

**METRO VANCOUVER REGIONAL DISTRICT
GEORGE MASSEY CROSSING TASK FORCE**

REGULAR MEETING

**Friday, February 5, 2021
1:00 p.m.
28th Floor Boardroom, 4730 Kingsway, Burnaby, British Columbia**

A G E N D A¹

OPENING REMARKS

Director Sav Dhaliwal, Board Chair

1. ADOPTION OF THE AGENDA

1.1 February 5, 2021 Regular Meeting Agenda

That the George Massey Crossing Task Force adopt the agenda for its regular meeting scheduled for February 5, 2021 as circulated.

2. ADOPTION OF THE MINUTES

3. DELEGATIONS

4. INVITED PRESENTATIONS

5. REPORTS FROM COMMITTEE OR STAFF

5.1 George Massey Crossing – Project Status

That the George Massey Crossing Task Force receive for information the report titled “George Massey Crossing – Project Status” dated January 21, 2021.

6. INFORMATION ITEMS

6.1 George Massey Crossing Task Force Terms of Reference

6.2 Correspondence re Submersed Richmond-Delta Tunnel Crossing for the Fraser River from Fraser Voices Society

¹ Note: Recommendation is shown under each item, where applicable.

7. OTHER BUSINESS

8. BUSINESS ARISING FROM DELEGATIONS

9. RESOLUTION TO CLOSE MEETING

Note: The Committee must state by resolution the basis under section 90 of the Community Charter on which the meeting is being closed. If a member wishes to add an item, the basis must be included below.

That the George Massey Crossing Task Force close its regular meeting scheduled for February 5, 2021 pursuant to the *Community Charter* provisions, 90 (2) (b) as follows:

90 (2) A part of a meeting must be closed to the public if the subject matter being considered relates to one or more of the following:

- (b) the consideration of information received and held in confidence relating to negotiations between the regional district and a provincial government or the federal government or both and a third party.

10. ADJOURNMENT/CONCLUSION

That the George Massey Crossing Task Force adjourn/conclude its regular meeting of February 5, 2021.

Membership:

Dhaliwal, Sav (C) – Metro Vancouver Board
Baird, Ken - Tsawwassen First Nation
Brodie, Malcolm – Richmond
Coté, Jonathan – TransLink Mayor’s Council
on Regional Transportation

Froese, Jack - Langley Township
Harvie, George - Delta
McCallum, Doug – Surrey

Stewart, Kennedy - Vancouver
van den Broek, Val - Langley City
Walker, Darryl - White Rock

41592579

To: George Massey Crossing Task Force

From: Neal Carley, General Manager, Parks and Environment

Date: January 21, 2021 Meeting Date: February 5, 2021

Subject: **George Massey Crossing – Project Status**

RECOMMENDATION

That the George Massey Crossing Task Force receive for information the report titled “George Massey Crossing – Project Status” dated January 21, 2021.

EXECUTIVE SUMMARY

Over the past year, the Province completed a business case for the replacement of the George Massey Tunnel. The business case included two short-listed options: an eight-lane bridge and an eight-lane immersed tube tunnel. As the project is expected to enter a new phase with the completion of the business case, the Metro Vancouver George Massey Crossing Task Force has been reconvened.

PURPOSE

To provide the Task Force with a status update on the Province’s George Massey Crossing Project.

BACKGROUND

The Finance and Intergovernment Committee and MVRD Board received updates on the George Massey Crossing Project in February, March and April 2019. At the April meeting, the MVRD Board passed a resolution for general support of the principles and goals for the George Massey Crossing developed by the Ministry of Transportation and Infrastructure.

The George Massey Crossing Task Force, struck by Chair Dhaliwal earlier in 2019, held meetings on June 27, 2019, July 24, 2019, and October 2, 2019. At the October 2, 2019 meeting, the Task Force received a presentation by the provincial project team and subsequently supported a new eight-lane immersed-tube tunnel with multi-use pathway as the preferred option for the George Massey Crossing for the purposes of the Province’s public engagement.

At the October 16, 2019 meeting, the Finance and Intergovernment Committee supported an eight-lane immersed-tube tunnel with multi-use pathway as the preferred option for the George Massey Crossing.

At the November 1, 2019 meeting, the MVRD Board passed the following resolution:

That the MVRD Board:

- a) *receive for information the report titled “George Massey Crossing Project – Results of Technical Evaluation on the Six Short Listed Options” dated September 24, 2019;*

- b) *based on the Province’s technical analysis, endorse a new eight-lane immersed-tube tunnel with multi-use pathway, including two transit lanes, as the preferred option for the George Massey Crossing for the purposes of public engagement;*
- c) *Provincial Government’s assessment of the immersed tube tunnel options takes into consideration:*
- *The project must address First Nation concerns regarding in-river works and fisheries impacts.*
 - *The project should not create additional potentially costly, lengthy or prohibitive environmental challenges or reviews.*
 - *The project should address the City of Richmond and Delta’s concerns regarding local impacts at interchanges or access points, as well as minimize impacts on agricultural land.*
 - *To fully realize the benefit of this significant investment, the entire Highway 99 corridor should be evaluated for improvements as part of the crossing project including the existing congestion at the South Surrey interchanges.*
 - *The project should address the City of Richmond and Vancouver’s concerns regarding excess capacity, the risk of increasing vehicle kilometres travelled, and the potential to worsen congestion at the Oak Street Bridge and along the Oak Street corridor.*
 - *The crossing should be designed to serve the needs of the region to at least 2100.*
 - *The crossing should include six lanes for regular traffic including goods movement and two lanes dedicated for rapid transit bus, with dedicated multi-use pathway and facilities for cyclists and pedestrians, and include immediate access to enhanced rapid transit capacity at opening. It should also have the potential for conversion to rail in the future, including consideration for potential high speed rail.*
 - *As it is now, all utility infrastructure, including BC Hydro power transmission lines, should be constructed underground in conjunction with the tunnel.*
 - *Any solution must address the matter in a timely manner, hopefully with construction completed by 2026-2027.*
 - *Any solution that addresses these issues should also be consistent with Metro Vancouver’s Regional Growth Strategy (Metro 2040) and TransLink’s Regional Transportation Strategy and Metro Vancouver’s new climate change targets, which promote sustainable transportation choices. The Regional Transportation Strategy update is currently underway and can provide the opportunity to further integrate the crossing as regional priority, as well as consider transportation demand management strategies to address municipal concerns; and*
- d) *as an interim measure to address the immediate traffic congestion at the tunnel, request the Provincial government work with TransLink through Phase 3 of the Mayors’ Council plan to provide additional funding for higher-frequency transit services to encourage people to leave their cars at home.*

GEORGE MASSEY CROSSING PROJECT

In 2018, the Province completed an independent technical review of the George Massey Tunnel replacement and the 10-lane bridge that had been approved at the time. The technical review was released in December 2018 and a provincial project team through the Ministry of Transportation and Infrastructure prepared the options for a new crossing. The provincial project team worked closely with Metro Vancouver, TransLink, member jurisdictions, and First Nations to develop and evaluate the crossing options.

Since November 2019, the provincial project team completed public engagement and completed a business case in late 2020.

George Massey Crossing Project Status

Over the past year, Metro Vancouver have been in contact with the provincial project team. The project team has recently completed the business case for the replacement of the George Massey Tunnel on Highway 99. The business case, which included two short-listed options (an eight-lane bridge and an eight-lane immersed tube tunnel) was received by the Minister of Transportation and Infrastructure in December 2020. The next step is for the Province to review the submission and make a final decision regarding the crossing.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this information report. Any financial implications or other impacts for Metro Vancouver that arise due to the George Massey Crossing Project will be assessed and reported to the Task Force as the project is developed.

CONCLUSION

Metro Vancouver's George Massey Crossing Task Force has been reconvened as the Province completed a business case, which included two short-listed options (an eight-lane bridge and an eight-lane immersed tube tunnel), for the replacement of the George Massey Tunnel. The Province will review the business case and make a final decision regarding the crossing.

George Massey Crossing Task Force

Terms of Reference

The George Massey Crossing Task Force is the standing committee of the Metro Vancouver Regional District (MVRD) Board responsible for providing advice and recommendations to the Finance and Intergovernment Committee and to the MVRD Board on the BC Ministry of Transportation and Infrastructure's George Massey Crossing Project and related matters.

Task Force Responsibilities

The Task Force will provide advice and recommendations through the Metro Vancouver Finance and Intergovernment Committee to the MVRD Board on issues related to the BC Ministry of Transportation and Infrastructure's George Massey Crossing Project. Key responsibilities for the Task Force include:

- Reviewing project-related materials and providing feedback to provincial representatives and others, as appropriate.
- Considering potential positive and negative impacts of crossing options and project-related works on Metro Vancouver plans, assets, infrastructure and legislated responsibilities, including but not limited to:
 - a) Regional planning and growth management, including land use, transportation, and agriculture;
 - b) Air quality, climate change, human health, and the environment;
 - c) Deas Island Regional Park; and
 - d) Metro Vancouver utilities.
- Reporting back through the Metro Vancouver Finance and Intergovernment Committee to the MVRD Board with advice and recommendations on the George Massey Crossing Project and related matters.

Task Force Membership and Meetings

The Chair of the MVRD Board shall serve as the Chair of the Task Force. Task Force members are appointed annually by the MVRD Board Chair and will consist of MVRD Board Directors who represent communities anticipated to experience either a direct or an indirect impact from this project.

The Task Force will meet every two months or at the call of the Task Force Chair. A quorum of 50% plus one of the Task Force's members is required to conduct Task Force business.

Task Force Management and Support

The Task Force Chair will be the chief spokesperson on matters of public interest within the Task Force's purview. For high profile issues the role of spokesperson rests with the MVRD Board Chair or Vice Chair. On technical matters, or in cases where an initiative is still at the staff proposal level, the Chief Administrative Officer or designated senior staff member is the appropriate spokesperson. Where necessary and practical, the MVRD Board Chair, Task Force Chair and Chief Administrative Officer will confer to determine the most appropriate representative to speak.

The Metro Vancouver General Manager, Parks and Environment, will serve as Committee Manager for the Task Force. The Task Force Committee Manager is responsible for coordinating agendas and is the principal point of contact for Task Force members.

The Task Force may request the Task Force Committee Manager to:

- gather information and provide analysis of potential impacts on Metro Vancouver assets, infrastructure and legislated responsibilities;
- seek out and consider input from additional stakeholders deemed to have an interest in the George Massey Crossing Project; and
- seek advice and input from other existing Metro Vancouver committees, such as the Regional Administrators Advisory Committee or Regional Planning Advisory Committee.

Funding for the Task Force is provided under Metro Vancouver's General Government function to cover incidental costs and meeting expenses. Voting members of the Task Force will be remunerated in accordance with the *Remuneration Bylaw*.

From: Otto Langer [<mailto:ottolanger@telus.net>]

Sent: Tuesday, January 5, 2021 7:48 PM

To: Vancouver Mayor and Council <mayorandcouncil@vancouver.ca>; Burnaby Mayor and Council <clerks@burnaby.ca>; Langley Township Mayor and Council <jfroese@tol.ca>; Langley City Mayor and Council <vvandenbroek@langleycity.ca>; Coquitlam <mayor_council@coquitlam.ca>; Port Coquitlam Mayor and Council <admin@portcoquitlam.ca>; Port Moody Mayor and Council <council@PortMoody.ca>; White Rock <clerksoffice@whiterockcity.ca>; Information Centre <ICentre@metrovancover.org>; New Westminster Mayor and Council <info@newwestcity.ca>; Malcolm Brodie <mayorandcouncillors@richmond.ca>

Subject: Fraser Voices Recommends a Submersed Richmond-Delta Tunnel Crossing for the Fraser River.

