



**To:** Public Works and Transportation Committee      **Date:** July 10, 2015  
**From:** Victor Wei, P. Eng.  
Director, Transportation      **File:** 01-0150-20-  
THIG1/2015-Vol 01  
**Re:** Update on George Massey Tunnel Replacement Project

**Staff Recommendation**

1. That the staff report titled "Update on George Massey Tunnel Replacement Project" dated July 10, 2015 from the Director, Transportation, be forwarded to the Ministry of Transportation & Infrastructure's George Massey Tunnel Replacement project team for consideration in the development of the Project Definition Report.
2. That a letter be sent to BC Hydro advising that, should the George Massey Tunnel be decommissioned, the City's preferred options for the relocation of the BC Hydro transmission line from the tunnel would be either an underground crossing of the Fraser River or attached to the new bridge.

Victor Wei, P. Eng.  
Director, Transportation  
(604-276-4131)

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Engineering	<input checked="" type="checkbox"/>	
Intergovernmental Relations & Protocol Unit	<input checked="" type="checkbox"/>	
Parks Services	<input checked="" type="checkbox"/>	
Sustainability	<input checked="" type="checkbox"/>	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: 	APPROVED BY CAO 

## Staff Report

### Origin

At the June 23, 2014 Council meeting, staff presented a report that provided a status update on the George Massey Tunnel Replacement (GMTR) Project and identified proposed project objectives. Since that time, staff have provided a further update to Council on the project via a memorandum dated October 10, 2014. This report provides the status and topics of discussion regarding the project since the last staff report and also responds to the following referral made at the April 22, 2015 meeting of the Public Works & Transportation Committee:

*That the materials related to Port Metro Vancouver's advocacy for the replacement of the George Massey Tunnel be referred to staff for analysis and report back.*

### Analysis

Technical planning work for the project by Ministry of Transportation and Infrastructure (MoTI) remains ongoing including data collection, traffic modelling and preliminary studies (e.g., potential environmental impacts). Staff continue to have regular meetings with the MoTI GMTR project team members every two weeks. Key aspects of the project discussed to date between City and the GMTR team are noted below.

#### Number of Lanes on Bridge

Although no formal announcement has been made to date, MoTI has stated to staff and at various stakeholder meetings that the bridge will be a ten-lane crossing comprised of the following lanes in each direction:

- three general purposes lanes (as in existing peak hour conditions);
- one transit/HOV lane; and
- one special purpose lane potentially for trucks (i.e., climbing lane) or provision for future rapid transit.

The potential impacts of the wider crossing and highway on adjacent farmland are not known at this time. Staff continue to reiterate to MoTI that the project should ensure a net zero or positive impact to agricultural land.

#### Origin-Destination Survey of Tunnel Traffic

Preliminary findings of field data collected by MoTI via Bluetooth technology regarding northbound morning peak period traffic volumes through the George Massey Tunnel suggest that:

- 60 per cent of the vehicles are destined for Richmond and of this 60 per cent, approximately one to two per cent is destined for the Bridgeport park-and-ride facility with the occupants continuing on to Vancouver via the Canada Line.
- Of the 40 per cent continuing on to Vancouver, 30 per cent use the Oak Street Bridge, ten per cent use the Knight Street Bridge and less than one per cent use the Arthur Laing Bridge.

Given that a new 10-lane bridge may induce higher traffic volumes on Highway 99 into Vancouver and MoTI analysis has indicated that the Oak Street-70<sup>th</sup> Avenue intersection may be a bottleneck in terms of traffic congestion, staff have requested that MoTI and City staff from both Richmond and Vancouver meet to proactively identify potential measures (e.g., signal timing changes) that could be implemented to mitigate any impacts. MoTI staff expect that this increased traffic heading towards Oak Street Bridge in the initial period after the opening of the new bridge will taper off once the new traffic patterns are stabilized.

