

REGULAR COUNCIL

TO: **Mayor & Council** DATE: **December 1, 2016**
FROM: **General Manager, Engineering** FILE: **5400-05**
SUBJECT: **Pattullo Bridge Replacement Project – Finalized Concept Design**

RECOMMENDATIONS

The Engineering Department recommends that Council:

1. Receive this report as information; and
2. Conditionally endorse the finalized Pattullo Bridge Replacement concept design by TransLink on the understanding that regional mobility pricing will be implemented in the 5-7 year horizon and triggers for expansion to a six-lane bridge are resolved within 1 year.

INTENT

The purpose of this report is to provide a summary update on the Pattullo Bridge Replacement project with respect to key considerations and technical work leading to the development of a finalized design concept. This report seeks Council endorsement of the finalized Pattullo Bridge Replacement concept design, allowing TransLink to progress the design efforts to a procurement ready status.

BACKGROUND

History and Issues

Built in 1937, the 79-year-old Pattullo Bridge was designed to last 50 years. The bridge has now outlived its projected life and urgent attention is needed to address several key issues:

- Most bridge components have surpassed their useful lives;
- The bridge may not survive a moderate earthquake or ship collision;
- The piers are at risk of being undermined by river scour; and
- The narrow lanes and tightly curved approaches do not meet current guidelines and create unsafe conditions.

Options Analysis and Review 2012-13

The replacement of the Pattullo Bridge has been actively pursued since 2008. In 2012, TransLink, the City of Surrey and the City of New Westminster, along with the Ministry of Transportation and Infrastructure (MoTI), Metro Vancouver and other associated agencies, participated in an extensive joint review of a large number of rehabilitation and replacement alternatives. Based on technical review and evaluation, public consultation was held in both 2012 and 2013 for the screening of 25 rehabilitation and replacement alternatives. These options were further shortlisted to 5 feasible options for continued analysis.

Mayors' Council

In February 2014, the Mayors' Council was asked by the Province to confirm its transportation vision, and identify strategic transportation infrastructure projects, their costs and priorities as part of a Regional Transportation Investment Plan. Through these efforts, and informed by analysis and consultation previously undertaken, the Mayors' Council in June 2014 adopted the alternative of constructing a new four-lane bridge with a design that did not foreclose the possibility of future expansion to six lanes.

The decision to adopt a phased approach to widen to the ultimate six-lane bridge was made in consideration of funding challenges and other competing regional priorities, such as the Surrey/South of Fraser LRT and Vancouver Broadway Lines. This replacement project is part of the Mayors' Council's 10-Year Vision for transportation investment in the region, and Surrey's support regarding the plans for the Pattullo Bridge has been on the basis that the entire plan including 27 kilometres of LRT will be delivered.

Tolling/Mobility Pricing

The Mayors' Vision also commits to implementing time and distance based mobility pricing on the road network as an efficient, fair and sustainable method for helping to fund the transportation system. The Mayors' Council and TransLink have committed to work to deliver Regional Mobility Pricing within seven years (from the start of implementing the Vision, i.e., by 2024). Given this commitment and the fact that the Pattullo Bridge will be constructed by 2022, a single-point toll will likely be needed as an interim step in support of the regional funding needs for the replacement bridge.

TransLink has initiated work with all of the regional partners on developing the process/approach to develop a policy along with a pilot project to assess viable mobility pricing options. An Independent Mobility Pricing Commission will be established in 2017 and will provide their assessment to the Mayors' Council in the short term.

Rehabilitation Work on Existing Bridge

TransLink prioritized efforts through 2014 and 2015 to evaluate the structural condition of the existing bridge and undertook the necessary rehabilitation works to extend the operating life of the existing bridge until the new bridge can be delivered.

DISCUSSION

Project Memorandum of Understanding

In 2016, a tripartite Memorandum of Understanding (MOU) outlining a partnership agreement between TransLink, the City of Surrey and the City of New Westminster was signed.

This MOU outlined TransLink's responsibilities as the bridge owner and its efforts to deliver the priority replacement of the Pattullo Bridge consistent with the Mayors' Council 2014 Regional Transportation Investment Plan.