To: Metro Vancouver Elected Officials - Mayors and Councillors:

Attached please find a letter from Fraser Voices Association to Transportation Minister Rob Fleming concerning the BC Government's intention to improve the existing George Massey Tunnel crossing of the Fraser River. Our previous letter and brief to the previous Transportation Minister Claire Trevena is also attached for your information. Local government must pressure the Province to ensure that this is not just another river crossing to promote yet more traffic, urban sprawl and non-sustainable growth south of the Fraser River. Considering where COVID and climate change has put us, now is the time to make more intelligent decisions affecting our communities' futures.



Otto E. Langer Chair Fraser Voices Society 604 274 7655



Minister Rob Fleming and Parliamentary Secretary Bowinn Ma
Ministry of Transportation and Infrastructure
Legislative Buildings,
Victoria, BC.

January 5, 2021

Re: Need to Upgrade the George Massey Tunnel with a New 8 Lane Tunnel.

Dear Minister Rob Fleming and Minister of State Bowinn Ma:

Fraser Voices congratulate you on your new appointments by Premier John Horgan to this important transportation ministry. Your appointment to this office is of great importance to the citizens of Richmond and Delta and surrounding communities because of the long delayed construction of an improved crossing of the Fraser River joining the cities of Richmond and Delta.

During the previous term of your government we had a number of discussions with Minister Claire Trevena and her staff related to the upgrade of the present Massey Crossing of the Fraser River by the adding of a new bridge or tunnel between Richmond and Delta.

I am certain that this file is thick but we were caught off guard after the 10 lane bridge by the Christy Clark government was cancelled by your government and a eight lane bridge or a 8 lane tunnel were substituted as possible alternatives. We were surprised by the 8 lane bridge option when that was not the recommendation of the Mayors Task Force and is not supported by Fraser Voices - an Association dedicated to the protection of our Fraser River Estuary and delta lands and our safety and the quality of life in our river communities. We felt an immersed tunnel with enhanced public transit was the best alternative from a number of perspectives and urge you to further examine the positive aspects of that option..

We attach for your information our analysis of the known 2019 options that we forwarded to the previous Minister Claire Trevena on January 4, 2020.

We again confirm our strong recommendation that an immersed tunnel is the best available option with the key proviso that any new crossing is not used to enhance greater private and

commercial motor vehicle traffic across the river that will only encourage greater sprawl and loss of quality of life in Richmond, Delta and the South Surrey – White Rock areas. Any new crossing has to be coordinated with sustainable local government planning so as we can reduce greenhouse gas emissions and make this south Fraser area a more environmentally sustainable community.

We are also extremely concerned that any new crossing will be used to increase the depth of the river and thereby allow relatively uncontrolled heavy industrial development of the river and facilitate fisheries and wildlife habitat destruction upstream of the crossing.

We would again appreciate being made aware of any new developments on this project and ask for the opportunity to be consulted on what is an integral part of our sustainability in the Richmond and Delta/Surrey area communities.

Your attention to this matter is greatly appreciated in that this is just not another river crossing to ease present traffic congestion and promote more urban sprawl – it's a development that will affect who we are as a community some decades from now. Planning for that future must start now.

Sincerely yours,



Otto E. Langer Chair Fraser Voices Society 604 274 7655 <ottolanger@telus.net>

Copies to:

Premier John Horgan
Kelly Greene Richmond MLA BC Environment Parliamentary Secretary
George Heyman Environment Minister
Henry Yao Richmond MLA
Aman Singh Richmond MLA
Fin Donnelly Parliamentary Secretary Fisheries and Aquaculture
Ravi Kahlon Parliamentary Secretary - Forests, Lands, Natural Resource Ops/Rural Dev.
Ian Paton Delta MLA
Teresa Wat Richmond MLA
Metro Vancouver Mayors and Councillors

***Fraser Voices is a non-profit citizen's society organized to examine a Fraser River crossing in the Richmond-Delta area and promote the associated livability and environmental sustainability of Fraser River delta and estuary and its life.**



Fraser Voices
6911 Dunsany Place
Richmond, B.C.
V7C 4N8

Hon. Claire Trevena
Minister of Transportation and Infrastructure
Legislative Assembly
501 Belleville Street
Victoria B.C. V8V 2L8

January 1, 2020

Dear Hon. Minister:

Re: Richmond to Delta Fraser River Crossing.

On December 11, 2017 members of Fraser Voices met with you to discuss the need to reconsider the building of a new 10 lane bridge across the Fraser River and to discuss the status of the Fraser River estuary and the need to better protect it. We again thank you for that meeting.

We also appreciate the halt put on bridge construction preparations and the initiative of your government to re-examine what is the best type of crossing of the Fraser River. Our opposition to a giant bridge crossing was further bolstered when the Metro Vancouver Board and recently saw fit to recommend that it is best to build an immersed eight lane tunnel across the river and retain the existing Massey Tunnel for service needs. We assume that your government will pursue that recommendation.

Fraser Voices has conducted our own review of the issues: ***The Proposed Fraser River Richmond to Delta Crossing – A Bridge or a Tunnel? --Environmental and Social Impacts and Sustainability Considerations.*** A Fraser Voices Report 35p. November 30, 2019. A copy has been enclosed (via email and hard copy mail) to aid in your government's deliberations.

Based on our past positions taken on this matter and considering the attached paper, Fraser Voices strongly recommends that the Province now begins the formal planning and approval applications for a smaller and less obtrusive Fraser River tunnel crossing at this time –i.e. an immersed 8 lane tunnel versus a 10 lane bridge.

It is of critical importance that all appreciate that we are not just selecting a method to cross the Fraser River but indeed selecting what our Surrey, White Rock, Delta and Richmond area communities should look like some decades into the future. A river crossing must service what we want in terms of our communities and way of life and not to just promote more development, non-sustainable sprawl and traffic congestion.

It is essential that all related cumulative impacts and considerations be taken into account so the project is not considered just another stand-alone project as is most often done in our traditional environmental-social impact reviews. This will require greatly improved multi-level government cooperation so as local zoning and development does not occur in relative isolation of cooperative long term regional community planning affecting the water, habitats and farmlands of the Fraser Estuary. This of course has to include developments such as at the Roberts Bank Terminal 2 as proposed by the Vancouver Fraser Port Authority.

We assume a final decision and project plan has to be decided upon and the various environmental reviews etc. can then take place including more effective public consultations than occurred prior to the bridge being approved by the previous government.

We feel that previous BC EAO directed studies on select similar projects in the Fraser Estuary (i.e. jet fuel shipping and terminal and Tilbury LNG facility) were inadequate and we therefore strongly urge a significant federal CEAA role in any environmental – social assessment relating to this new tunnel project. The past cooperation we have seen between CEAA and the BC EAO, including that at the recent RBT2 hearings, has been totally inadequate and will not serve the public interest.

We hope our attached report can assist in your deliberations and look forward to any updates you can provide us on moving this project forward.

Sincerely yours,

Otto E. Langer MSc Fraser Voices Chair <ottolanger@telus.net>

One attachment.

Copies to:

- Premier John Horgan and Environment Minister Heyman,
- Metro Vancouver Mayors
- Prime Minister Trudeau, Fisheries Minister Jordan, Environment and Climate Change Minister Wilkinson, Employment, Workforce and Disabilities Minister Qualtrough.
- Metro Vancouver area MPs and MLAs.

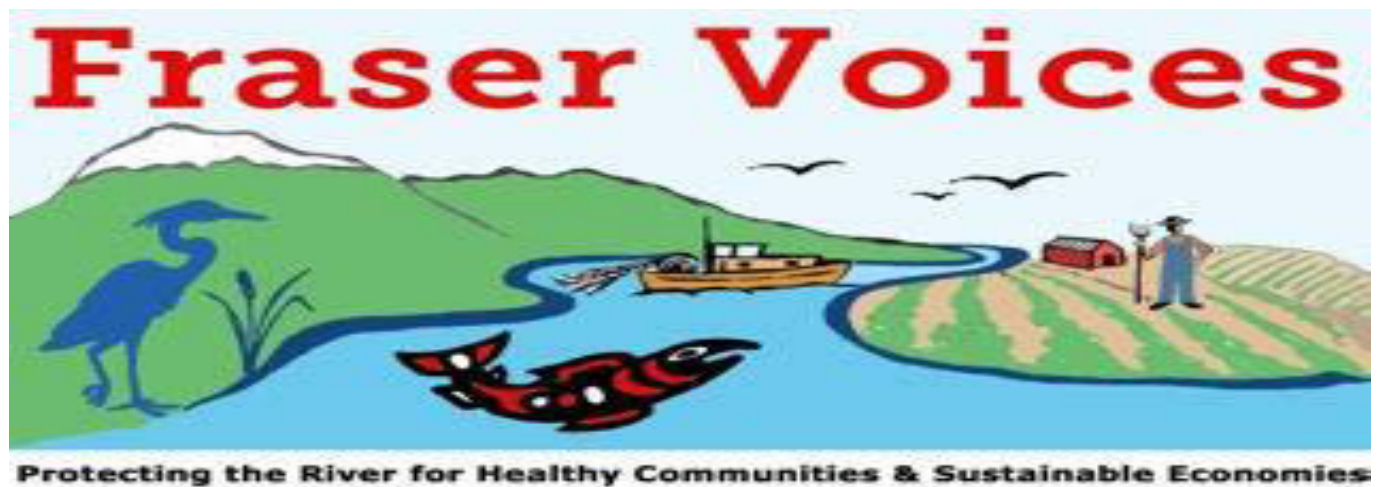
December 17, 2019



The Proposed Fraser River Richmond to Delta Crossing – A Bridge or a Tunnel?

--Environmental and Social Impacts and Sustainability Considerations.

It is strongly recommended that that a smaller and less obtrusive Fraser River tunnel crossing be considered at this time. This will allow and require better long range planning to address sustainable quality of life needs for our environment and our children' futures. Although this may be seen as counter- productive to many economic proponents and those caught up in gridlock it is in the best interests of longer term sustainability and an economy that can better live in concert with nature and the Fraser River estuary. An eight lane tunnel with an emphasis on two lanes for mass/ rapid transit is the best decision to now pursue.



The Proposed Fraser River Richmond to Delta Crossing – A Bridge or a Tunnel? --Environmental and Social Impacts and Sustainability Considerations.

A *Fraser Voices** Report

December 17, 2019.

I. INTRODUCTION:

In 1957 to 1959 time period the BC government built the George Massey Tunnel (also called the Massey Tunnel or The Deas Island Tunnel) across the Fraser River from Richmond to Delta just upstream of the village of Ladner and adjacent to the Ironwood area in Richmond. The tunnel was originally designed as a toll crossing but tolls were discontinued in 1964. The tunnel was not designed for pedestrian or bicycle lanes and did not meet later seismic standards. The tunnel now has shake detectors to assist in shutting down the tunnel to traffic during an earthquake event.

The original construction consisted of the placement of prefabricated sections of the tunnel into a large trench dredged into the bottom sands of the river. The trench was extended as

**Fraser Voices is a non-profit citizen's society organized to examine a Fraser River crossing in the Richmond-Delta area and promote the associated livability and environmental sustainability of Fraser River delta and estuarine area and its life.*

each section of the tunnel was put into place. The river bottom to bedrock at this point is about 600m and the draft clearance over the tunnel for river flows and shipping is a maximum of approximately 22m. This area of Richmond does have soil stability concerns for any significant earthquake event.



Douglas Massey has summarized a chronology of the history of Fraser River crossings from pioneer times to the present date. See Appendix III.

The tunnel was the first immersed tunnel of this type built in Canada and installed below sea level. The 4 lanes of traffic were placed in a single tube with a concrete divider between the two lanes of traffic going north and south respectively. The project was considered a success but due to ever increasing economic and population growth the four lane tunnel reached a point of congestion in the 1970s. In 1981 a counter flow system (as first used on the Lions Gate Bridge) was installed to give the prevailing rush hour traffic another lane to relieve traffic congestion.