#### Interchanges at Steveston Highway and Blundell Road

MoTI anticipates construction of a new interchange at Steveston Highway rather than an upgrade of the existing interchange. MoTI is examining options that would improve traffic flows for some of the key movements (e.g., northbound Highway 99 to westbound Steveston Highway and eastbound Steveston Highway to northbound Highway 99), by shifting the existing northbound Highway 99 off-ramp to the north side and re-configuring it as a cloverleaf. With respect to this option, staff have identified the impacts to farmland of a new cloverleaf ramp on the north side of Steveston Highway and have stated that the design should, at a minimum, have no net loss of farmland and strive for a positive impact given that the existing cloverleaf ramp on the south side of Steveston Highway would be eliminated under this option and that area could be returned to farmland.

The GMTR team is also modelling the effect on traffic patterns of a new interchange at Blundell Road. To date, the analysis indicates there are more disbenefits than benefits to Richmond, as traffic is diverted to rural roads east of Highway 99 (e.g., Sidaway Road). MoTI staff are continuing further analysis using more up-to-date traffic forecast modelling data and will report on the outcome of this analysis in the Project Definition Report (PDR). Should the PDR conclude that a new interchange at Blundell Road is not warranted as part of this project, then staff will re-assess the need to retain this proposed interchange in the City's long-term transportation plans as identified in the *Official Community Plan*.

#### Decommissioning of Tunnel

MoTI has consistently stated that the core project includes decommissioning of the tunnel as the new crossing will be more cost-effective due to on-going maintenance expenses associated with the tunnel. MoTI has not, however, elaborated on what decommissioning would entail (i.e., the extent of physical removal). The proposed decommissioning of the tunnel will trigger a BC Environmental Assessment Office (BCEAO) process and MoTI has stated that the scope of the decommissioning will be subject to this BCEAO process. To date, MoTI has not shared any business case to justify this decision.

Staff continue to assert concerns related to tunnel decommissioning and related potential impacts to City dike infrastructure, bank stability, sediment transport, fish habitat including foreshore habitat, sloughs, and the South Arm Wildlife Management Area. As past Council discussions regarding the decommissioning of the tunnel have indicated sensitivity to potential impacts such as enabling increased shipping traffic on the Fraser River, staff will continue to seek further details and advise Council accordingly when new information becomes available.

### Height of New Bridge and Committee Referral re PMV Correspondence

MoTI has stated that the height of the new bridge is currently planned to be the same as that of the Alex Fraser Bridge, which is 57 m above the high water mark based on two ships passing together underneath the bridge (i.e., 200 m wide navigational envelope). This height is favoured by MoTI as it would preclude any need to shift the existing interchange locations at either end (i.e., a higher span would require longer access ramps) while allowing the grade to remain at a maximum of five per cent, which is preferred for accessibility for pedestrians and cyclists as well as for truck movements.

Staff have reviewed the referred material (dated between January 2012 and August 2014) that was obtained via freedom-of-information requests by Voters Taking Action On Climate Change (VTACC) and tabled at the April 22, 2015 meeting of the Public Works & Transportation Committee. The material comprises internal emails within PMV as well as external correspondence with MoTI regarding PMV's preferred "air draft" for the new bridge, which is the clearance for a ship between the water line and the bottom of the bridge deck. The correspondence indicates that PMV at that time preferred that the new bridge have a higher air draft of 65 m (height of navigational envelope) to provide the greatest flexibility to accommodate the potential size of ships that would sail up the lower Fraser River.

PMV has since confirmed to the City on June 12, 2015 that the height of the new bridge recommended to MoTI is 59.6 m above the high water mark based on a single ship passing underneath the bridge (i.e., 130 m wide navigational envelope as opposed to a 200 m wide envelope noted above). Based on the GMTR team's assessment, this height is essentially equivalent to the overall navigational envelope favoured by MoTI under an arc-shaped bridge span (similar to Alex Fraser Bridge) – i.e., a narrower navigational envelope (59.6 m high measured at the centre highest point) required by a single ship or a wider envelope (57 m high measured at the side sloping points) required by two opposing ships.

The GMTR team have indicated that the potential height of the new bridge would not be the only impediment to accommodating larger ships. According to information in the material obtained by the VTACC, other existing navigational constraints include:

- the depth at the top of the existing George Massey Tunnel (11.9 m at low water), which prevents larger ships that sit deeper in the water from passing upstream;
- the width of the river, which impacts the ability of larger ships to turn around in the river;
- the presence of underground utilities (i.e., Metro Vancouver water main); and
- the on-going requirement for annual dredging to maintain the navigational channel.

