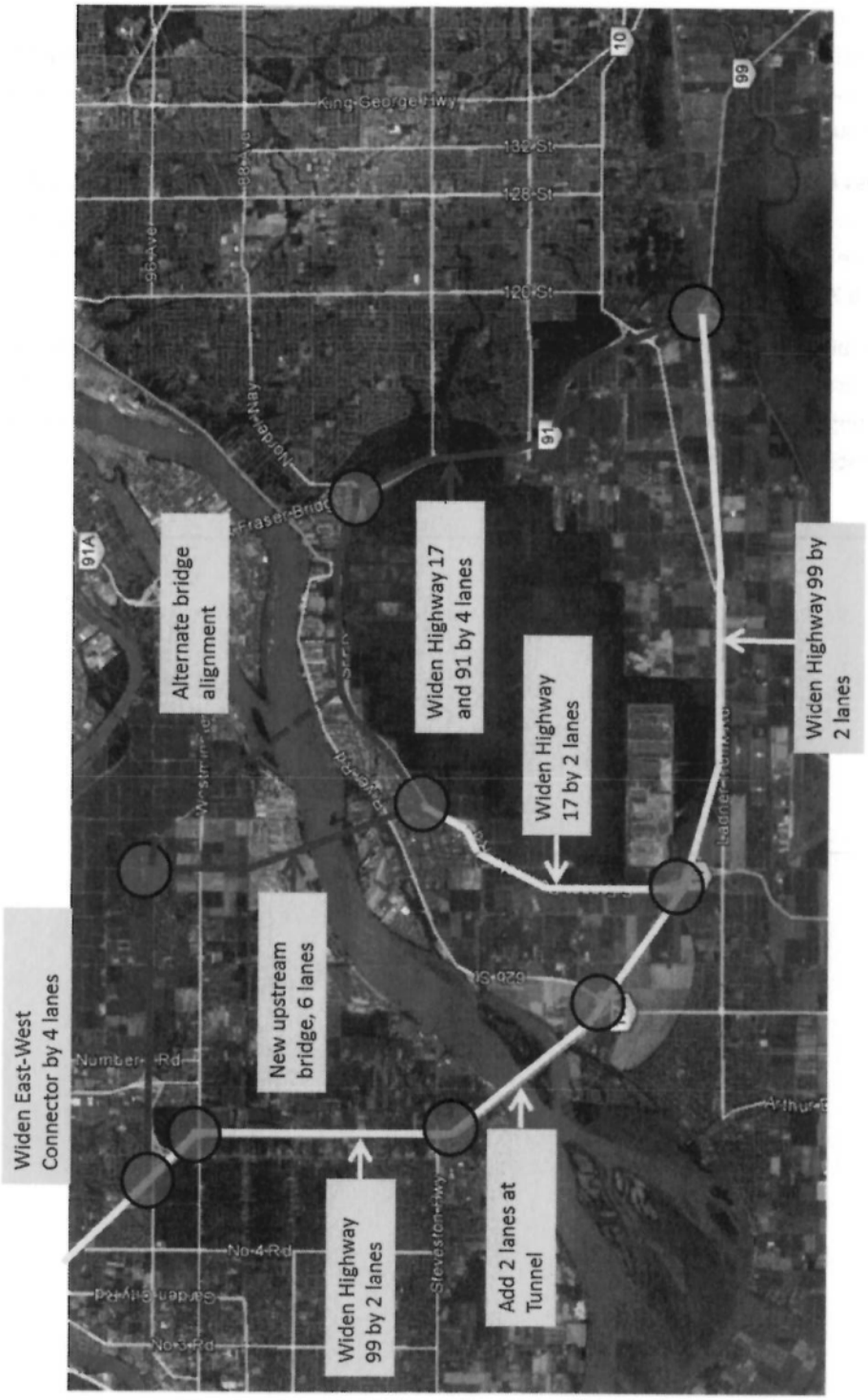

Figure 7 – Scenario 5, New upstream bridge

The following table summarizes this scenario as well as its cost and risk profile.