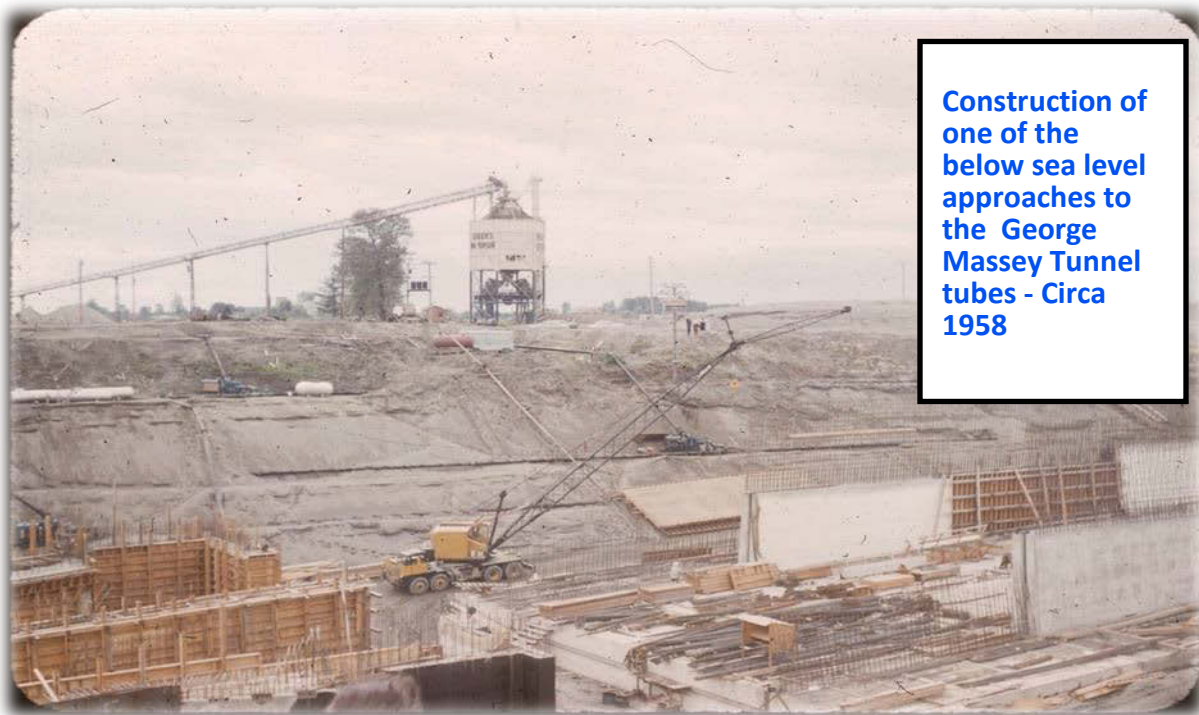
As Delta and South Surrey and transportation to the Roberts Bank Port, ferry terminal and the US Border continued to grow rapidly in the 1980s to the present time, commuters and the transport industry has constantly complained about this daily traffic congestion problem.

No concerted effort was made to select an option to address this traffic issue until about 2006 when the previous provincial government announced plans to twin the tunnel. Then, in 2012, BC government looked at options to address the problem and in 2013 concluded that a new 10 lane bridge was to be built at a cost of about \$3.5B. The BC Environmental Assessment Office (BC EAO) completed its environmental assessment (EA) and issued an environmental certificate in 2017.

Despite federal government mandates in this part of the river for fish, wildlife, the port and navigation the federal Canadian Environmental Assessment Agency (CEAA) demonstrated no desire to take the lead in this environmental assessment. In 2012 the federal Harper government had neutered environmental assessment and protection legislation in Canada and it was only expected that they would sit on the sidelines as large impact type projects in the Fraser Estuary such as a jet fuel import and LNG export terminals were approved by junior authorities.

The BC EAO directed EA studies and associated public consultations were constantly criticized by many citizens and most local governments. Delta was the only local government that favored this new bridge option. Despite the opposition to a large bridge the then BC Liberal Clark Government rushed to initiate construction and ground breaking took place in 2017 just before the spring provincial election. Despite that, the May 2017 election gave rise to a new government that was under great pressure to have a new look at this project.

The new NDP Horgan Government put a halt to its construction (ground preparations) and began new studies to put the various options (bridge, immersed tunnel, deep bore tunnel, 6, 8 or 10 lanes, etc.) under additional review. Some that wanted a new large crossing as soon as possible felt this was a stall tactic and the real need for traffic relief was being ignored.



The new BC Minister Transport and Infrastructure (Claire Trevena) contracted an expert team to re-examine the issue and a report was forwarded to the minister in 2018. This was referred to the Metro Vancouver Regional Board for review. The Board set up a Task Group to look at the study and on October 2, 2019 the task group recommended that an eight lane immersed tunnel be built and the existing Massey Tunnel be retained for service operations. On November 1, 2019 this recommendation was then approved by the Metro Vancouver Regional Board. This approval has been forwarded to the BC Minister of Transportation for hopefully an early decision on the next steps to be taken by early 2020.

Some including those associated with the previous government and of course those tied up in the daily gridlock felt that the bridge had a head start and should not have been halted in favor of a smaller tunnel project which will again reach gridlock in the foreseeable future. This concern may be understandable but it has to be realized that in the past 30 years three very costly bridges have been built across the Fraser (Alex Fraser, Port Mann and Golden Ears) and that more highways and bridges always guarantee more traffic as the region is dedicated to continuous growth and an over reliance on personal transportation.

The billions of dollars spent on the new Port Mann Bridge and Highway 1 expansion has often given rise to larger traffic jams and minimal traffic movement efficiencies at peak times of the day. In addition to costly bridge infrastructures built in the recent past one must realize that a gridlock problem also exists on other crossings e.g. two North Shore and the Pattullo Bridge crossings.

Society can most often be in a quandary when economic and population growth and technology advances often outpaces ideas and needs that should be advanced by insightful long term planning based *on economic and social needs and environmental requirements*. Tax dollars are always in short supply and the public and businesses rarely advocate greater tax increases as governments often favor more tax cuts and more debt. The wishful flow of tax dollars also runs into gridlock problems. Considering the state of the local and global environment the sky cannot be the limit for continuous infrastructure building to promote ever more economic and population growth.

This is not a unique problem to this region in that it can be seen in most jurisdictions. Recent surveys have noted that over half of US bridges have outlived their useful safe life expectancies and many are unsafe. Most of these structures were built during the post-World War II boom of the 1950s and the 1960s i.e. the same time the Massey Tunnel was also built. It's easier to find the monies and political will to build what some would see as new monuments to the car rather than find the resources to fully maintain them and build better public transport to sustain our communities over the next many decades.

What many do not acknowledge and what the environmental assessment studies ignore is the overall cumulative impacts of such large traffic infrastructure projects on the overall long-term wellbeing of the community. *The impact of such large projects on community growth, land use, nature, livability, energy use reduction will be a much greater than any impacts often associated with the building and maintenance of any such bridge or tunnel.*

The bigger the bridge or tunnel, the greater will be the impact on land use, water, livability and quality of life. Here one must not in 2019 consider the ability of a single passenger car getting from South Surrey to Vancouver in under an 45 minutes as being one of the most important aspects in one's quality of life. The public must realize that In just a decade (i.e. 2030) we are to have achieved drastic reductions in our greenhouse gas (GH) emissions. The 2018 IPCC media report ¹ on climate change in part stated:

“We have just 12 years to make massive and unprecedented changes to global energy infrastructure to limit global warming to moderate levels, the United Nation’s climate science body said in a monumental new report released Sunday.

“There is no documented historic precedent” for the action needed at this moment, the Intergovernmental Panel on Climate Change (IPCC) wrote in its 700-page report on the impacts of global warming of 2.7 degrees Fahrenheit, or 1.5 degrees Celsius. From rising sea levels to more devastating droughts to more damaging storms, the report makes brutally clear that warming will make the world worse for us in the forms of famine, disease, economic tolls, and refugee crises. And there is a vast gulf between

¹. *Valérie Masson-Delmotte, co-chair of IPCC Working Group - United Nations Intergovernmental Panel on Climate Change. Oct 2018. Incheon, South Korea 700pp.* (beginning in 2012 the IPCC has issued a series of major reports on the climate change issue and the impacts this will have on our planet and life on this planet).

the devastation from 1.5°C, what's considered the moderate level of average warming, and 2°C. “

Staying at or below 1.5°C requires slashing global greenhouse gas emissions 45 percent below 2010 levels by 2030 and reaching net zero by 2050.”

Do we plan future transportation around last or next year's technologies as many of our society live in denial of what our transportation and communities should look like in 2040? Even if we all traded in our internal combustion cars for electric cars what will that do to resolve the congestion problem?

It is now a totally outdated notion that we can all keep growing across our limited land base and move around in our own private automobiles. Planning for 10 lanes of traffic will simply ensure that we have 10 lane gridlock at some time in the foreseeable future e.g. 2040.

If we set 8 lanes as the limit and finally plan strategically around that transportation limitation, we will be far better off in terms of transportation and in addressing global and local environmental and social costs. Simply accommodating more cars and truck traffic is not a solution except in terms of immediate convenience. The long term implications and options that we must pursue at this time are extremely critical if we are to address solutions needed to address planet survival issues as issued in warnings by many experts, informed citizens, international governmental agencies such as the United Nations² and our children.

II. SUMMARY OF BRIDGE VS. TUNNEL CONSTRUCTION AND OPERATIONAL IMPACTS AND LONG TERM CONCERNS:

For assessment purposes the Metro Board's October 2019 Task Force recommendation as approved by the Metro Regional Board in November, 2019 for an 8 lane tunnel is compared to the past BC Liberal government approved 10 lane bridge. This section is a summary of the issues that should be explored when examining the present controversy whether we need a ten lane bridge or an eight lane tunnel across the river to replace the present George Massey Tunnel. The list is not meant to be comprehensive and it must be realized that some of the

²-S. Diaz and R. Watson report on global biodiversity loss (Global Assessment Report Produced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). May 2019. Bonn, Germany

Assessment is subjective in that it involves values and not only objective scientific criteria and economic considerations

- 1. In river construction impacts.** Work in the river for an immersed tunnel (trench and fill) will have a significant temporary impact on the river hydraulics, fish, the fishery and navigation. Of special concern is the impact is to the fishery (seasonal timing) and upstream migrating salmon – adults from February to Dec and downstream juveniles from April to July. Over 50 species of fish can be disrupted or harmed by the local dredging, tunnel immersion and back filling of the trench. It is assumed that trenching and tube immersion and back filling would be by sequential sections. That will mitigate impacts and once that is complete rehabilitation of the river bottom will be relatively rapid. An out of the river footing for a bridge would have less impact although it has to be noted that the footings of the Alex Fraser Bridge had to be placed in the river and then protected from shipping accidents by protective rock islands.
- 2. Localized construction impacts.** As in item 1 the tunnel will have a greater construction impact due to trenching and filling and this will cause adjacent river scour and at times heavy local suspended sediment issues which can harm fish and bottom river life which serves as fish food. Mitigation can include limiting the dredging for each immersed section of the tube as was done in the 1950s.
- 3. Local impacts on habitat.** As in 1 and 2 the actual construction will have a significant impact on local habitat especially on the river bottom, water column and in the riparian areas. If the bridge was built on land that would greatly reduce those impacts. Longer term impacts from each option would not be significant although a bridge will cast a shadow over marshes and reduce their growth in perpetuity. Any future bridge over Deas Slough would have such a shadow impact as it now does for the Massey Tunnel.
- 4. Impacts of construction on the fishery (recreational, commercial and aboriginal) and salmon migration.** Further to item 1 above, tunnel trenching, tunnel section laying and refilling will of course interfere to some with the fishery and fish migration. This is common during the many annual dredging programs that take place in this region of the river. The usual ways of mitigating the impacts are by minimizing dredge side casting, sediment curtains (largely ineffective in river currents) and most importantly by timing so as to avoid biologically active times of the year.