The MOU further outlined a collaborative approach in many areas of this project, including the development of the design concept and supporting road connections, inclusion of community considerations/mitigations, use of appropriate design guidelines, agreement to initiate in 2016 the development of criteria for expansion to a six-lane bridge, and support in stakeholder and public

consultation. This agreement further specified the objective to advance the project to a procurement ready stage by 2017.

Concept Design Development

In early 2016, TransLink, the City of Surrey and New Westminster continued to develop the early concept to include details for the key regional and local road connections to the new bridge and address a number of project objectives while delivering the Mayors' Council directive, namely providing improved operational performance, provision of community access and mitigation of impacts, and providing cycling and pedestrian facilities to modern standards.

The resulting major improvements are illustrated in Appendices "I", "II" and "III", with the key features summarized as follows:

- **Regional/Major Road connections:**
 - King George Boulevard (KGB): Maintains the three-lane westbound merge down to a single lane onto the bridge (for the opening day four-lane bridge configuration);
 - Scott Road: The two northbound lanes merge to one lane and then merge again with the southbound lane from a new Scott Road extension (connecting from Highway 17) forming the second lane onto the bridge;
 - Scott Road Extension: Connection between KGB and Highway 17. This removes industrial/regional traffic from the existing 124 Street, which would remain as a separated residential roadway. The extension would provide a more direct regional connection from Highway 17 to Pattullo Bridge and reduce demand along Bridgeview Drive and KGB; and
 - Direct ramp connection from the Pattullo Bridge to westbound Highway 17.

- **Community/cycling/pedestrian connections:**
 - Retain limited community access into the Bridgeview community;
 - A new grade separated cycling/pedestrian connection from the Bridgeview community, across KGB to Scott Road SkyTrain Station;
 - Improved and separated cycling/pedestrian facilities on both sides of the bridge meeting modern standards; and
 - Improved and more direct cycling/pedestrian connections to/from the bridge and to existing facilities.

Appendix "I" has been newly created to provide more clarity on the roadway connections. Appendices "II" and "III" have been presented as part of the materials for public consultation. For information, the key features of the bridge approach at New Westminster are shown in Appendix "IV", also presented in the public consultation meetings.

Traffic Modelling and Operational Analysis

In conjunction with the connection and alignment design, TransLink has continued to undertake further traffic analysis to inform the on-going design work and document the operational characteristics, such as queuing, with all options.

Travel Demand Modelling

Opening Day (2023) and longer term 2045 travel demands were forecasted utilizing the updated Regional Transportation Model (RTM). The forecasted daily traffic volumes were used for the Business Case analysis and revenue forecast by TransLink's Finance Department.

This comprehensive update was implemented by an experienced TransLink modelling team and validated by a separately commissioned exercise which developed a future demand forecast utilizing alternative modelling methodology. The results confirmed that TransLink's updated model predicted demand to within acceptable margins.

The current Pattullo Bridge volumes are typically in the 75,000 to 80,000 vehicles per day. With tolls in place, this volume is expected to reduce to approximately 65,000 vehicles per day in 2023 and increase to approximately 72,000 vehicles per day by 2045. The 2045 level of demand during the peak hours would far exceed the four-lane capacity, indicating the need to expand the bridge to six lanes well prior to 2045.

Modelling to validate the 'workability' of any given design has been undertaken by a more detailed traffic model. This model translated the regional level trip movement down to the road and vehicle level to understand the implications of road network configurations on queuing and overall delays.

Operational Performance Queuing Analysis

Modelling and sensitivity analysis determined that opening day (2022/23) queuing and delays would be lower than the current conditions. More specifically, a new tolled Pattullo Bridge would result in:

- Reduced traffic volumes across the bridge due to the toll;
- A transitional shift of vehicles to alternative bridge crossings as a result of the introduction of a point toll at the new Pattullo Bridge (between 25-35% diversion during peak times);
- Operational movement efficiency gained from the reconfigured Scott Road interchange and the new Scott Road Extension; and
- A shift to other transportation modes.

The comparison between the existing day bridge and queuing compared to the modelled new opening day Pattullo Bridge with tolls is illustrated in Appendix "V".