TABLE 5 - EVALUATION OF SCENARIO 5

PROJECT GOAL	PERFORMANCE	SCORE (5 = EXCELLENT) (0 = UNACCEPTABLE
Reduce congestion	Provides enhancements for all modes of transportation including pedestrians, cyclists, transit, car pools and trucks; however, it is not clear if the proposed alignment will eliminate congestion at the Tunnel and it may increase congestion on Highway 91.	3
Improve safety	Because the Tunnel is retained, existing concerns about seismic vulnerability and outdated highway geometry along Highway 99 will not be addressed.	2
Support trade and commerce	A new alignment would significantly impact agricultural lands in Richmond and Delta, due not only to the new crossing, but also widening of existing highways.	1
Support transit on Highway 99	It is not clear if this scenario would reduce congestion on Highway 99, and as such, if transit service will be improved.	2
Support options for pedestrians and cyclists	Without modifying or replacing the existing Tunnel, there would be no improvements for cyclists and pedestrians along Highway 99. A high quality cyclist/pedestrian facility could be provided on a new alignment but would result in a longer route for cyclists using the Canada Line bridge or destined for BC Ferries, downtown Richmond, Tsawwassen or Ladner.	2
Enhance the environment	The new crossing would require extensive marine works for either a bridge or tunnel, and as such, would have a significant impact on the Fraser River. If marine works are minimized (Phase 2a alignment), the existing green space along the river edge will be eliminated.	2
	TOTAL SCORE (out of 30)	12
Risk Profile	See comments under Scenario 1, 2 and 3.	HIGH
Cost	Costs include rebuilding 9 interchanges and widening Highway 99, 91 and 17 between Bridgeport and Highway 91 in Surrey. Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing.	$5,800 million

3. SUMMARY

The following summarizes how well the five scenarios meet the Project goals, their construction costs and risk profiles.

	SCENARIO				
	1 Existing Tunnel	2 New Bridge	3 New Tunnel	4[2] (c) New Bridge +Existing Tunnel (d) New Tunnel + Existing Tunnel	5
Achievement of Project Goals	20%	90%	80%	60%	40%
Risk Profile	High	Medium	High	Medium - High	Medium-High
Cost in $ millions[1]	590	3,500	4,300	3,550 (a) 4,050 (b)	5,800
Assessment	Least cost; high risk associated with geotechnical works adjacent to the Tunnel; very poor achievement of project goals including poor seismic performance.	Second lowest cost; risks associated with bridge construction and traffic management; high achievement of project goals; Minimal property impacts; minimal environmental impacts.	Second highest cost; high risks associated with tunnel construction adjacent to the existing Tunnel; reasonable achievement of project goals; significant property impacts; significant environmental impacts.	Medium to high cost and risk; marginal achievement of project goals; significant property impacts; significant environmental impact (for tunnel option); poor seismic performance of existing Tunnel.	Highest cost; high risks associated with tunnel construction and retrofit of existing Tunnel; poor achievement of project goals; Significant property impacts including ALR; significant environmental impacts from tunnel construction; poor seismic performance of existing Tunnel.

Notes:

[1] Costs include construction, engineering, project management, property, utilities, environmental, escalation, risks, contingencies and financing

[2] Scenario 4(a) is a new six lane bridge adjacent to the Tunnel and Scenario 4(b) is a new six lane immersed tube tunnel adjacent to the Tunnel.

Project goals, established through consultation, that are key to the analyses presented in this report include congestion reduction, accommodation of all modes of travel including cycling and

transit, and minimizing impacts to agricultural land. Scenarios 2 and 3 were the only two scenarios that substantially achieved these goals.

Subsequent to consultation, Scenarios 1, 4 and 5 were deemed to be significantly inferior options because as it was confirmed that the Tunnel could not be improved to meet modern day seismic standards.

Of the two remaining scenarios, Scenario 3 is significantly more expensive and has a higher risk profile than Scenario 2, and would be more challenging, require more agricultural land and have a greater environmental footprint.

The conclusion of the review is that a new bridge over the existing alignment best meets the Project goals and provides best overall value for British Columbians.

Observations on the summary table are:

- Keeping the existing Tunnel without adding additional traffic capacity (Scenario 1) scores very low because congestion is not addressed and the safety issues inherent with the Tunnel remain unchanged.
- All scenarios that keep the Tunnel (Scenarios 1, 4 and 5) score low because safety concerns associated with highway geometrics and seismic vulnerability inherent with the Tunnel are not resolved to meet today's standards. These Scenarios are therefore not recommended.
- All scenarios that keep the Tunnel (Scenarios 1, 4 and 5) have high risk because of the Stage 2 seismic retrofit that would need to be completed. These Scenarios are therefore not recommended.
- A new bridge is recommended over a new tunnel as it better meets the project objectives, is less expensive and intrusive to the environment, agriculture, etc., and involves less risk.