Fish can be abundant in the river from March to December of each year. This biologically active time period includes early salmon upstream migrations (e.g. Chinook), spring and summer downstream migrants (up to a billion juvenile salmon) and later upstream adult migrants to the spawning grounds e.g. chum salmon. This does not leave a large construction window for such a large project. The time period could be expanded with close monitoring by expanding the closed window in November and December. A bridge would also interfere with the fishery (construction barges etc.).

- 5. Maintenance issues.** Tunnel vs bridge maintenance impacts can be mitigated but the maintenance such as sanding blasting, repainting, etc. of a bridge decking above water caused impacts to pink salmon fry at the Pattullo Bridge in the 1980s. Special

tarping etc. is required to keep such pollutants out of the river. Tunnel maintenance should avoid all such impacts.

- 6. Bird flight impacts.** The bridge would of course be a major intrusion into the local flight ways of major bird populations. These bird populations make the Fraser Estuary the largest overwintering habitat in Canada and are of global significance to migratory bird life. Cables have been repeatedly shown to cause bird mortality including that from power cables at Roberts Bank and the Alaksan Wildlife Refuge and at tower supporting cables on Sturgeon's Bank.
- 7. River navigation during construction.** There will of course be some cautions required for navigation around construction activities/works. It is felt the tunnel complications to navigation would be greater than that from bridge construction.
- 8. Upstream port expansion.** This is hard to score in that it depends upon the draft over any new tunnel and whether or not the existing tunnel will be removed. Also the height of any bridge clearance is a key consideration for shipping beneath it. Over all, if the old tunnel is retained, it would have the greater restraint on deep sea port development upstream of the existing tunnel. This is a fortunate situation for river and habitat conservation but does limit deep port expansion in the river.
- 9. Impact on mass transit opportunities.** Both options have allowed for two lanes of mass transit. Ice and snow on electrical cables and tracks has been shown to be a problem for existing Metro Vancouver rapid transit lines. This would be a problem on a bridge but not in a tunnel. The retention of the Massey Tunnel could be an additional option for mass and or rapid transit.
- 10. Aesthetic impact.** This is difficult to score in that some feel a giant bridge is a sight to behold and it is exhilarating to drive over such a structure. However, others would see it as a blight on a flat agricultural and residential landscape and on the nature seen on and along the river. Driving through a tunnel would probably be less of a sight-seeing experience than from the height of a bridge.
- 11. Noise impacts.** A bridge is well known for the noise it creates and this will be manifested in terms of the car and heavy truck traffic especially from the Robert's Bank port. Mass transit can also be noisy on a bridge but that is dependent on the technology used. Less than visionary land use planning (especially by Delta) has allowed medium density housing directly adjacent to what would be the alignment of a bridge and possibly a new tunnel. The noise of a bridge almost obliquely above housing could be near unbearable especially if one bought a home in what was to be a quiet environment save the noise from the existing Highway 99. A tunnel would greatly baffle any sound from the crossing area.
- 12. Impacts from facility lighting.** The issues of noise (see above) from the bridge will be similar for light interference for local residential areas. In addition the greater lighting impacts from a bridge will have a greater impact on the fishery and wildlife. Fish and wildlife have evolved to a diurnal cycle of light and darkness and each time darkness is taken away some impact is bound to occur.
- 13. Ice and de-icing issues.** There are two consideration in this category of concerns i.e. ice on the roadway and ice on bridge cables. The roadway ice issue will be much more of a concern on an open bridge deck and has been shown in upstream Fraser

River cable stayed bridges. Icing of the cables resulting in 'ice bomb' development has been an issue causing vehicle damage in cold winter storms. This will not be an issue in a tunnel.

- 14. Wind and fog issues.** Simply put – fog and wind are issues on a bridge but not in a tunnel.
- 15. Suicide jumpers.** Major bridges of high elevation attract jumpers (suicide victims). Significant expense must go into bridge barriers to prevent jumpers from using that death draw. When such an event does take place, usually the bridge is shut down e.g. as has often occurred at the Lions Gate and countless other Canadian and international bridges. No evidence exists of anyone killing themselves by jumping off a tunnel.
- 16. Impacts of utility services.** The cost and impact of new utility lines across the Fraser to replace any in the George Massey Tunnel will be costly and have a significant environmental impact. It is of course noted that BC Hydro began the construction of a new \$100M dollar electrical line across the river as part of the previously planned bridge but it was put on hold. The existing line now crosses the river in the existing tunnel. Any facilities such as the BC Hydro line could remain in the existing tunnel if it is to be retained as a services tunnel or put in any new tunnel or on a bridge. This would be a good decision from an environmental and aesthetic point of view. Large hydro lines across the river are unsightly and offer a significant hazard to birdlife.
- 17. Air safety issues.** A bridge and planned high elevation hydro line would be a hazard to aircraft using that air space.
- 18. Ventilation.** Unlike a bridge, tunnels do need ventilation and this can add to background noise coming from such a facility. However, it should be minor in comparison to the noise generated by the traffic on a bridge.
- 19. Sea level rise.** Climate change (global warming) will continue to cause the sea levels to rise in the Fraser River estuary. This will be a major issue in the decades to come. Special construction (elevation considerations) will have to be made to flood proof approaches to the tunnel or bridge. A bridge itself will be above flood concerns whereas the tunnel could be subject to a greater flood risk.
- 20. Catastrophic failure.** Despite some of the best engineering some risk of structural failure can exist with any human built structure. Although the engineering of several decades ago has to be taken into account, many bridges across the world have collapsed. There is little data on the catastrophic failure of significant highway tunnels even though many are built in unstable geologic settings e.g. unstable soils and in earthquake regions of the world.
- 21. Hazardous Cargo risks.** One of the documented hazards of tunnel use is the transport of hazardous cargoes through tunnel. That very problem has been eliminated in the Massey Tunnel by the prohibition of such transport through that crossing. That prohibition would be expected to apply to any new tunnel. Such cargo transport on a bridge is also a hazard but of reduced danger due to the open environment on the deck. However, the transport of hazardous cargoes on the river below a bridge is a real concern and in Boston, U.S.A., a major bridge is shut down each time an LNG tanker moves under the bridge. This is a much greater concern

now that the BC government has allowed jet fuel and is promoting LNG tankers to move under any new bridge or over the recommended tunnel.

- 22. Unlimited traffic growth.** Trying to meet unlimited development and traffic growth in our region by building ever more highways and bridges is not an intelligent option – it never ends! The bigger the highway, tunnel or bridge the greater will we put off or ignore the thinking and meaningful planning that must now take place so as to solve the problem and not keep treating the symptom. See 23 below.
- 23. The secondary impacts** of building any major bridge or tunnel across the Fraser for the Highway 99 corridor is of a much longer term and greater impact than any associated with the building and maintenance of associated bridge or tunnel. The bigger the bridge or tunnel is, the greater will be the impact on land use, livability, nature and our quality of life.
- 24. Localized farm/parkland impact from construction.** Until detailed plans are agreed upon its difficult to score the impacts on local land use. However, a high bridge (as was planned) does have a greater lead up to the decking and will require more land and the many road access points will be in valuable and continually disappearing farm land and green space. The artist drawing of the proposed Steveston Highway change for the bridge is simply a monster exchange transplanted off of a Los Angeles freeway. The South Perimeter Highway is a great example of the continued permanent loss of ALR land. Land required for marshalling yards for construction of a bridge or tunnel will be large. With significant effort such lands can be rehabilitated back to their farm or other status.
- 25. Overall long term impact on ALR.** The bigger the tunnel or bridge, the greater will be the impact on farmland and green space due to traffic pressures on local roads and of greatest concern will be the continuous pressure to develop more lands for residential and commercial/ industrial purposes. The previously proposed bridge option would have the greatest impact on farmland and green spaces. Note item 23 above.
- 26. Any limits to growth in Surrey and Delta?** See comments in 23, 24 & 25.
- 27. Project completion date.** A number of complaints constantly note that if the government did not halt the building of the bridge, it would be ready by 2024. Any additional assessment and any new structure design such as a tunnel will take much longer. Many of these complaints come from those tied up in tunnel traffic and by those that feel the tunnel has slowed down real estate development and business in this region. London Drugs in Richmond has even threatened to move their headquarters to Calgary because of the tunnel traffic inconveniences their employee's travel and movement of goods. Despite these complaints in 2019, a new crossing will take many more years to be in place.
- 28. Overall sustainability of the region by 2050.** The above sections should provide the answer to this question. If they do not provoke some deeper thought, maybe we should build a 12 lane bridge and pretend it will forever serve all future traffic needs regardless of any other considerations. Unfortunately it is this type of thinking that we have to deal with.

29. Environmental assessment and public consultation opportunities. The 2017 EA as directed by the BC Environmental Assessment Office (EAO) was less than thorough and again ignored public views and values. In the past the EAO has stated that their assessments are only based on science and not address public wishes i.e. it is not a voting issue⁴. Although the issues greatly impact federal responsibilities i.e., air and river navigation, migratory birds, fish habitat, fish protection, the fishery, aboriginal concerns, and harbour ownership the federal government ignored their EA responsibilities and coasted along with a lower bar BC EAO assessment which did not address many public concerns. It is assumed that any assessment related to a new tunnel could be done much more thoroughly and with better local and federal government and public input.

30. Pedestrian – bicycle use. For these travellers a bridge can give one great views but be uncomfortable during many weather events. Foot or pedal traffic in a small side lane in a tunnel could be claustrophobic and have greater personal safety concerns.

⁴ [BC EAO March 7, 2011 at Vancouver Airport Jet Fuel Project – public meeting. Richmond, BC.](#)



Artist drawing of the proposed eight lane immersed tunnel crossing. View from above highway 99 in south Richmond towards Delta. Fraser River flows from left to right



Delta exit and entrance to the above proposed tunnel.



Artist rendering of the proposed 10 lane bridge crossing from Richmond (left of photo) to Deas Island and into Delta on the right. River flow is from the left to the right. Forested island in the upper right is Deas Island Regional Park.



Looking north from the deck of the proposed 10 lane cable stayed bridge.

III. IMPACT SUMMARY TABLE OF BRIDGE VS. TUNNEL CONSTRUCTION AND OPERATIONS:

Each impact is scored as a negative impact or that contributing to a lack of long term environmental and social sustainability.

IMPACTS (minor* to significant***) ^{5.}	TUNNEL	BRIDGE
1. Work in river.	***	*
2. Construction Water Quality	***	*
3. Construction in river habitat	***	*
4. Maintenance on fish/birds	*	**
5. Aerial habitat impact (birds)		***
6. Construction fishery and passage	***	*
7. Construction navigation	***	*
8. Upstream port development	**	*
9. Impact on mass transit opportunities		
10. Aesthetic impact	*	***
11. Noise	*	***
12. Lighting	*	***
13. Ice and salt issues	*	***
14. Wind/fog -weather issues	*	**
15. Jumper risk		***
16. Utilities transmission		***
17. Aircraft issues		***
18. Ventilation issues	***	*
19. Sea level rise concern	**	*
20. Catastrophic failure	*	**
21. Hazardous cargo risks	*	**
22. Unlimited traffic growth	*	***
23. 2035 Gridlock-based on 2019 car use	**	*
24. Construction farm/parkland footprint	*	***
25. Overall impact on farmland protection	**	***
26. Max. population growth Surrey-Delta	*	***
27. Facility completion		
28. Overall sustainability future by 2050	*	***
29. Environmental assessments		
30. Pedestrian / cycling	**	*

^{5.} Any removal of the existing George Massey Tunnel has not been addressed in this summary presentation. The Mayor's Task Group indicates it should be retained for services. This would of course cause the least impact and would be highly recommended from a biological point of view. If removal was to take place it could be partial or complete removal.

IV. DISCUSSION.

The present greatest controversy on this project at this time appears to relate to the fact that a crossing will not be in place in the next few years due to the suspension of the bridge construction by the present BC government and whether eight lanes of traffic is adequate or should it be 10 lanes to accommodate more traffic and growth south of the Fraser River.

