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June 14, 2010

File: 50-10751

City of Victoria
1 Centennial Square
Victoria, BC, V8W 1P6

Attention: Mr. Mike Lai, P.Eng.

Dear Mr. Lai

Reference: Traffic Operations Impact: Closure of one westbound lane on the Johnson Street Bridge

At your request, subsequent to the analysis completed in 2009, we have prepared this letter report that summarizes our analysis of the operational impacts predicted as a result of closing one of the two westbound traffic lanes on the Johnson Street Bridge. The purpose of the closure would be to reallocate the traffic lane into on-street westbound and eastbound bicycle lanes.

Our analysis was based on 2009 weekday PM peak hour traffic volumes provided by the City. The data was provided in the format of Synchro transportation analysis software files which included traffic volumes, pedestrian volumes and traffic signal timings. Our analysis was conducted using a combination on Synchro and SimTraffic transportation analysis. The use of these two separate tools allows us to obtain more confidence in the range of predicted results. In this sense, Synchro was used for the analysis of the conventional intersections and road segments, whereas SimTraffic was used to represent the impact of the lane drop beyond signalized intersections.

In the current configuration westbound traffic is loaded on to the Johnson Street Bridge from the Pandora Avenue / Store Street and Johnson Street / Wharf Street intersections. These two intersections share a single traffic signal controller which is programmed to activate the westbound signal phases sequentially. A simplified explanation of this can be described as the westbound green phase on Pandora Avenue / Store Street intersection will run while the north to westbound phase at the Johnson Street / Wharf Street intersection is red. Once the westbound Pandora Avenue phase goes to red, then the north to westbound green phase at the Johnson Street / Wharf Street will run. As the westbound phases of the two signals alternate, there is typically no conflict with these two traffic platoons attempting to merge together at the bridge end as they arrive at the bridge end at different times.

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TRAFFIC ANALYSIS

Existing Geometric Conditions (three lanes on the Johnson Street Bridge)

Pandora Street/Store Street Intersection – 2009 volumes (Synchro Results)

- This intersection operates at an overall intersection level of service (LOS) of C. The westbound approach is also expected to operate at LOS C and the southbound approach at LOS D.
- Traffic queues are no longer than 60 metres, thus indicating no traffic conflicts with adjacent intersections.

Johnson Street/Wharf Street Intersection – 2009 volumes (Synchro Results)

- This intersection operates at an overall intersection LOS D. The northbound left turn movement operates at LOS C and the southbound movement operates at LOS F.
- Traffic queues are no longer than 75 metres, thus indicating no traffic conflicts with adjacent intersections.

Pandora Street/Store Street Intersection – 2009 volumes (SimTraffic Results)

- This intersection operates at an overall intersection LOS of C. The westbound approach is also expected to operate at LOS C and the southbound approach is expected to operate at LOS E.
- Traffic queue on the westbound movement is no longer than 80 metres, thus indicating no traffic conflicts with Government Street intersections.

Johnson Street/Wharf Street Intersection – 2009 volumes (SimTraffic Results)

- This intersection operates at an overall intersection LOS C. The northbound left turn movement operates at LOS C and the southbound movement operates at LOS E.
- Traffic queues are no longer than 75 metres, thus indicating no traffic conflicts with adjacent intersections.

Two lane operation on the Johnson Street Bridge Scenario

Two scenarios were examined. One scenario removed the lane after the intersection signal and before the bridge end. The second scenario removed the lane on the approach to the intersection signal. The first scenario was evaluated through Synchro, whereas the second scenario made use of SimTraffic.

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Pandora Street/Store Street Intersection – Lane removed after the intersection – 2009 volumes (SimTraffic analysis)

- Pandora Street westbound was reduced from two lanes at the Store Street intersection to one lane prior to the bridge end. This resulted in reducing the overall intersection level of service (LOS) from C to D. The westbound approach LOS was also reduced from LOS C to D.
- Traffic queues extended east along Pandora Street from Store Street approximately 110 metres. The simulation indicated that vehicles at the back of this queue would require two signal cycle lengths to clear the intersection. As a result, the LOS for these vehicles at the back of the queue would be reduced to LOS F.

Johnson Street/Wharf Street Intersection – Lane removed after the intersection – 2009 volumes (SimTraffic Analysis)

- The two north to west turning lanes at the Johnson Street/Wharf Street intersection were reduced to one lane prior to the bridge end. The overall LOS remained at LOS C while the north to west bound approach was reduced from LOS C to LOS D.
- Traffic queues extended south along Wharf Street from Johnson Street to south of the Yates Street intersection. The simulation indicated that the vehicles at the back of this queue would require two signal cycle lengths to clear the intersection. As a result, the LOS for those vehicles at the back of the queue would be reduced to LOS F.
- With the queue extending south through the Yates Street intersection, it is likely that the intersection will be blocked periodically. A blockage could affect west to south bound traffic turning vehicles from Yates Street and south to east bound turning vehicles from Wharf Street to Yates Street. Blockage of the Yates Street intersection will also extend through the crosswalk across Wharf Street at that location which may impact the safety for pedestrians. In addition, left turning traffic will use courtesy gaps but may not be able to adequately see southbound traffic, which may lead to safety concerns.

An area of additional delay was also observed. Under the current conditions, the westbound traffic from the Pandora Street/Store Street intersection clears onto the bridge before the north to west bound traffic from the Johnson Street/Wharf Street intersection arrives. This does not occur under the scenarios studied. The last vehicles in the west bound platoon from the Pandora Street/Store Street intersection must yield and wait for a gap in the traffic platoon arriving from the Johnson Street/Wharf Street intersection.

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Pandora Street/Store Street Intersection – Lane removed before the intersection – 2009 volumes (Synchro Analysis)

- Pandora Street westbound was reduced from two lanes to one in the approach to the intersection. A single lane was taken westbound through the intersection. This resulted in reducing the overall intersection LOS from LOS C to LOS E. The westbound approach was reduced from LOS C to LOS F.
- Traffic queues extended east along Pandora Street from Store Street approximately 145 metres.

Johnson Street/Wharf Street Intersection – Lane removed before the intersection – 2009 volumes (Synchro Analysis)

- The Wharf Street north to west bound movement was reduced from two lanes to one lane. A single north to west bound lane was taken through the intersection. This resulted in reducing the overall intersection LOS from LOS D to LOS E. The north to west bound movement LOS was reduced from LOS C to LOS F.
- Traffic queues extended south from the intersection approximately 146 metres. Impacts similar to the earlier scenario can be expected at the Yates Street intersection.

While not quantified, these additional delays will increase vehicle emissions over the existing conditions.

Future Conditions

As a sensitivity analysis an assessment of the three scenarios was conducted for the City of Victoria Planning Horizon, which corresponds to year 2026. Forecast traffic volumes were estimated using an annual growth rate of 2% as per the CRD 's TravelChoices Long Range Transportaton Plan projections. This annual growth rate represents a 40% increase in all trips by 2026.

The traffic analysis for this horizon year indicates that for all scenarios, the proposed geometry and laning configurations cannot carry the future traffic demand and the system will likely fail. These levels of congestion may be unrealistic as drivers would likely take alternative routes to avoid the congested areas or choose to travel at other times spreading and extending the peak period traffic.

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Bridge Opening Clearance

In the event of a bridge opening for marine traffic, it is likely that under a single westbound lane operation on the bridge, the vehicle queue built-up would take as twice as much time to dissipate than with the existing two westbound lanes.

Yours truly,

MMM Group Limited



Felipe Rodriguez, P.Eng., PTOE
Senior Project Manager



Mark Mertz, P.Eng.
Reviewer

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