4. REFERENCES

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Collection reports available at ht

[20] British Columbia Ministry of Tr
Analysis reports available at http:/

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Transportation Contrast

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- "For British Columbians looking for other modern options to get from A to B, your government will deliver on its commitments to support car and ride sharing. While all parties in this legislature publicly stated their support for ride sharing in the recent election, your government has heard the message that legitimate implementation concerns remain. Any proposed legislation will be referred to an all-party committee for extensive consultation with the public and stakeholders, in particular regarding boundaries and insurance." Clone Speech, June 2017

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Transportation and Infrastructure – Main Messages

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BRITISH COLUMBIA

INFORMATION BULLETIN

Ministry of Transportation and Infrastructure

[release number]
[Date]

George Massey Crossing technical review underway

VICTORIA – The Province of B.C. has hired professional engineer Stan Cowdell to lead the independent technical review of the George Massey Tunnel crossing, in order to find a solution to safety and congestion issues faced by commuters, commercial drivers and first responders at the tunnel.

Stan Cowdell is president of Westmar Project Advisors Inc., and has years of experience as an engineering consultant for public infrastructure projects. Cowdell's firm is leading the review, with the Ministry of Transportation and Infrastructure also recruiting additional expertise as needed to support his work, in the fields of geotechnical, tunnel, bridge and road construction, traffic engineering and transportation planning.

The first task of the review will be to independently undertake a technical review of the lifespan, safety and seismic vulnerability and current congestion of the existing tunnel. As well, Cowdell will review the technical assumptions and analysis for the tunnel and bridge options. As part of this, he will review the technical information already produced for the project and challenge or verify the assumptions made out of that work. This assessment may identify the need for further technical work.

As the independent technical review proceeds, the Province will continue to engage with the Metro Vancouver mayors to ensure that any plan for this corridor reflects their ideas and fits into the overall vision for the region.

The review will help the B.C. government choose a solution to the safety and congestion issues at the tunnel that is best for the region and the province, reflects the views and vision of Metro Vancouver, and gets the best value for public money. A report on the independent technical review is expected in spring 2018.

Based on the analysis, the Province will determine next steps to address safety and congestion along the Highway 99 corridor.

Learn more:
The Terms of Reference for the independent technical review of the George Massey Tunnel Crossing are available online at: (link to Terms of Reference).

Contact:
Media Relations
Government Communications and Public Engagement

Ministry of Transportation and Infrastructure
250 356-8241

INDEPENDENT TECHNICAL REVIEW
GEORGE MASSEY CROSSING

Terms of Reference – Nov. 1, 2017

Background

The George Massey Tunnel Replacement Project has been in pre-development, planning and procurement since 2012. Questions have been raised about the proposed bridge option, such as: how the improvements fit within the regional context; the need for 10-lane capacity; tunnel vs. bridge; magnitude of connecting infrastructure, etc. Public comments have been made about environmental, agricultural, port marine/truck impacts and imperatives and the need to ensure George Massey traffic modelling aligns with broader regional models.

The Ministry of Transportation and Infrastructure is proceeding with an independent technical review of the George Massey corridor. The review will focus on what level of improvement is needed in the context of regional and provincial transportation planning, growth and vision, as well as which option would be best for the corridor.

While this review is underway, the Province will engage with mayors from Metro Vancouver, including Richmond and Delta, to gather their perspectives on the project, and to ensure that any plan for this crossing reflects their ideas and fits into the overall vision for the region.

Terms of Reference

The timeline for the independent review is expected to be six months.

The review will include the following:

1. **Review the technical objectives for George Massey crossing improvements;**
2. **Review the analysis and assumptions made for the Project;**
3. **Review and analyze previous public statements of impacts/drivers (e.g. environment and agricultural, port marine/truck traffic impacts);**
4. **Undertake a technical review of safety, seismic and congestion issues for George Massey Tunnel;**
5. **Review the costs and technical requirements of a tunnel vs. a bridge;**
6. **Identify improvements necessary to address safety, seismic and current congestion issues, including any technology limitations;**
7. **Review traffic models and, with TransLink, determine regional traffic model to be used for George Massey and other future regional traffic demand analysis;**
8. **Use the outputs from provincial, regional and local transportation planning and regional traffic modelling to validate the future traffic demand for the George Massey crossing;**

9. **Based on validated future traffic demand, safety and seismic objectives, identify options for the George Massey crossing;**

10. **Identify George Massey improvement options that meet technical objectives, including the size and capacity of the infrastructure, scope and cost.**

The independent technical review should assume all bridges in the Lower Mainland are not tolled. The review is not a reconsideration of decisions made by the environmental assessment process, the Agricultural Land Commission review or by statutory decision makers.