Neither a bridge nor a tunnel will jointly address these two controversies at this time. Neither a bridge nor tunnel will give rise to any traffic congestion relief for a number of years. The capacity of a bridge over that of a tunnel is irrelevant in that either can be 8 or 10 lanes. It just so happens that a 10 lane bridge did get the original nod but that decision was a controversial issue itself and did not get wide public or local government support.

The real issue here is not how big should a bridge or tunnel be to resolve present gridlock and ever increasing traffic needs. Congestion does indeed cause inconvenience, time loss and financial setbacks. However, this alone should not force our decision makers into a less than properly thought out long term responsible solutions relating to the social and ecological sustainability of the entire region.

The halt in the bridge construction must allow some more advanced thinking, consultation and sustainability planning to take place. New thinking especially as related to environmental, social and economic assessments is urgently required. The crossing decision must relate to the communities we want and not just address the transportation needs to ever growing communities. We cannot use the traffic and transportation options of the past or even the present time to plan how we will move around in 12 or 40 years from now. How will our lack of reliance on fossil fuels affect our methods of transport and the outdated notion that we can all keep growing across our limited land base and do so in our own private automobiles – even if they are electric.

Planning for 10 lanes of traffic on a bridge versus 8 lanes in a tunnel will not do much to avoid gridlock at some time in the foreseeable future e.g. 2040. Is it a good investment in our community to spend \$3.5B billion dollars (plus interest, maintenance, etc.) for 20 years of traffic relief? The present population of the metro region is 2.55M people. By 2041 it is predicted to increase by over 1.1M more people⁶ – a 44% increase with most growth in the Surrey area. Do we look to shorter term ‘solutions’ for traffic congestion or plan long term solutions to address population sprawl, continuous and growth south of the Fraser River

If we set 8 lanes as the limit and plan strategically around that traffic limitation with mass transit we will be far better off in terms of transportation, local and global environmental and social costs. To achieve this, local, provincial and federal governments must be part of a

⁶ Vancouver population 2019. In <worldpopulationreview.com>

new and environmentally sustainable planning exercise. That includes everything from community size, to type of transportation needed and even include major future developments such as Roberts Bank port development which now seems to do its own thing independent of community needs and livability.

Do we keep on building highways and bridges or tunnels to address endless economic and population growth that will result in just bigger future gridlock issues. Even an 8 lane tunnel alone will create greater gridlock issues elsewhere in existing transportation corridors such as the Oak Street Bridge. Do we then build a new bridge at that site? We are at a point in time of our human development on this planet where great personal sacrifices have to be made in that we cannot just continue to coast on what is most profitable and convenient to some of us.

Many including local governments were opposed to a 10 lane bridge as approved by the previous government under less than ideal public consultations. Some still feel we should have just built the bridge and we could get to work faster with less traffic congestion. If the previous BC government had directed proper environmental- social – economic assessments we maybe would not have worked ourselves into a deeper non-sustainability hole.

The conflicting issues related to such growth related infrastructure projects are complex and society will never get all on side at this time in our history. The issues can be confusing to the less than informed especially when the politicians and ex-politicians present often less than factual evidence to the public. A review of a few arguments against the Metro Vancouver’s recommendation that we should now build an eight lane tunnel is worth reviewing.

The Richmond Chamber of Commerce (RCofC) and BC Liberal Leader Wilkinson and Richmond MLA Johal (2019 CBC), ex Richmond mayor Halsey-Brandt and ex councillor Mawby and Liberal MLA Paton of Delta and others with little understanding of river and fish protection now appear to be self-appointed protectors of Fraser River salmon. They noted that a bridge is better for salmon than a tunnel. In fact many of them seem to indicate that a tunnel will devastate salmon runs.

In relation to a tunnel, MLA Paton has [stated](#); *“Can you imagine the environmental damage to sturgeon and salmon spawning grounds?”* Mr. Paton seems to not know that salmon do not spawn anywhere in the fine sediment and sand reaches of the Fraser Estuary.

Mawby’s letter to the media (Richmond News Nov 7, 2019). is indeed so misleading so as to be near entertaining. He notes in part:

“There will be much less environmental devastation with the bridge than the extra tunnel. The biggest problem way beyond the relatively small loss of farmland will result in the worst attack on Fraser River salmon. The interruption of the full flow of the river could see 10 years of salmon return damage. Mitigation will be extremely expensive take years to redeem.”

Such opinions are misinformed and have no scientific logic to support them. It is unethical to pretend that the salmon will be devastated if certain spokespersons do not get their 10 lane bridge. It should be noted that it is some of these very same individuals (i.e. RCofC) have promoted massive dredging of the river for flood control⁷, sand fill, development and navigation. Such ongoing dredging has had a significant impact on salmon, sturgeon and eulachons fish populations.

Even the Vancouver Fraser Port Authority has led some of the political arguments for various aspects of a bridge and Massey Tunnel removal. They have favored removal of the Massey Tunnel and have noted the need for dredging for a deeper river channel for navigation. They then have insisted on a more expensive bridge to provide height clearance for large ships to pass beneath it. They then deny that they have taken such positions. Also they have argued that the large amount of truck traffic in the tunnel from their port is insignificant and they do not anticipate them creating greater traffic congestion by greatly increasing the size of their container port (RBT2 CEAA Hearings May 2019).

Such transportation infrastructure projects can be indeed be more about politics than financial considerations, river hydraulics, biology and engineering. It is for that reason that in this paper political affiliations are given for positions taken on this river crossing. Accountability is important.

We will have to expect citizens to make personal sacrifices so as to reverse many of the non-sustainable practices that are now taking place on this planet. This crossing must not be exempt from such considerations. In fact our lifestyle is known to cause a greater per capita impact on this planet than most other citizens of other countries. Many recent studies show that Canada is already a laggard in addressing climate change (i.e. reduction in the emission of greenhouse gasses)⁸. Simply exploiting more fossil fuel resources and accommodating more cars and truck traffic is not a solution except in terms of immediate convenience and a short sighted and constant need to grow the economy at almost any cost.

The long term implications and options that we must pursue at this time are extremely critical if we are to address solutions needed to address planet survival issues as issued in warning by many including the United Nations. Why not start now – with this river crossing?

⁷ *Richmond Chamber of Commerce et al. July 2014 The Economic Importance of the Lower Fraser River. From Summary* - "THREATS TO FUTURE SUSTAINABILITY - Each year during the spring freshet, approximately 32 million m³ of sediment is transported by the Fraser River, with roughly 10% of this material settling in the lower reaches of the river. There is a strong need for increased dredging of these parts of the river."

⁸ *G20 Brown to Green Report 2019* <www.climate-transparency.org>

Unfortunately the average citizen has limited power to change things and will go along with what is mapped out providing it is most convenient, adds happiness to our lives and or generates more profit. Here the large corporations and government have to play a much more responsible and a much greater leadership role if we are to have a sustainable future.

V. CONCLUSIONS.

There are two major overarching theme issues here:

- 1) What is the type and size of a bridge or tunnel necessary to address anticipated traffic levels over the next two generations? This time period is selected in that most works built in the past seem to have such a life expectancy and if growth is not control managed and existing transport technology continues to exist (i.e. emphasis on individual commuter transport), other expansion options will probably be examined within a couple of decades from the present date. This continual upgrading of such works is time consuming, costly, inconvenient, divisive and non-sustainable.
- 2) 2). If we maintain a fossil fuelled society and promote continuous growth, there are no real long term solutions to the human and cargo transport challenge. The conversion to electric cars can be part of the climate change challenge but will do little to solve the congestion issue. Instead society and our political leaders and lobby powers will move from one short term solution to another as each option slips into the recent past and is overwhelmed by continuous growth. A new bridge or tunnel is again society treating the symptom and will not address real solutions to solve the problem of growth and sustainability. This is an opportunity to look into the future with solutions to human created growth problems and not just treat the symptoms of continuous growth.

It is obvious that many just want a maximum transportation corridor to move as much conventional traffic as can be contemplated in their immediate future and not worry about what will be or should be here in 2040 while ignoring all the global environmental warning signs and reports now available for all to see.

The previous Chapter III table does show a strong indication that if overall temporal and special impacts are considered as related to nature and a highly liveable community, a 10 lane bridge would have greater long term negative impacts on our community, farm lands, natural environment and quality of life. This summary indicates how a more holistic cumulative impact assessment must better scope out all related impacts related to that development in that ecosystem area. Most traditional environmental assessments fail to do this e.g. the BC EAO EA on the VAFFC jet fuel terminal – tanker project on the Fraser River

Here many traditional environmental – social assessment or impact reviews (EAs or EIAs) treat most environments as equal and the project type drives the EA – ***not the sensitivity and value of the natural world.*** *It must not be forgotten that this bridge or tunnel project is in the middle of an estuary of global significance (see Appendix I) and is under tremendous development pressures and has withstood massive losses over the past 150 years. A very significant part of this global significance is its wealth in salmon and other fish and its wildlife populations. This natural wealth is now decreasing at an alarming rate due to human activities.*

Fraser Voices concludes that it is best that a less obtrusive tunnel be considered as a Richmond to Delta Fraser River crossing at this time. An eight lane immersed tunnel would have less overall impact and would require and promote better long range planning and livability needs for our next two generations and our environment.

Although this may be seen as counter-productive to many economic proponents and those seeking immediate traffic congestion relief, we are at a time in human history globally and in the Fraser Estuary where a sustainable environment must take precedence over the present unbalanced emphasis on the 'grow the economy' approach.

A sustainable economy can only survive when it can live in concert with a healthy natural world and intact ALR lands in the Fraser delta and estuary region. Accordingly the eight lane tunnel with an emphasis on two lanes for mass and/or rapid transit must be seen the best decision to now pursue.

This recommendation will not allay the fears of those that predict single car tie ups in a 2030 tunnel but we are at a decision point that must force us into considering other more environmentally and socially friendly options of overall development in the delta-estuary and Highway 99 regional area and indeed in the this overall region as part of the larger Canada landscape.

This tunnel option may have a greater construction impact on the local environment (dredging and filling) than an 'out of the river' bridge but it will rapidly heal and not have as great an impact on the river than the annual dredging programs designed maintain the Fraser River as a deep sea port and remove sand from the river to flood proof ever more developments lands along the river.

The 8 lane tunnel option must stress rapid transit to Delta and South Surrey, rapid train service to the Cascadia international region and promote a form of mass transit to and from the ferries serving Vancouver Island. The time to start this longer term and better option is now – not a decade or two from now when a tunnel or bridge again becomes clogged up with traffic that will continue to sustain a non-sustainable lifestyle and industrial base.

It is further suggested that the existing tunnel be maintained and seismically upgraded to serve emergency traffic and service options (e.g. hydro line) and allow for an eventual transit route along Highway 99 from Vancouver to Portland that can bypass White Rock's water front.

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Publication by Fraser Voices, Richmond / Delta, BC, Canada. Contact [<ottolanger@telus.net>](mailto:ottolanger@telus.net)
[Paper prepared for BC Minister of Transportation, Minister of Environment, BC Premier, Metro Vancouver Mayors and Lower Fraser Valley MLAs and MPs.](#)
December 17, 2019, Richmond, B.C.

Qualifications of the author.

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In 1969 Otto Langer began work in DFO and Environment Canada in stream protection, contaminants control and enforcement. He has been an expert witness in over 100 habitat and pollution trials across Canada. He was a leader in the development of DFO's 'no net loss' of habitat principle and pioneered its use in the Fraser River Estuary. He was very involved in the working of FRES and FREMP and instrumental in the development of Canada's first harbour environmental management plans.

In the 1970s he was an originator of the B.C. Assoc. of Professional Biologists, served as their president and was awarded APB Meritorious Service Award. He also received the B.C. Silver Metal for assisting the Province in protecting urban streams in the Lower Fraser Valley.