Under current channel conditions, the Fraser River can accommodate vessels that are 270 m in length, 32.2 m beam, and 11.5 m draft (with tidal assist). To enable their passage, larger cargo vessels with a deeper draft that already use the Fraser River are not fully loaded. Removal of the tunnel plus additional dredging to enable a draft of 13.5 m would allow these vessels to be fully loaded. In light of recent Council discussions regarding the potential industrialization of the river, staff will monitor any plans or actions towards removing the above navigational constraints and inform Council accordingly.

### Environmental Impacts

City-designated Riparian Management Areas (RMAs) and Environmentally Sensitive Areas (ESAs) are comprised within the project footprint. These areas include Fraser River foreshore ESA habitat (afforded a 30 m setback from highwater mark landward and seaward) and inland watercourses (afforded 5 and 15 m setbacks) in the City's *Official Community Plan (OCP)*. Staff have advised MoTI that it is expected that the City's RMAs and ESAs will be respected and compensated for any areas impacted by the project. Staff have also identified the potential presence of species at risk within this corridor including barn owls, stream bank lupine and Northern watermeal. All environmental values within the project footprint will be addressed through the BCEAO process.

### Height of Highway 99 and Dike under New Bridge

The dike in the vicinity of the tunnel is currently 3.5 m geodetic, as per the provincial standard. Where dikes are upgraded in Richmond, 4.7 m geodetic expandable to 5.5 m geodetic is the new standard height that accounts for climate change induced sea level rise. Accordingly, as part of the City's Flood Management Strategy is to ultimately utilize Highway 99 as a mid island dike, the City has requested that the area under the new bridge on Lulu Island be raised to 4.7 m geodetic and, where practical, to raise Highway 99 to 4.7 m geodetic.

### Relocation of BC Hydro Transmission Line

BC Hydro has a 230 kilovolt (kV) transmission line running underground through the George Massey Tunnel and overhead on either side of the tunnel adjacent to Highway 99. The transmission line must be relocated out of the tunnel prior to decommissioning and other segments of the transmission line must be relocated prior to construction of the new bridge. BC Hydro met with City staff on March 30, 2015 and identified the following three options for the relocation of the transmission line:

- Alternative 1: an overhead crossing of the Fraser River;
- Alternative 2: an underground crossing of the Fraser River using horizontal directional drilling; and
- Alternative 3: a transmission line attached to the new bridge.

BC Hydro intends to determine the preferred alternative by Fall 2015 and is currently seeking input from stakeholders (i.e., Richmond, Delta, Metro Vancouver, and First Nations). Metro Vancouver staff will be presenting a report on this topic to its Climate Action Committee on July 15, 2015.

BC Hydro has indicated that, based on analysis to date, Alternative 1 (overhead crossing) is the leading option based on considerations of cost and ease of construction and maintenance. The agency is therefore currently proceeding with preliminary design of this alternative. Detailed design of the preferred alternative is scheduled to commence in late 2015 with construction in 2016-2017 such that the relocated transmission line is in operation in 2017 prior to construction of the new bridge.

BC Hydro will be meeting with City staff on July 20, 2015 to provide an update on the common works sections of the relocation (that runs alongside the highway) as well as the plans for public consultation; staff will provide a verbal update on the discussions of this meeting when this report is presented at the July 22, 2015 Public Works & Transportation Committee meeting. At this time, staff recommend that BC Hydro be formally advised that the City's preferred options are either Alternative 2 or 3, given that these options are aesthetically similar to the existing installation and therefore avoid the negative visual impacts of the proposed overhead system.

#### Potential Connection to Rice Mill Road

MoTI is investigating the technical feasibility of a direct connection between Highway 99 and Rice Mill Road. Such a connection could allow traffic travelling from No. 5 Road south of Steveston Highway (e.g., Riverside Industrial Park) to northbound Highway 99 to bypass the No. 5 Road-Steveston Highway intersection and vice versa. Further analytical work as well as a business case is required to determine the viability of the proposal including:

- quantification of the net benefit to Richmond, the region and the province;
- cost and property impacts of this connection;
- modelling of the operation (e.g., level of service) of the No. 5 Road-Steveston Highway intersection and the new Highway 99-Steveston Highway interchange with the new bridge open, which will inform development of a business case as to whether or not a separate connection to Rice Mill Road is needed;
- technical feasibility including increased traffic weaving and whether or not the connection to Rice Mill Road would need to be grade-separated; and
- any upgrades to Rice Mill Road needed to accommodate the increased traffic volume as well as pedestrians and cyclists.