The independent review lead must submit to the Minister of Transportation and Infrastructure a report by Spring 2018.

Resources

The lead will draw from the technical information developed by the Province and from Metro Vancouver municipalities. The lead may also obtain expert advice and analysis on any subject related to the review, which may include highway infrastructure design and construction, transportation planning and traffic engineering. Ministry of Transportation and Infrastructure staff will be available to support the review in ensuring procurement of independent expert advice.

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THE CORPORATION OF DELTA
Office of The Mayor, Lois E. Jackson

October 13, 2017

The Honourable Claire Trevena
Minister of Transportation and Infrastructure
PO Box 9055, Stn Prov Govt
Victoria, BC V8W 9E2

Dear Minister,

Re: George Massey Tunnel Independent Review Process

Thank you for taking time to meet with myself, members of Delta Council and senior staff during the UBCM convention last month to discuss the George Massey Tunnel Replacement Project.

As you know, Delta Council is very supportive of the Provincial government's decision to undertake an independent review of the project. We appreciate that it is important to ensure that any decision on the future of the crossing is based on the best available information.

The tunnel project has already undergone an extensive three-year provincial environmental assessment process. Therefore, we would urge you to proceed with this second review without undue delay. We would appreciate an update as to where the process is at and what are the anticipated timelines for completion of the project.

Yours truly,

Lois E. Jackson
Mayor

cc: Delta Council
George V. Harvie, City Manager
Chief Dan Copeland, Delta Fire & Emergency Services
Chief Constable Neil Dubord, Delta Police Department

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THE CORPORATION OF DELTA

Office of The Mayor, Lois E. Jackson

November 3, 2017

The Honourable Claire Trevena
Minister of Transportation & Infrastructure
PO Box 9055, Stn Prov Govt
Victoria BC V8W 9E2

Dear Minister,

Re: George Massey Tunnel Update

I was very pleased to hear that a professional consultant has been hired to lead the independent technical review of the George Massey Tunnel crossing, and that the review is expected to be complete in spring 2018.

As you know, the City of Delta is fully supportive of the Province's approach to this matter and would like to see an expedited solution to the tunnel congestion and safety concerns.

We would very much appreciate an opportunity to meet again with you to discuss progress on this matter. If it is convenient for you, a meeting sometime in February 2018 would be preferable.

In the meantime, if we can be of any assistance to the independent review process, please do not hesitate to contact me.

Yours truly,

Lois E. Jackson
Mayor

cc. George V. Harvie, City Manager

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Massey Replacement:

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Massey Replacement

Highlights:

- Opposition members are criticizing the government for stopping the project, saying it puts the safety of commuters at risk and wastes millions already spent on the preliminary work.
- Numerous municipal leaders have asked for the project to be reconsidered, including Richmond City Council.
- Minister Trevena announced the stoppage of the procurement for the project and the technical review on September 6.
- The Terms of Reference for the review have not yet been established, but the report should be ready late Spring 2018.
- Mayor of Delta Lois Jackson spoke to Surrey Board of Trade on this issue on September 14, criticising the choice to put the project on hold. The Surrey BoT supports the bridge project.

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Background:

- The ministry is in the process of appointing a person to lead the George Massey Tunnel crossing review.
- The review will focus on what level of improvement is needed in the context of regional and provincial planning, growth and vision, as well as which option would be best for the corridor, be it the proposed 10-lane bridge, a smaller bridge or tunnel.
- The Province's work on the project, up to this point, will be looked at closely as part of the independent review, including technical information developed by the project team and from Metro Vancouver municipalities, as well as new analysis that includes looking at how the removal of tolls will affect the crossing.
- While this review is underway, Minister Claire Trevena will engage mayors from Metro Vancouver, including Richmond and Delta, to gather their perspectives on the project, and to ensure that any plan for this crossing reflects their ideas and fits into the overall vision for the region.
- Pending the outcome of the review, the current procurement process has been cancelled and the project will not be budgeted for in the government's capital plan until a solution has been identified.
- The terms of the request for proposals dictate that each of the two final bidding teams will be paid up to $2 million to help offset their expenses to date.
- The bridge project is estimated at $3.5-billion.