In 2001 he moved to the David Suzuki Foundation and developed their Marine Directorate. There he was an advisor to the London U.K. based MSC. He has published numerous articles and co-authored *Stain Upon the Sea* which won a BC Book Prize. In 2009 and 2010 he was respectively awarded the BCWF and the Canadian Wildlife Federation's B.C. and Canadian Conservationist of the Year Awards. In 2016 he was awarded the Totem Flyfishers' Roderick Haig-Brown Conservation Award.

In 2012 Mr. Langer exposed the Harper government's plans to weaken environmental protection legislation in Canada. He retired in 2004 and lives in Richmond BC where he is active as a volunteer for several environmental groups.

Appendix I:

An overview of the environmental and social values found in the Fraser River and environs of the Richmond – Delta South Arm Reach of the Fraser River as Related to any New Tunnel or Bridger Crossing in that Area.

Adopted from **Social and Environmental Values in the Fraser River and Estuary in the Sandheads to Annacis Island Reach - In Relationship to the Risks Caused by the Approved VAFFC Proposal to Ship Jet Fuel into the Fraser River and Build an Off Loading Terminal and Tank Farm in Richmond Upstream of the Massey Tunnel.** Otto E. Langer - Fisheries Biologist and Aquatic Ecologist. November 15, 2014.

Social and Environmental Values in the Fraser River and Estuary in the Sandheads to Annacis Island Reach

- In Relationship to Environmental Risks and Impacts from any New Tunnel or Bridge Crossing to Replace the Massey Tunnel

Otto E. Langer - Fisheries Biologist and Aquatic Ecologist

November 15, 2019.

Since the beginning of significant European settlement of the British Columbia's southern coast and the Lower Fraser Valley The Fraser River estuary has been or will be subject to three industrial development periods that has and will greatly affect the nature of the river and its aquatic life. In each development period some significant attributes from our natural world was lost and we are now dealing with a remnant of what habitat and fish and wildlife populations we had in the 1860s.

1. **The 1st Industrial Era : 1860 to 1920 (land clearing, dyking, drainage of wetlands)
The first Interlude: 1920 to WW II (no protection laws but little development due to war, flu and depression))**
2. **The 2nd Industrial Era : 1950 to 1975(no protection laws and major industrial devilmnt such as Roberts Bank port)
2nd Interlude: 1975 – 2010– Age of Enlightenment (ongoing economic development but with many new environmental protection laws)**
3. **The 3^d Industrial Era: 2010+_(reduced environmental protection and major developments planned – RBT2, LNG, jet fuel terminal, etc.).**

Since about 2010 a great deal of industrial development pressure has been put on the Lower Fraser River and its estuary after a period of somewhat manageable and less

than significant harmful economic growth i.e. 1975 to 2010. This past decade of stressors on the life in the river and livability has included everything from USA coal export terminal to a marine jet fuel marine import and storage facility to a giant bridge to a large expansion of the Roberts Bank container terminal.

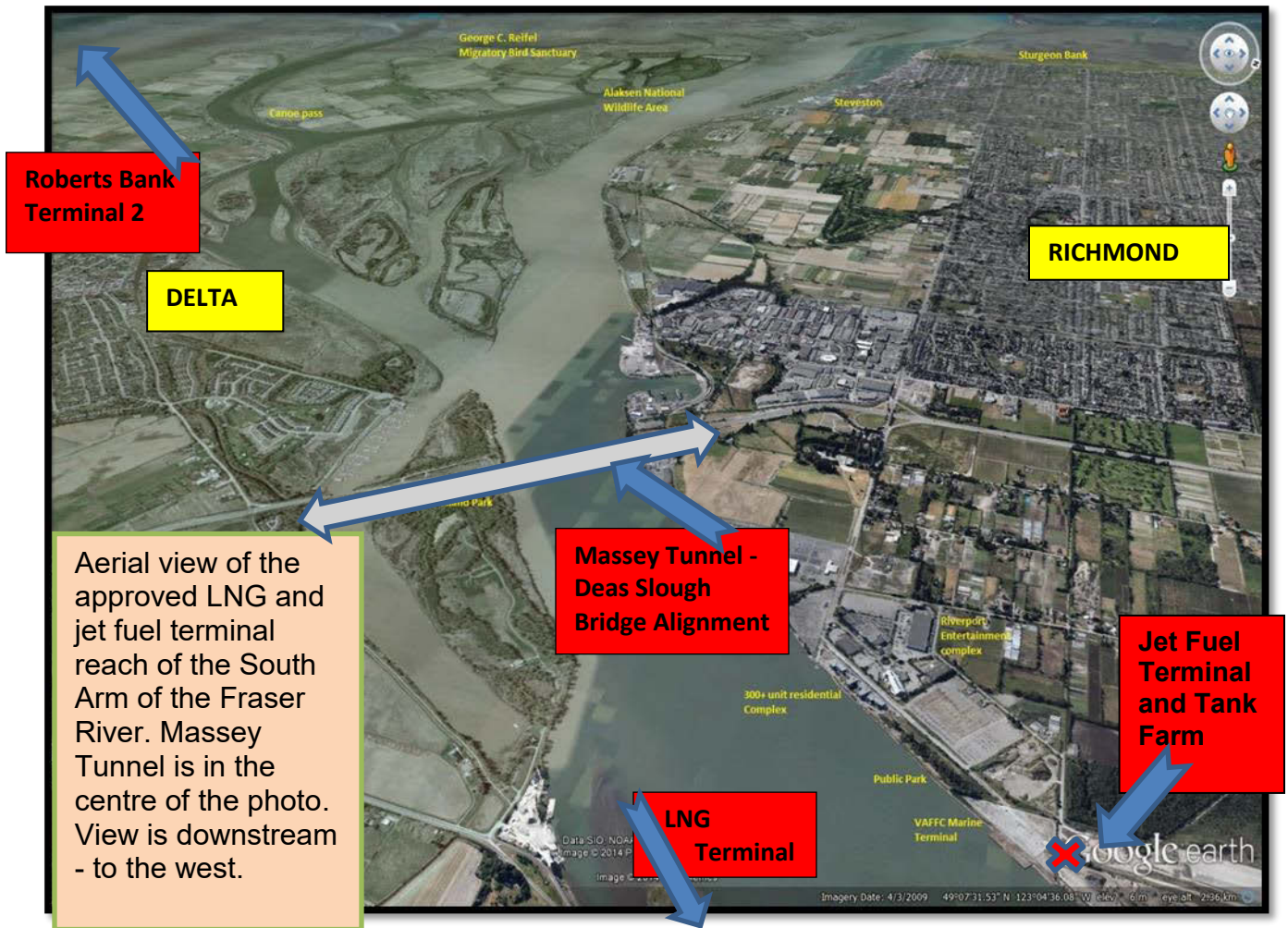
In the South Arm of the river in the vicinity of the present Massey tunnel between the cities of Delta and Richmond can be found three new developments have been proposed and or approved. This has included a precedent setting jet fuel shipping and storage terminal, an LNG processing and marine export terminal (both under construction) and a major 10 lane bridge was approved by the previous BC government in 2017.

Since the 1970s the Fraser River estuary has been subject to many industrial developments including constant flood proofing and dredging of the river for its sands. The public conscience, improved laws and environmental impact reviews and a slower industrial facility construction gave the estuary a bit of a reprieve but things began to change a decade ago as Vancouver Fraser Port Authority began to promote and build a greater industrial complex in the estuary and the BC and Federal governments of the day either lost their leadership to protect the environment or as was the case with the federal Harper government simply undermined science and neutered environmental and environmental assessment laws.

On December 13, 2013 the B.C. Government in cooperation with Port Metro Vancouver (PMV) issued approval (an Environmental Certificate) to the Vancouver Airport Fuel Facilities Corporation (VAFFC) to construct a marine jet fuel off loading dock and terminal and adjacent 60 million litre tank farm on the banks of the Fraser River at a point just upstream of the present George Massey Tunnel. This project will allow barges and Panamax tankers of highly toxic and flammable jet fuel to enter the Fraser River for the first time in history.

In addition Fortis is completing the building of an LNG marine export terminal just upstream of that facility on the Delta side of the river. This proposal was recently given a grant by the BC Government to study and encourage LNG bunkering in this region ([March 21, 2019, Bennett, N. Vancouver Business. Vancouver BC](#)).

Finally in this one reach of the river the previous BC Liberal government then approved a large 10 lane bridge just downstream of these facilities. These three issues are of great concern for the natural wellbeing of the river and its abundance of aquatic life in the reach shown in the below aerial view. This section of the river is of extreme biological importance and the advancements made to protect it in the 1970s and 1980s seem to have been largely lost by government's lack of will to truly offer the environment meaningful protection while emphasizing the promotion of economic growth.



Aerial view of the approved LNG and jet fuel terminal reach of the South Arm of the Fraser River. Massey Tunnel is in the centre of the photo. View is downstream - to the west.

Any approval of any new industrial project in the heart of the Fraser River Estuary such as those mentioned above reverses past conservation, planning and decisions on the river by regulatory agencies and the public and sets a terrible new precedent which will come back to haunt conservation in the river for future generations.

How has environmental protection gone downhill in the past 20 or more years. In 1986 the VAFFC proposed a relatively small barge jet fuel facility on the North Arm adjacent to the airport. This was to import cheaper USA jet fuel into Canada by mainly avoiding taxes. This project was rejected by the Federal Government due to the threat such a facility and toxic and flammable fuel would have on the estuary and its abundance of fish and wildlife resources.

This did not prevent the BC Government and VFPA to in 2013 approve a much larger facility on the South Arm of the river upstream of the Massey tunnel. The barges and tankers of VAFFC will enter into the Fraser River via the Sandheads entry into the

navigation channel and proceed about 8k m upstream to Garry Point at Steveston and then a short distance upstream of the Massey Tunnel or any new tunnel or bridge that



Large ocean freighters and tankers must pass over any tunnel or under any bridge to access upstream terminals for autos, jet fuel, LNG, etc. Hazardous materials do pose a risk to land transportation at such river crossings.

will replace that river crossing. Tankers full of jet fuel or LNG are considered a hazard to any bridge that they must pass beneath. In Boston USA the vehicle traffic on a large bridge has to be shut down each time an LNG tanker passes under the bridge.

In the lower river the river channels keep changing in that millions of tonnes of sediment are transported into this reach each year from upstream erosion. Extensive dredging is required to keep the channels navigable to larger ships. The George Massey Tunnel is seen by some to be an obstacle to deep sea shipping in that the tunnel is now the river's most shallow point and most large ships cannot pass over it except at high tide and at times with reduced cargo loads.

The South Arm of the river and the estuary is of extreme importance to the survival of the world's largest salmon runs in a river system. Almost all adult salmon returning from

the sea (over 20 million in some years) must pass the proposed jet fuel terminal and almost all juvenile salmon (up to 1 to 2 billion in a good year) must pass to the ocean in front of this dock and unloading terminal.

Many of these salmon such as the chum and Chinook salmon will reside in the waters around the proposed fuel terminal and tank farm area for up to two months each spring. They depend upon the food and rearing environment along the river shorelines and in the many sloughs in this reach of the river. Of course many habitats area have been lost due to filling and dykes during the past 140 years making what remains even more essential habitat. Over 80% of past critical marsh habitat has been lost. Despite this fact, many still feel there is room to compromise more of this last remnant habitat.

On the north bank of the South Arm downstream from Annacis Island, past the terminal site to Steveston the remaining habitats are truly remnant vestiges of what was once there. Here and there stands are the last remaining riparian forested areas and river side marshes. One such area can be found immediately downstream and adjacent to the proposed terminal. This site is classed as highly productive habitat. In the estuary plan such areas are color coded red. They are conservation areas of high productivity and often high sensitivity and industrial development is to avoid impacting them.

Further downstream on the north side of the river is the historic 'squatter ' community in the valuable Finn Slough habitat area. Downstream of that is the London and Steveston Island marshes. At Steveston, the Hole in the Wall allows water from the South Arm to spread across Sturgeons bank - one of the largest estuarine marshes in this region. The Steveston training wall directs the river in a north- west direction across the sand and mud flats and then abruptly turns south west. This area is called the Steveston Bend and it poses some risk to large ship navigation.