Bridge Approach Traffic Merging Analysis

On-going modelling efforts by the project team continue to extend merging locations and configurations from the Scott Road connections and KGB to the Pattullo Bridge to maximize operational capacity and reduce overall system delays.

Further work is underway on the two best performing merge options to assess the cost and implications with the future transition from a four-lane to a six-lane configuration.

Development of a Four-Lane to Six-Lane Trigger Mechanism

Trigger Development

During the last few months, TransLink, the City of Surrey and the City of New Westminster have been meeting to discuss the development of criteria for the trigger for future expansion from the planned new four-lane bridge to a six-lane bridge. Discussions have also occurred with other municipalities in the region, which has led to agreement that the approach and triggers used for the Pattullo should be consistent with the approach for any regional transportation improvement project.

A number of wider regional considerations and measures will be examined such as delays and queuing, cost, alternate possible infrastructure improvements, and road pricing options.

It is expected that this work will take up one year to complete, but will result in guidelines that will provide clarity on the trigger point for expansion from four lanes to six lanes.

Public Consultation

The community consultation continues to play an important role in the project with TransLink supported by the municipal partners. Two public and stakeholder consultation events occurred in June and October 2016 seeking input on the development of community and wider cycling/pedestrian connections.

In both cases, notification of the events were undertaken with postcard mail drops to approximately 34,000 residents and businesses, invitation e-mails to 360 stakeholders, newspaper advertisements, digital online advertisements, social media, digital billboards in both Surrey and New Westminster, a consultation webpage, and media advisories.

Over 4,200 people participated in the public consultation and the key results regarding connectivity and cycling/pedestrian infrastructure on the Surrey side were (details can be found in Appendix "V"):

- Support to maintain Bridgeview community road access across King George Boulevard via 112 Avenue;
- Support for a cyclist/pedestrian crossing of King George Boulevard at 125A Street via an underpass or overpass; and
- Support for the proposed cyclist/pedestrian connections to/from the Pattullo Bridge.

Of note, although there was a little more support from the public for an overpass at 125A Street, the project team assessed the concerns raised and concluded that the public objectives could be better met with the at-grade underpass solution. The most significant concerns raised related to safety and visibility, and to a lesser extent crime, impacts to traffic and cost effectiveness. The project team believes that an at-grade solution that encompasses established CEPTD (Crime Prevention through Environmental Design) principles would largely negate the issues raised. In addition users would benefit from a more accessible (no grades) and 300 metre shorter walking distance. It also creates a place-making gateway between the Bridgeview community and the SkyTrain Station.

The June consultation summarized all other comments/feedback provided through this stage of consultation. It is noteworthy that out of 513 comments received, 212 comments (41%) covered two topic areas, namely the need for a new bridge to be a six-lane bridge on opening day and those in opposition to a tolled bridge. This was further re-affirmed in October when 796 comments were received, with 408 comments (51%) combined expressing the need for a new bridge to be a six-lane bridge on opening day and opposing a tolled bridge.

In further reference to consultation, the project is currently working with the BC Environmental Assessment Office (BCEAO) to finalize the Environmental Assessment process. Through this process, the public will have continued opportunities to provide feedback through the spring 2017 period.

128 Street Connection

In concert with the October consultation, City of Surrey staff further expanded the scope of discussion to include plans to progress the completion of the 128 Street connection between 109 Avenue to 111 Avenue.

Surrey presentation boards depicted the conceptual alignment and highlighted property implications, which illustrated that the majority of impacted properties were City-owned. Overall feedback has been supportive, with a number of detailed questions raised in relation to grades, noise and walkway access to 110 Avenue and view obstructions caused by the new road connection. These elements will be further explored as a more substantive detailed design work is undertaken through 2017/18, inclusive of continued local community consultation.