#### Pedestrian & Cycling Connections

MoTI has stated that the new bridge will accommodate pedestrians and cyclists but the scope of the facilities has not yet been determined. The GMTR team has indicated that a multi-use path on only one side of the bridge is favoured due to lower costs and has not confirmed if a sidewalk would be present on the opposite side. Staff have expressed a preference for a sufficiently wide (e.g., 4 m) shared multi-use path on each side of the bridge to better:

- integrate with existing and planned local cycling and pedestrian facilities and avoid circuitous connections;
- tie in with the ultimate destinations of users on both sides of the river and the new bridge;
- accommodate anticipated user volumes by providing adequate capacity; and
- allow a driver of a disabled vehicle to safely access an adjacent walkway without having to cross opposing lanes of traffic.

#### Potential Funding Strategy

To date, staff meetings with the GMTR team have focussed on the technical aspects of the new bridge and interchange; little information has been offered regarding potential funding strategies for the construction and maintenance of the bridge (e.g., tolling). The Mayor has recently

requested information on this topic from the Minister of Transportation & Infrastructure in a letter dated July 8, 2015 (Attachment 1).

#### Release of Project Definition Report

The Project Definition Report (PDR), which will formally confirm the scope of the project, is currently anticipated to be submitted to the BCEAO in Fall 2015. Staff have consistently requested to review a draft of the PDR so that staff may provide Council with an opportunity to relay comments to MoTI on the draft report prior to its finalization. MoTI has so far acknowledged the City's request for this review period but has not explicitly committed to it. This request for early sharing of the report with the City was also reiterated in the Mayor's letter to Minister Stone.

#### **Financial Impact**

None.

#### **Conclusion**

The Ministry of Transportation & Infrastructure continues to work towards the release of a project definition report and business case for the George Massey Tunnel Replacement Project in Fall 2015, which will be followed by an environmental assessment application that will include public consultation. Concurrently, BC Hydro has developed three alternatives for the required relocation of its transmission line that runs underground through the tunnel and overhead adjacent to Highway 99. Staff recommend that BC Hydro be advised of the City's preferred alternatives that do not involve new overhead power lines spanning across the river (Alternative 2 or 3) in order to minimize environmental and visual impacts.



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Att. 1: Letter from Mayor to Minister Todd Stone

JC:jc



City of  
Richmond

Malcolm D. Brodie  
Mayor

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July 8, 2015

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

Dear Minister Stone:

**Re: George Massey Tunnel Replacement Project**

Members of Richmond City Council appreciated the opportunity to attend the luncheon hosted by the Richmond Farmers Institute held July 7, 2015 at Mayfair Lakes Golf and Country Club at which you spoke of transportation and infrastructure improvements in Richmond.

As you know, the City of Richmond, as one of two host municipalities of the new proposed bridge crossing to replace the George Massey Tunnel, has a strong interest in obtaining more details about this bridge project sooner rather than later. In addition, I have three specific follow-up requests regarding this highway improvement initiative for your consideration:

- May we have a draft copy of the Project Definition Report as soon as possible? There needs to be sufficient time for Richmond City Council to review and comment on the Report before it is finalized later this year.
- May we have your advice regarding the Ministry's plan on the funding strategy for the construction and operation of the new bridge?
- What can be done to assure the preservation of the Tunnel?

The early sharing of the above information would allow the City of Richmond to further analyze the project. The Tunnel Replacement Project needs to address any issues or concerns raised by our community.

I look forward to your reply.

Yours truly,

A handwritten signature in black ink, appearing to read "Malcolm D. Brodie".

Malcolm D. Brodie  
Mayor

pc: Members of Council  
SMT  
Victor Wei – Director, Transportation