The south bank of the South Arm is more richly endowed with relatively undeveloped sections of highly productive marsh lands. Directly across the river from the terminal and on the south side of the South Arm is the Tilbury Slough complex, Deas Regional Park and Deas Slough. Just upstream of that is the now under construction Fortis LNG storage and shipping facility. Immediately downstream of that is the is one of the most complex and extensive estuarine marsh areas in BC as the river widens into the Ladner Marsh and Richmond Islands (Duck, Barber and Woodward Islands complex).

The Tilbury Slough to Richmond Island area is a maze of islands, marshes and excellent juvenile salmon rearing areas and is intensively used by over a hundred species of birds and other wildlife. It is one of the few areas were bird hunting is still allowed. Here the river then forms distributary Canoe Pass channel and it and the South



A critical surviving marsh - riparian area 1km upstream of the Massey Tunnel crossing. Such areas are essential for salmon and bird life.

Arm overflow water spreads across the mudflats and marshes of Westham Island and Roberts Bank. The above complex of quiet rearing waters, marshes and sand and mudflats makes this area one of the best fisheries rearing and wildlife areas in the Americas.

Unfortunately the Roberts Bank ecological and geo-hydrological integrity was severely compromised in the 1960s by the BC Ferries and the Roberts Bank Port causeways, car and shipping container parking lots, docks and coal port facilities. New proposals to greatly increase the size of the port by Port Metro Vancouver will have an immense additional impact on the habitat and natural life in this area. In that backup terrestrial green spaces and farmlands are an integral part of the estuarine ecosystem, the

present extensive development of the farmlands backing onto Roberts Bank will especially compound those impacts on wildlife.

The Western Hemisphere Shorebird Reserve Network rates this and the overall Roberts and Sturgeons Banks and Boundary Bay estuarine areas as a Hemisphere Site for shorebird abundance. Only eight of these sites exist in all of North and South America. The sand and mudflats are key food production areas for shorebirds due to the microscopic growth of life on them known as the biofilm phenomenon. The lower flats

support key eel grass beds and that is a key zone for shrimp and crab production and is an essential spawning area for herring and many other species of fish.

Along the shoreline are the few remaining large trees in the estuary. These trees are very important for songbirds of many species and serve as nesting sites and are key rest and observation and nesting areas for bald eagles and other raptors. The forested site immediately adjacent to the jet fuel terminal is indeed one of these are valuable shoreline forested areas.

The above abundance of fish and wildlife of course makes this area extremely valuable for recreation of all sorts. There is everything from motor sports to kayaking, whale watching and sea lion observation excursions. Seals and California sea lions will indeed swim up the river and can be found in the Steveston area. Seals commonly frequent the area of the jet fuel terminal.

Recreational fishing occurs during all seasons at all opportune locations in the river and along its shorelines from Garry Point to Annacis Island. Boaters of course go well downstream of that area and into the ocean. Commercial and First Nations fisheries do occur in the section of the river directly in front of the jet fuel terminal. During a salmon opening, 200 fishing boats could be in this reach of the river.

Whale watching does take place mainly in the estuary beyond the river mouth but even grey whales have been spotted in the river and endangered killer whales just off of Steveston. Harbour seals and migratory sea lions are very common in the area and can be seen in Cannery Channel (Steveston Harbour) immediately adjacent to the public docks. This overall habitat area from the jet fuel terminal to the ocean is home to about 80 species of fish.

Bird watching is very important in the Fraser River Delta in that the river, estuarine, green space and farmland habitats supports hawks, eagles, snow geese, sand hill cranes, swans, black brandt, shorebirds like plovers and sand pipers, many species of ducks, grebes, loons, cormorants etc.

Some of these areas have developed into important bird watching areas and the development of Steveston, the Lulu Island dyke trail system and the Ladner area marshes and Westham Island sanctuaries has brought in thousands of tourists each month to enjoy the bird life and riverside walks. In Steveston the dockside restaurants and the wildlife that comes right up to the docks is a major attraction in Richmond. This is indeed an area of needed maximum protection for social, recreational, business and existence values for now and future generations.

Park and conservation area are very prevalent in this reach of the river. The overall reach covered is from Sandheads to Garry Point (8km), Garry Point to VAFFC Terminal (13km) and from the Terminal to the bottom end of Annacis island - 5 more kms for a

total reach length of 26km. The reach upstream of the Terminal is important to include in that the river does reverse at flood tides and the westerly ocean winds drive flows upstream and the ocean salt wedge reaches that point in the South arm. Key park and conservation areas in this river reach include:

North side of the river:

- Annacis and Don and Lion Islands
- Triangle Road Park (immediately beside the jet fuel terminal area)
- Finn Slough
- Britannia Shipyard Park
- Shady Island and Cannery Channel
- Garry Point Park and Sturgeons Bank (Ramsar designated)
- Iona and Wreck Beaches

South shoreline of this reach:

- Deas Island Regional Park
- Ladner Marshes and Ladner lagoon restoration area
- Duck Barber Woodward Island complex (the Richmond Islands - Ramsar designated).
- Alaskan National Wildlife Refuge
- G. C. Riefel Wildlife Sanctuary
- Roberts Bank and Ramsar designated wetlands

These areas are also Wildlife Management Areas (BC designation) and recognized as a IBA (Important Bird Area by Birdlife International). They are also rated as one of eight Hemispheric Sites in the Americas by the Western Hemisphere Shorebird Reserve Network.

This reach of the river is also home to several marinas including the Ladner and Steveston Harbour Authorities, Shelter Island Marina and closer to the jet fuel terminal is the large BC ferries holding lagoon and repair facilities. Recreational boating is a daily activity and peaks on weekends especially in the summer fishing seasons. The large marina complex in Steveston Cannery Channel is home to one of the largest fishing / recreational fleets in BC. Richmond has made many dock improvements to host tall ship events in Cannery Channel.

The entire area described above is subject to the impacts of shipping and above all will be highly sensitive to any size of jet fuel spilled into the river. Jet fuel is very toxic and flammable and will rapidly spread over the river and onto the sensitive marshes and mudflats. It will cover the gills of fish, the feathers of birds and the fur of marine mammals. It will also soak into the many habitat areas and once in the sand and shoreline detrital (broken down plant material) collection areas it will remain there for

weeks or months. Spilled LNG will have a very different impact but it is also deleterious and of great concern to the safety of communities and bridges etc.

In this 3rd Industrial Era on the Fraser Estuary and especially in this south arm reach the new industrial developments and river crossing etc. can ensure the loss of habitat, detrimental impacts on aquatic life and at times a significant impact on community safety and quality of life. Of special concern is the locating of jet fuel, LNG and container ports directly on or adjacent to critical habitat areas in the estuary.

A new bridge or tunnel crossing from Richmond to Delta is also of significant concern to the excessive stress being added to this single reach of the river and on adjacent Roberts Bank i.e. RBT2. However, if a bridge or tunnel is built with proper techniques and with proper seasonal timing, minimal long term damage should be done to the river or its life. This does of course not include the much more massive impacts the new traffic, city sprawl, and economic growth will have on the overall estuary and adjacent wildlife and farm lands.

Otto E. Langer November 15, 2019



Marine life such as the sea lion and cormorant are commonly found in the Steveston - Massey Tunnel reach of the Fraser River Estuary.

Appendix II. 2019 papers by Fraser Voices.

1. **Roberts Bank Terminal 2 Proposal by the Vancouver Fraser Port Authority is the Beginning of the End for the Globally Significant Fraser River Estuary - Have we not learned our lessons?** Fraser Voices Brief to CEAA Roberts Bank T2 Impact Assessment Panel. May10, 2019. Richmond/Delta, B.C. 10pp.
 2. **History and Outcomes of the Fraser River Estuary Management Program (FREMP) and the Burrard Inlet Environmental Action Plan (BIEAP). After FREMP / BIEAP – What Next? O. Langer. March 15, 2019. 32 p.**
 3. **Closing Remarks – Roberts Bank Terminal 2 (RBT2) Project and Related VFPA EIS and CEAA Hearing Process – May/June 2019.** August 25, 2019, British Columbia. 8pp.
 4. **The Richmond to Delta Fraser River Crossing – A Bridge or a tunnel – Environmental Impacts and Sustainability Considerations.** Fraser River Voices. November 15, 2019. 38p. Richmond/Delta, BC.
 5. **Letter of Support to Richmond City Council in support of Motion on Climate Emergency. April 2019.**
- Above papers available from ottolanger@telus.net
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Fraser Voices supporters at a Fraser River estuary conservation rally at Garry Point, Richmond. The author of Appendix III (Douglas Massey) is second from the right. September 14, 2017

Appendix III.

Chronology of the History of the Transportation of People, Goods, and Services, Up and Down and Across the Lower Fraser River.

by Douglas George Massey

November 19, 2019

It all began in 1860, some 160 years ago, starting with the canoe, steamships, roads, railways, bridges and tunnel crossings. Finding the answer for transporting people, their goods and services in the Delta, Richmond, New Westminster and Surrey areas up and down and across the Lower Fraser River has been a problem since its creation and settlement.

These questions always come up;

- Where will you put a Fraser River crossing?
- What kind of river crossing?, bridge or tunnel?
- When will they build it?
- Who will build it?

≈ It all began in 1862: With a side wheeler the “Enterprise”, carrying people and goods from New Westminster to Victoria. During that time, on Nov. 10, 1879 the Municipality of Delta was Incorporated.

≈ Then from 1887 to 1892 a side-wheeler called the “Alice” owned by the Reeve of Richmond, John Wesley Sexsmith, stopped at Ladner’s Landing, New Westminster and Victoria twice a week in the summer and once a week in the winter.

≈ There were other ferry corporations that competed for the business: Motor Vessels like, the “Wilson G. Hunt”, the “Enterprise” and the “Transfer “. The Transfer ran daily trips between Ladner and Steveston. You could get an unscheduled stop if you waved from the shore or raised a white flag from the nearest flagpole.

≈ In 1903 the Victoria Terminal Railway and Ferry Company, built a ferry terminal and steamship dock where Laurent Guichon had built a hotel and pier in 1888, and it became known as “Port Guichon”.

≈ This was where the steamship the “S.S. Victorian” stopped on its route from Victoria to as far up the Fraser River as Fort Langley. It also carried 12 freight cars to and from Sidney on Vancouver Island. This was also where the sailing ship the “Porteviate” docked with the rails from Great Britain for the Victoria Terminal Railway that was built in 1903 from Port Guichon Delta to Colebrook in Surrey.

≈ During that time it was realized that a river crossing for passengers and goods was needed from the South Arm connecting Steveston, Westham Island, Ladner, New Westminster and Woodward’s Landing (Est. Time Built 1893) on Lulu Island.