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Community Benefit Agreements

Highlights:

- Premier Horgan gave a speech to the BC Federation of Labour discussing the value of evaluating infrastructure bids not just for cost, but for benefits returned to the community.
- Community Benefit agreements are used to ensure communities receive benefits from infrastructure projects – such as apprenticeships, local hiring, supporting local businesses, or equity hiring requirements.
- The opposition and media may ask about the impact of these agreements on the cost of projects.

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Background:

- Project labour, now more appropriately named community benefit agreements, are often used by government and communities to ensure that benefits of infrastructure procurement are returned to the community.
- This can be in the form of apprenticeship quotas for local, Indigenous, or under-represented groups, the use of local businesses for supplies, use of unionized labour, or equity hiring quotas.
- The government could use community benefit agreements to create jobs in BC, especially in remote and rural communities.
- Parts of these agreements would fall under the Ministry of Advanced Education, Skills, and Training, the Ministry of Labour, and the Ministry of Jobs, Technology and Trade.
- Previous procurement projects by the BC Liberals that ran over budget were:
    - In 2009, the BC place roof and renovations were estimated to cost $365 million. The final project cost was $514 million.
    - In 2004, the Vancouver Convention Centre was estimated at $565 million, but the final cost was $900 million.
    - When BC Hydro's Northwest Transmission Line was first proposed, it was estimated at $404 million, but in 2013 it was re-estimated during construction that the final cost would be $736 million.
- In 2014, small businesses complained that power from the Northwest Transmission line was unusable due to recouping of hook up costs by BC Hydro, which is not a requirement of industrial users.

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Massey Replacement Bid Price

Issue: Opposition members say there was a bid on the Massey tunnel replacement bridge that would have saved $900 million.

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BACKGROUND: Terms of Reference not yet established, but report should be ready late Spring 2018.

Advice to Minister

Massey Replacement Bid Price

Massey Replacement Costs of Delay

Issue: Opposition members say delaying the construction of the Massey Bridge will cost government up to $250 million due to inflation and market conditions.

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Massey Replacement Costs of Delay

BACKGROUND: Terms of Reference not yet established, but report should be ready late Spring 2018.

Port Mann Investigation

Issue: A CBC article based on sources and leaked documents says the BC liberals wasted millions trying to accelerate the construction of the Port Mann bridge prior to the 2013 election. The BC Greens are calling for a full inquiry into the issue.

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Ride-hailing

Highlights:

- On Tuesday, November 28, the legislature passed a motion to authorize the Select Standing Committee on Crown Corporations to examine, inquire into and make recommendations on ridesharing in British Columbia; for up to three days.
- An amendment to the motion proposed by the BC Liberals asked for the 3 day limit to be removed, and also to include a specific reference to those who work in the taxi sector, those who hold taxi licences.
- The amendment did not pass. The BC Liberal caucus voted against the main motion.

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Background on Uber – operations in other jurisdictions

- Uber operations:
  - Uber operates in over 300 cities across the world, including at least 15 communities in Canada. Calgary, Waterloo and Edmonton approved updated regulations or Uber operations in 2016.
- Restrictions/does not operate:
  - In Quebec, a pilot project that allows Uber to operate legally has been extended for a second year but Uber has threatened to leave the Province in protest over the increased training requirement for their drivers.
  - In Denmark, regulators were concerned that Uber's presence created an unfair playing field with existing taxi drivers. Their regulations forced Uber to pull out of this market a year after operating there since 2014.
  - In Italy, Uber will soon be completely banned from the country, after its business practices were found to "constitute unfair competition". The

company is permitted to continue operating until a final court ruling is made.