Finalized Concept

Based on the technical design and modelling work undertaken, informed by public feedback through the consultation process, the following concept elements have been established (see Appendix “I” for overall connections and Appendix “II” for a rendering):

- Separated Scott Road Extension (between KGB and Highway 17), including an eastbound to southbound flyover connection between Highway 17 and the Scott Road Extension;
- Ramp connection from the new Pattullo Bridge to westbound Highway 17 and the Tannery Road interchange. In conjunction with this work, MoTI will also honour a previous commitment to grade separate the current Highway 17/Old Yale Road intersection;
- Realignment of Bridge Road connecting through to Timberland Road;
- Maintaining a limited road connection to the Bridgeview community via 124 Street and 112 Avenue;
- Construction of new, and improving existing, cycling and pedestrian connections to/from the new Pattullo Bridge; and
- An ‘at-grade underpass’ connection for the 125A Street connection (see Appendix “V”).

SUSTAINABILITY CONSIDERATIONS

Progress toward the delivery of Pattullo Bridge Replacement project supports the objectives of the City’s Sustainability Charter. In particular, delivery of the replacement bridge relates to the Sustainability Charter theme of Economic Prosperity and Livelihoods and Infrastructure. Specifically, this project supports the following Desired Outcomes:

- Economy SD 4: Collaborate with senior levels of government and TransLink to reduce congestion along strategic goods and people movement corridors;
- Transportation DO11: An integrated and multi-modal transportation network offers affordable, convenient, accessible and safe transportation choices within the community and to regional destinations; and
- Transportation DO14: Goods movement throughout the City is efficient, and minimizes environmental and community impacts.

CONCLUSION

The project team has made significant progress through 2016 in establishing a balanced design concept that addresses/mitigates each of the stakeholders’ needs and concerns, within the wider context of delivering the Mayors’ Council Vision. Implementation of a regional mobility pricing approach and establishing triggers to move to a six-lane bridge is essential for Surrey’s endorsement of the Pattullo Bridge replacement concept design.

The project team will continue to work together, adhering to the MOU scope of services, to further refine and close out remaining design elements, particularly:

- Discussions with the MoTI on connections and integration plans;
- Developing an optimal merge configuration close to the Pattullo bridgehead; and
- Establishing a more detailed cross-section and treatment for pedestrian and cycling connections.

The Engineering Department recommends that Council:

- Receive this report as information; and
- Conditionally endorse the finalized Pattullo Bridge Replacement concept design by TransLink on the understanding that regional mobility pricing will be implemented in the 5-7 year horizon and triggers for expansion to a six-lane bridge are resolved within 1 year.

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FS/JB/PL/MD/clr

Appendix "I" - Pattullo Bridge – Surrey Concept Design
Appendix "II" – Pattullo Bridge – Surrey Concept Design for Cyclists/Pedestrians
Appendix "III" - Surrey Southside Improvements - Aerial Rendering
Appendix "IV" – New Westminster Aerial Rendering
Appendix "V" – Comparison of Existing to Opening Day Queuing
Appendix "VI" – 125A Street At-Grade Underpass Rendering and Plan Views
Appendix "VII" – Consultation Feedback Details