- ≈ In 1904, the first major Fraser River Crossing was built from New Westminster to Brownsville on the Surrey side. It was a railway swing bridge, with an upper deck for automobiles and remained that way until Patullo Bridge was built in 1937. The toll was .25 cents, each way.
- ≈ In 1910 the Richmond Board of Trade petitioned the Richmond Council requesting that a bridge be built across the Fraser River from Lulu Island to Ladner.
- ≈ In 1912 a ferry service was started between Steveston and Ladner. In 1913 the route was changed to go from Woodward's Landing to Ladner.
- ≈ In 1913 the Federal government appointed the New Westminster Harbor Commission to govern transportation on the Lower Fraser River.
- ≈ The last ferry to run that route starting in 1949 was the "Northern Princess" and remained there until the George Massey Tunnel was opened in 1959.
- ≈ On Feb. 8, 1927, a bill was passed by the then Provincial Government establishing the Fraser River Bridge Co., to build a bridge from Ladner to Richmond. At that time the New Westminster Council, the New Westminster Board of Trade and the New Westminster Harbour Commission strongly opposed the proposed low level bridge crossing from Richmond to Delta, and urged that the bridge be built above New Westminster instead
- ≈ The Terminal Engineering Consultants (T E C) was hired by the Department of Transport of B.C., to undertake a full traffic study of the Lower Mainland.
- ≈ And as a result the Act of 1927 was amended in 1931 to fix the site of the proposed bridge to be at or near Deas Island.
- ≈ In 1931 Richmond Council passed a by-law #578 authorizing the Ladner Bridge Co. to build a toll bridge at a cost of \$2,600,000 from Richmond to Ladner on or near Deas Island. This was also supported by Delta Municipality.
- ≈ In 1931 the then Federal government authorized the construction of highways to connect to the proposed new bridge.
- ≈ In 1933, the Ladner Bridge Co. reported, that it had started work on the wharf, the road connections and test borings for the new bridge. That same year an election was held and a new Provincial Government was elected, led by Premier T.D. Patullo, who was M.L.A. for New Westminster.
- ≈ The new Provincial government led by Premier Patullo, put a hold on the construction and location of the bridge from Woodward's Landing to Deas Island, stating that it was not in the public interest and obstruct river traffic.
- ≈ In 1934 the new Provincial government amended the 1927 Act, changing the site of the Ladner Bridge to New Westminster
- ≈ By 1937, the Patullo Bridge was opened.
- ≈ In 1936 George Massey arrived in Ladner by crossing the Fraser River on a ferry from Richmond and said he questioned,; "Why is there not a tunnel here".
- ≈ In 1939 to 1945, WW 11 occurred resulting the delay of government participation in a new crossing to replace the ferry, as their greater priorities were in support of the war effort. In the interim years George Massey had continued to pursue the idea of a tunnel.

- ≈ In 1947, John Guichon a Delta Municipal Councillor provided him with an engineering magazine describing the construction of the immersed Maas River Tunnel in Rotterdam, Holland built by Christiani & Nielsen. This tunnel was the exact length of the crossing area proposed at Deas Island to Woodward's Landing. In the initial design of the tunnel there were two traffic lanes in each direction, each lane being 10' wide; a 16 ft. wide bicycle path and 14 ft. wide pedestrian walk, complete with escalators for ingress and egress of pedestrians. Sadly the pedestrian and bike lanes were not included and neither was the ceramic tile lining of the tunnel for better lighting, cleanliness and safety.
- ≈ In 1947 the Ladner Bridge Company became active again.
- ≈ In 1947 George Massey prepared a brief supporting a Fraser River Tunnel, and formed the Lower Fraser River Crossing Improvement Association to support the idea of the tunnel crossing proposal. He was able to get the endorsement of the Municipalities, Cities, Councils, Boards of Trade, Chambers of Commerce, Ratepayers and unions throughout the Lower Mainland, with the exception of New Westminster City Council, the New Westminster Harbour Commission and Board of Trade.
- ≈ So in 1955 the government of British Columbia ordered that "Comparative Report on the Fraser River Bridge and Tunnel Crossing at Deas Island" be undertaken by Crippen Wright Engineering Ltd. Engineering Consultants. It concluded that a tunnel was the best route to go.
- ≈ In February of 1956 Highways Minister Phil Gaglardi announced; that a tunnel would be built across the Fraser River at Deas Island at a cost of \$17 million.
- ≈ The argument of a bridge versus tunnel continued.
- ≈ Protests began immediately from the New Westminster Mayor and Council, the New Westminster Board of Trade and the New Westminster Harbour Commission.,
- ≈ On May 23, 1959 the Deas Island Tunnel (George Massey Tunnel) was officially opened for traffic. By October 31, 1959 one million cars had travelled through it.
- ≈ In 1965 the Federal Government replaced the New Westminster Harbour Commission with the Fraser River Harbour Commission.
- ≈ By 1969 the need for more capacity at the GMT crossing, resulted in a counter flow system being installed.
- ≈ In 1986 the 7 lane Alex Fraser Bridge was built downriver from Pattullo Bridge from Richmond to North Delta.
- ≈ In 1995 a Transportation Study by Reid Crowther for the B.C. government, recommended a two lane addition to the George Massey Tunnel.
- ≈ In 2000 Buckland & Taylor for B.C. recommended upgrades to the GMT;
They were;
Phase 1: Join the tunnel sections together with metal plates.
Phase 2 Stabilize/reinforce the soils below tunnel.
- ≈ In 2004 Kenaidan Contracting completed Phase 1, of the seismic upgrades to GMT at a cost \$22.5 million dollars. This was said to be good for a 1 in 275 year seismic event.

- ≈ In 2004: A study was undertaken by UBC to determine what could be done to stabilize the soil under tunnel, under phase 2 of the seismic report. It was determined that the seismic upgrades to the soil under the GMT should not be carried out at this time while the tunnel was being used by motor vehicles. At this time the Port of Vancouver now controlled the docking facilities and shipping on the Lower Fraser River above and below the GMT and wanted to be able to handle deeper ships and demanded that in order to do this the GMT would have to be removed and the Lower Fraser River deepened.
- ≈ In 2006: The then B.C. Minister of Transportation Kevin Falcon announced they would refit the George Massey Tunnel and that it would last another 50 years. That it would be twinned and operate, with a total of six lanes, and that the existing GMT could last for another 50 year. Also work on the seismic upgrade would be delayed until a new tunnel crossing was built in the future as there was concern of accidental damage occurring to the GMT during the seismic upgrade.
- ≈ In April of 2006 the Pacific Gateway Ports Strategy Plan that involved both senior levels of government, municipalities, Port Authorities and industrial interests on the Lower Fraser River advocated the removal of the George Massey Tunnel, so the Fraser River could be deepened to accommodate their plan.
- ≈ In 2008 Port Metro Vancouver took over control of all ports and shipping in the Lower Mainland including the Fraser River, and began to immediately lobby the ministry of Transport of B.C. for the removal of the GMT so they could deepen the river to accommodate deep sea ships to their port facilities up to New Westminster. In 2009 in place of phase 2 of the seismic upgrades to the GMT and early seismic warning system was installed Weir Jones Group in the GMT. This would shut the tunnel down in advance of an earthquake reading of a certain level.
- ≈ In 2012 other meetings were held by Port Metro Vancouver, Surrey Fraser Docks and other industries involved on the Lower Fraser River to plan a strategy to remove the GMT Again on March 21, 2013 the Pacific Corridor Enterprise Council representing cross-border business's advocated the removal of the GMT.
- ≈ On April 4, 2013 TEC Tunnel Engineering Consultants (note the same initials were for Terminal; Engineering Consultants in 1927) were hired by Ministry of Transportation of B.C., to assess the condition of the GMT, and compare another tunnel with a bridge solution. T E C recommended four improvements to the existing GMT and recommended how the existing GMT could be expanded and a second immersed tunnel could be built alongside it, along the existing Highway 99 corridor. None of this information was released to the public, nor given serious consideration by the then Liberal B.C. government.
- ≈ On September 20, 2013, lobbying by the Port of Vancouver and the industrial interests along the Fraser River convinced the B.C. government to announce that a bridge would be built instead of a tunnel and that the tunnel would be removed to allow for deeper dredging of the Fraser River. The then B.C. Minister of Transport proceeded with the building of the \$3.5 billion dollar bridge. (Similar to the preparation of the then B.C. Provincial government of 1933). They proceeded with the buying of property, the design, the, test borings and the pre-loading piling of sand along the highway corridor leading to

the location of the new bridge. And the contract was let for the removal of the B.C. Hydro lines from the GMT and placing them overhead across the Fraser River.

- ≈ In 2015 Tunnel Engineering Consultants from the Netherlands were hired by a subcontractor to the proposed new bridge that was to replace the GMT, to insure that there would be no damage to the George Massey Tunnel during construction of the bridge.. They asked me to keep this information in confidence until such time as they would be released from their bridge contract. Which I did.
- ≈ On February 2017: A Report by the B.C. Minister of Transport: outlined the costs of decommissioning the GMT to be \$210 million and the cost of removing the B.C. Hydro Transmission lines from the GMT to be \$78 million and place overhead.
- ≈ On Jan. 12, 2016 I wrote to Tunnel Engineering Consultants in the Netherlands, having heard that they were experts in immersed tunnel construction. I advised them that the George Massey Tunnel that had been built by Christiani & Nielsen from the Netherlands, some 50 years ago was to be decommissioned and replaced with a 10 lane high level bridge and I asked them if they would consider coming to B.C., and assess as to whether the present George Massey Tunnel still had a life and whether another modern tunnel could be built in the same general area and would meet the future needs of the area I also sent a copy of an 8 page document called “The Vision to Build the George Massey Tunnel & the Road to its Removal.
- ≈ On Jan. 13, 2016, I received an e-mail from them saying that they had visited British Columbia Provincial Government on April 4, 2013 and made a presentation to them on immersed tunnels in general. They had not heard back from them, and later learned that they had chosen a bridge instead of a tunnel.
- ≈ On Jan. 13, 2016 I wrote back to them and asked them if it would be possible for them to send me a copy of the presentation they had made to government of British Columbia. They were unable to send me a copy of their presentation at that time, as they were still under contract to a subcontractor that was going to build the bridge.
- ≈ Once discovering that such a presentation was made several of my friends, including our M.L.A. Vicki Huntington applied to the B.C. Governments Freedom of Information for a copy of the presentation that was made on April 4, 2013, and were told that no such document existed, It became available only when the new B.C. Government was elected..
- ≈ On May 9, 2017 the New Democratic Party was elected the new British Columbia Provincial Government in Victoria.
- ≈ In May of 2017 the newly elected NDP Provincial Government cancelled the Christie Clark Bridge project stating that the Liberal Provincial Government had not considered the wishes of the Regional District and called for an Independent review of bridge versus tunnel crossing.
- ≈ On Aug. 16, 2017 I received a lengthy e-mail outlining T E C, saying that they had been approached late in 2012 by the B.C. Government to assess the condition of the George Massey Tunnel and possibly building another tunnel beside it. They presented their assessment on April 4, 2013, and although it was well received, they felt that the bridge

commitment had reached a point of no return and learned not long after that this was the case.

- ≈ On Nov. 25, 2017 I had not heard back from T E C so I wrote to them wishing them the best for the holidays, and advised them that I and a few others would be meeting the B.C. Minister of Transportation on Dec. 13, 2017 to discuss the proposed decommissioning of the George Massey Tunnel, and could they provide me with information that would be helpful in our discussions
- ≈ Nov 26, 2017: I received an e-mail from T E C, and they informed me that they had been released from the bridge contractor and the presentation that they had made to the B.C. Minister of Transportation on April 4, 2013, could be released to the public. A presentation that was not made public at that time, nor were any of its recommendations considered. They advised me that they were going to forward me a copy of their April 4, 2013 presentation that day.
- ≈ I met with Richmond's Mayor and Council who in the past had supported George Massey in his efforts to build the GMT and who supported twinning the George Massey Tunnel instead of a bridge, and advised them of the TEC presentation to Liberal Provincial Government on April 4, 2013. They were both surprised and angered, that such information had been withheld from the public.
- ≈ On Dec.13, 2017: I along with other citizens met with the Minister of Transportation Claire Trevena, and provided her with the TEC documents. Documents that were suppressed from the public when the former Provincial Liberal Government was in power. They were finally made public in January, 2018.
- ≈ On August 15, 2019: 40 million dollars worth of safety improvements, were approved to the George Massey Tunnel.
- ≈ On Oct. 2, 2019: Metro Vancouver Board of Directors approved the recommendation of their task force, that an eight lane immersed tunnel be built alongside the existing George Massey Tunnel. Immediately the vested interests in constructing a bridge, removing the GMT and deepening the Fraser River protested and began their campaign to misinform the public.

As resident of the City of Delta for over 80 years I hope that the proposed 8 lane tunnel is built before I leave this great earth and we do not allow the political parties and vested interests that want to build the bridge, remove the GMT, deepen the river, and destroy the ecosystem of the Lower Fraser River, as they have pursued in the past

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November 19, 2019