- In 2015, Uber suspended its UberPOP commercial rideshare service in France following riots by taxi drivers. UberPOP is Uber's cheapest type of service (UberX in North America), charging a base fare of just 1 euro, threatening the taxi industry as the Uber fare was often cheaper than a licensed taxi.
- In Hungary, the government passed legislation preventing Uber from operating after they claim the company breached regulations for over two years. The new law permits a Hungarian authority to block internet access to illegal dispatcher services.
- Bulgaria says if Uber wants to return to the Bulgarian market, it will have to meet the minimum requirements of legislation and register as a taxi service.
- Uber has also faced suspensions in Finland, Spain and the Netherlands, primarily over its UberPOP commercial rideshare service. Barcelona's main taxi operator accused the company of running an illegal taxi service and is currently awaiting a ruling from the European Court of Justice.
- The City of London, England announced that it is not renewing Uber's licence in that city because Uber "demonstrate[s] a lack of corporate responsibility in relation to a number of issues which have potential public safety and security implications".
- In Asia, Uber pulled out of the Chinese market, and was bought out by a local Chinese competitor. In Taiwan, the government imposed fines on the ridesharing company, and they subsequently suspended their service.
- Closer to home, Uber pulled operations from Austin, Texas after the city required Uber to fingerprint and background check all prospective and current drivers.
- In Alaska, Uber pulled out after six months in the state, after a dispute over whether drivers were independent contractors or registered taxi drivers - which would mean they are entitled to workers' compensation insurance. Uber paid a hefty fine to the Government of Alaska, before abandoning the Alaskan market.

Additional Background:

- The consultant hired to conduct the consultation with the taxi industry and other stakeholders is Dr. Dan Hara.
- Dr. Dan Hara of Ottawa-based Hara Associates has 21 years of experience advising government agencies on regulatory and transportation policy. A specialist in industrial organization, his work has covered many regulatory environments, including taxi regulation.
- Dr. Hara is an expert on the taxi industry in Canada and has undertaken a number of reviews and initiatives for cities and governments across Canada concerning the entry of commercial rideshare services.
- He has consulted in this capacity for the cities of Calgary, Edmonton, Ottawa and Halifax, to name a few.
- The previous government had engaged in some stakeholder engagement around what was needed in terms of a regulatory and economic environment to fairly bring ride-sharing into B.C.
- This process led to a report: Ride Sourcing in BC: A Stakeholder Engagement Summary released September 22, 2016.
- This report was used to guide the previous administration in developing its proposed economic and regulatory framework for ride sharing in B.C.
- The previous government announced its plans for ride sharing on March 7, 2017 and committed to bringing its model into place by December 2017. In response to this announcement, the Vancouver Taxi Association issued an open letter to the previous government on March 9th, criticizing the plan by saying the proposed insurance model was unfair and that not restricting the number of taxi licenses issued would create destructive competition in the taxi industry.
- In its letter, the VTA expressed a desire to work with the NDP government to come up with a model that meets the interests of taxi users while protecting the existing industry.
- In 2012, Uber entered the B.C. market with an app-based black car service, but was forced to suspend service following an order from the Registrar of Passenger Transportation.

Ridesharing Safety

Highlights:

- The volunteer ride service "Operation Red Nose" has announced it won't be operating in Surrey and Langley this holiday season due to a lack of volunteers.
- This has raised questions about the lack of ride-sharing and whether people will have safe rides home.
- Our government committed to bringing in ride-sharing in 2017 during the election campaign.
- An engagement plan with the taxi industry and other stakeholders was revealed on Monday, October 16.
- A report by consultant Dan Hara is due in the Spring.

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Background on Uber – operations in other jurisdictions

- Uber operations:
  - Uber operates in over 300 cities across the world, including at least 15 communities in Canada. Calgary, Waterloo and Edmonton approved updated regulations or Uber operations in 2016.
- Restrictions/does not operate:
  - In Quebec, a pilot project that allows Uber to operate legally has been extended for a second year but Uber has threatened to leave the Province in protest over the increased training requirement for their drivers.
  - In Denmark, regulators were concerned that Uber's presence created an unfair playing field with existing taxi drivers. Their regulations forced Uber to pull out of this market a year after operating there since 2014.
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Advice to Minister

Ridesharing

Oct. 17

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Tolls FOI

Highlights:

- The government eliminated tolls on the Port Mann and Golden Ears bridges, starting September 1, 2017.
- An FOI on the cost-benefit analysis and business case on the decision to remove the tolls has been released.
- One of the released documents lists the Patullo and Massey replacements under the heading "proposed future tolled projects".
- Large sections are not being released, as per sections 12, 13, 14, and 17 of FOIPPA.

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Background:

- An FOI on the cost-benefit analysis of the decision to remove the tolls on the Port Mann Bridge and the Golden Ears bridge is being released.
- Large sections are being withheld because the information is considered to be cabinet confidence, policy advice, legal advice or harmful to financial or economic interests. (Sections 12,13,14,17)

Paying for Toll Removal

Issue: Opposition members and media are asking how the province will pay for the removal of tolls on the Port Mann and Golden Ears bridges.