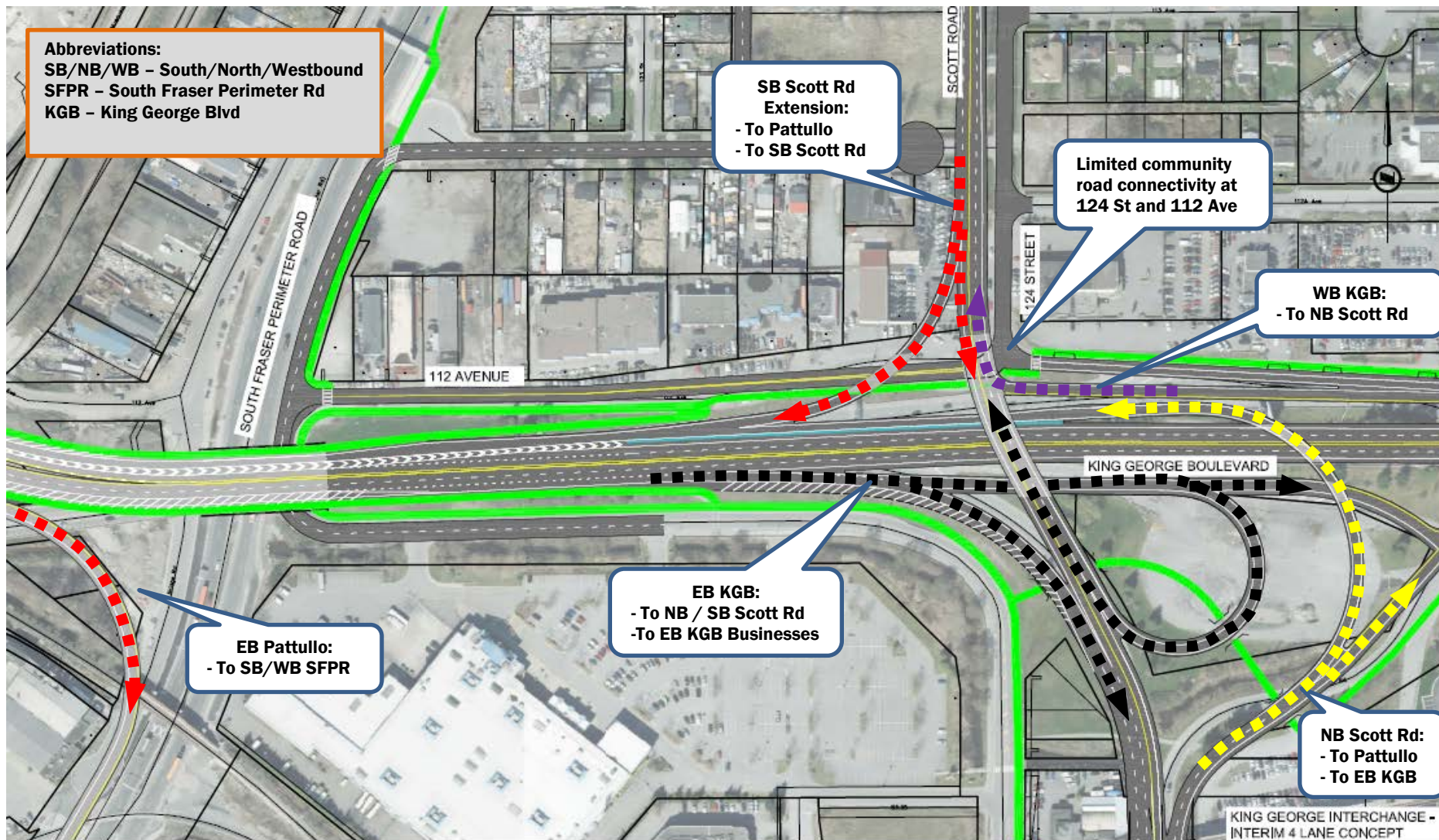
Pattullo Bridge – Surrey Concept Design Overview



Pattullo Bridge - Surrey Concept Design (Highway 17 to Southbound Scott Road extension)



Pattullo Bridge - Surrey Concept Design (Interchange Movements)



Source: Background Image - TransLink project team

Pattullo Bridge - Surrey Concept Design for Cyclists/Pedestrians



Source: Pattullo Bridge Replacement Project Community Connections Phase 2 Consultation: Discussion Guide and Feedback Form October 3 – October 31, 2016

Surrey Southside Improvements - Aerial Rendering



Source: Pattullo Bridge Replacement Project Community Connections Phase 2 Consultation: Discussion Guide and Feedback Form October 3 – October 31, 2016

New Westminster Aerial Rendering



Source: Pattullo Bridge Replacement Project Community Connections Phase 2 Consultation: Discussion Guide and Feedback Form October 3 – October 31, 2016