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Tolls

Highlights:

- The government eliminated tolls on the Port Mann and Golden Ears bridges, starting September 1, 2017.
- Commuters who cross the bridge twice each weekday now save about $1,500 a year.
- Media reports suggest collisions are up on the Port Mann, and that this could be due to the removal of tolls.
- A spokesperson for the RCMP's traffic services division said the collision data for the past six weeks have not yet been collected and reviewed, and would need a larger comparison over six months.

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Patullo Bridge

Issue: Opposition members and media are asking how the province will pay for the replacement of the Patullo Bridge, which was an election promise.

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Road Pricing

Issue: The Mobility Pricing Independent Commission is tasked with figuring out exactly how Metro Vancouver can implement mobility pricing, which could include road pricing.

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Abbotsford 6 Laning Project

Background:

- The previous administration made an announcement just prior to the election on Tuesday, March 28, 2017, regarding this future project.
- The news relesae stated that "the British Columbia government has committed $113 million in its share of funding for Phase 2 of the Trans-Canada Six-Laning Fraser Valley Project. This will be a federal-provincial-municipal project to six-lane the highway from 216th Street to 264th Street."
- Neither federal nor municipal dollars had been secured by the time of the announcement.
- Neither federal nor municipal dollars have been secured to date.

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Surrey Transit

Background:

- The Mayors of Metro Vancouver are seeking commitments from the government to sign on to the 10 Year Plan.
- Surrey, in particular, has promised to have construction underway by 2018 on a transit extension.
- The Surrey Mayor has called on the province to sign off on the technology choice for the Fraser Highway portion of the planned 27-kilometre light rail system – LRT or Skytrain.
- The Mayor's Council has endorsed light rail for this project.
- Total costs for the Surrey line are estimated at 2.2 billion.

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Background:

- The proposed Surrey Newton – Guildford LRT Line (or L-Line) is an at grade, light rail rapid transit line through the northern parts of Surrey, extending approximately 11 kilometres along King George Boulevard and 104th Avenue.
- The project scope includes 11 stations at opening day, with an additional potential station in the future at 84th Avenue. The planned service levels require 16 vehicles (13 in operation plus three spares) of 40 metres each.
- An operations and maintenance facility is planned on the west side of King George Boulevard, south of 72nd Avenue.
- The Mayors' Council Vision also identifies the Fraser Highway LRT Line along the Fraser Highway. It includes 16 kilometres of two-way track, mostly at street level, and eight stops. The Mayors' Council Vision contemplates construction of the Fraser Highway Line approximately five years after the Surrey Newton – Guildford LRT.
- TransLink's project timelines for L-Line include earliest procurement (Q1 2018), earliest construction (Q2 2019) and earliest service date (Q4 2022).

Advice to Minister

Greyhound Route Cancellations

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Party Bus Safety

Highlights:

- On Saturday, Nov. 18 a party bus in Vancouver erupted in flames on Granville Street. There were no injuries.
- In January 2016, 23 year old Chelsea James died after falling out of a passenger door on a party bus.
- **According to media reports**: An investigation determined that the door valve had been installed backwards and therefore opened at a light touch.
- No criminal charges were laid against the company or its owner.
- The driver was fined under the Motor Vehicle Act and media is reporting the company was also fined by the Passenger Transportation Branch.
- The driver behind the wheel of the bus that night was fined $230 and paid the fine two weeks ago.
- In opposition, the NDP called for stronger regulations and proposed a private members bill to require party buses to have adult chaperones.

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Background:

- On January 9, 2016, a 23 year old woman died in Vancouver after falling out of a party bus and being struck by the bus while it was turning a corner.
- The accident was investigated by the Vancouver police.
- On Oct. 25, 2016, the Vancouver Police Department released the result of the investigation into the accident.
- Criminal charges were not laid against the company or the driver.
- After a full and comprehensive mechanical inspection of the vehicle involved, it was determined that a door valve of the limousine was incorrectly installed and low operating pressure with the pneumatic door were the main contributing factors in the fatality.
- CVSE assisted in the investigation by inspecting the vehicle and investigating the driver regarding vehicle compliance.
- The vehicle passed its last semi-annual vehicle inspection, done on Sept. 30, 2015. This particular vehicle is no longer owned or operated by the previous carrier.
- The company that owned the vehicle at the time of the accident, Silver Lady Limousines, has been a licensee since 2000 and held a Special Authorization licence, approved by the Passenger Transportation Board.
- The Registrar investigated the history of the company, and found it was in non-compliance on a number of occasions:

    - August 2015 – the company received an open liquor violation in one of its vehicles in August 2015.
    - May 2015 - the Registrar issued the company a warning for having photos on its website showing liquor bottles in a vehicle - the company subsequently removed the photos.
    - 2014 - The company's carrier profile also shows an additional violation ticket for open liquor.

- 2007 / 2008 - The company has also been issued three administrative fines over 2007-2008 for licence non-compliance unrelated to the Liquor Control and Licensing Act.

- Changes to the industry:
  - In 2015, the ministry strengthened the Passenger Transportation Regulation governing licensing for limousines. The regulation requires all limousine operators with perimeter seating vehicles to have their vehicles licensed and approved by the Passenger Transportation Board, an independent tribunal, with a Special Authorization license. Licensed vehicles must have a passenger transportation plate and decal displayed at all times. The transportation plate and decal allows government and law enforcement to better enforce laws for the industry, and it motivates operators to provide a service that is safe and compliant with provincial laws.

- The Liquor Control and Licensing Act prohibits open liquor in a motor vehicle. It is also against the law to consume alcohol in an unlicensed public place, including inside a vehicle.
- Party bus advertising cannot allude to drinking alcohol in a company-operated vehicle and limousine operators must refuse to board passengers carrying alcohol and they must terminate trips if they find alcohol being consumed in a vehicle.

BC Ferries Review

Highlights:

- In 2003, BC Ferries was transformed from a Crown Corporation into an independent company under the BC Business Corporations Act and the Government of B.C. maintains a service contract with this company.
- The Minister of Transportation's mandate letter confirmed government's commitment to conduct a comprehensive review of BC Ferries.
- Both the Premier and the Minister have recently spoken to media about the review – the Premier saying "everything's on the table" and the Minister committing to a thorough operational review.

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Background:

- Government has committed to reduce fares on the small ferry routes by 15%, freeze fares on the major routes, and reinstate the 100% seniors' weekday discount.
- This change will come into effect April 1.
- Under the model created by the Coastal Ferry Act, the Province negotiates with BC Ferries to implement government objectives, either voluntarily or via mutually agreed to changes to the Coastal Ferry Services Contract between BC Ferries and the Province.
- The free passenger fares for seniors on Monday to Thursday's was reduced to 50% in 2014.

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E&N Rail Corridor

Highlights:

- A Victoria Times Colonist article published on Nov 23 reports that a proposed study of commuter rail service between Victoria and the West Shore has been put on hold.
- The study was announced under the old government by Todd Stone.
- A request for proposals was posted, asking for a consultant to examine the feasibility of using the E&N rail corridor between Victoria and Langford as a regional transit route. The RFP required that a report be due by end of July.
- Minister Trevena told media on Nov. 22 that the RFP has been put on hold.
- Currently, consultation with local First Nations and municipal partners about how best to transform the E&N rail line into a functional corridor is being led by MLA Mitzi Dean.

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Background:

- Local governments (Langford, Victoria, Esquimalt, View Royal) have expressed their interest in having light rail or transit service operating on the 15-kilometre E&N corridor between Westhills in Langford and Victoria West.
- During the 2008 municipal elections, the City of Langford and City of Colwood included referendum questions regarding support for developing the E&N Rail Corridor and 93% of respondents responded favourably.
- In March 2017, Minister Todd Stone announced that the provincial government would undertake an evaluation of the feasibility of using all or part of the E&N Rail Corridor between Langford and Victoria as a regional transit corridor.
- A Working Group to review options for commuter rail service in the CRD was also announced.
- The Ministry actively sought and invited the Esquimalt and Songhees Nations but a representative was not confirmed prior to the writ and caretaker period. The Working Group held three meetings prior to the writ being dropped.
- Given that the timelines for completion of the study were ambitious, combined with an extended post-election transition period and the duty of the provincial government to properly consult with First Nations, which did not happen before the writ dropped, the Ministry was unable to award the contract.
- In early August, the ministry reached out to those involved in the process to date, including the 5 bidders on the original RFP, in order provide an update on the new approach.
- Presently, MLA Mitzi Dean is leading consultations with local First Nations and municipal partners about how best to transform the E&N rail line into a functional corridor and to make sure their ideas and needs are included in our plans.

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