Comparison of Surrey Existing to Opening Day Queuing

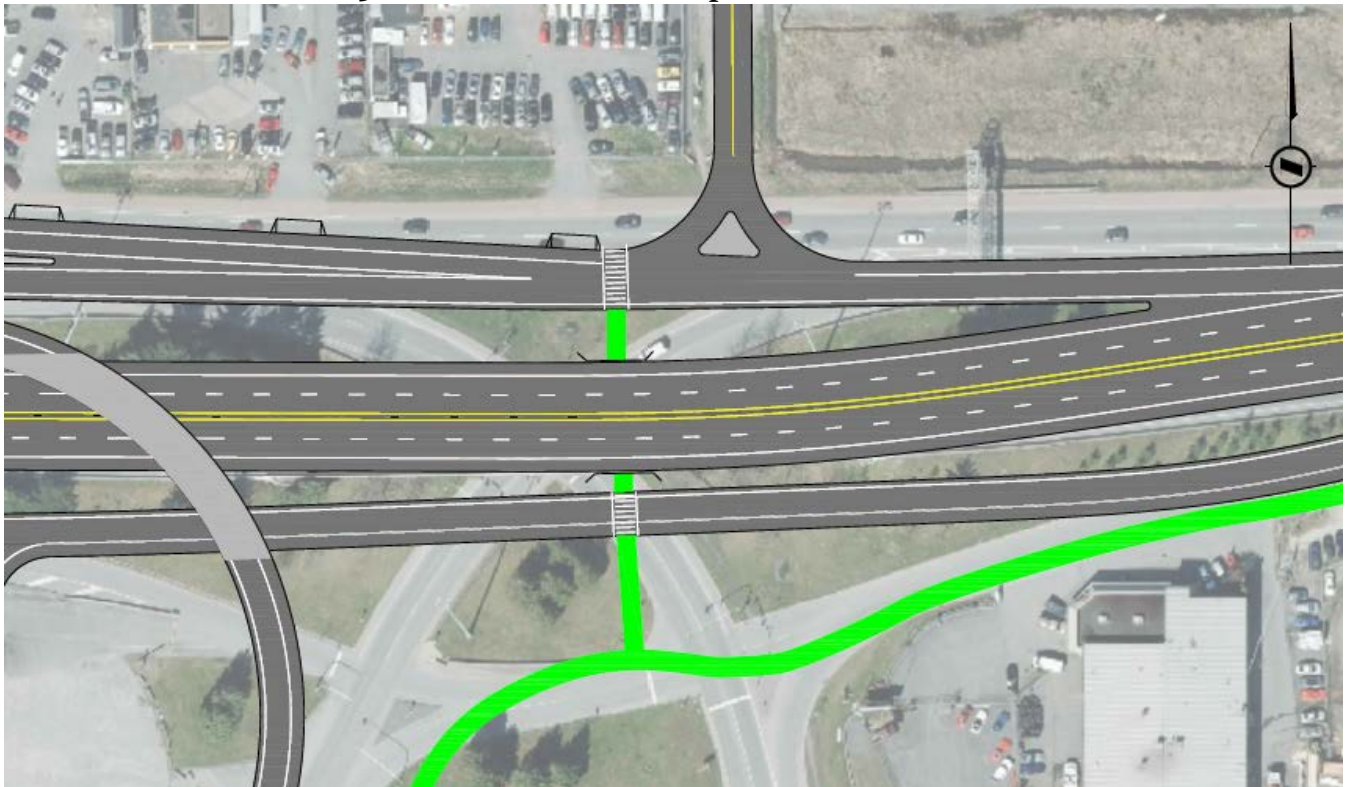


Source: TransLink Demand and Queuing Analysis

125A Street At-Grade Underpass Rendering



125A Street At-Grade Underpass: Plan View



Source:

1. Rendering - Source: Pattullo Bridge Replacement Project Community Connections Phase 2 Consultation: Discussion Guide and Feedback Form October 3 – October 31, 2016
2. Plan View: TransLink project team

Consultation Feedback Details

June 2016

There were 2,033 participant interactions during the consultation period, primarily from completed online or hardcopy forms (1,585) and attendance at four open houses (341). The community was asked to provide input on two key areas:

Consultation Topic	Results
<ul style="list-style-type: none"> Potential 125A Street connection from the Bridgeview community to Scott Road SkyTrain station, and level of connectivity provided 	<ul style="list-style-type: none"> Majority support (56%) for a separated pedestrian and cyclist crossing of KGB, compared to: <ul style="list-style-type: none"> No connection (44% support); and At-grade vehicular, cycling and pedestrian connection (41% support).
<ul style="list-style-type: none"> Bridgeview community road access between the new Scott Road Extension and 112 Avenue/124 Street 	<ul style="list-style-type: none"> Majority support to maintain similar levels of connection as today (54% support), compared to: <ul style="list-style-type: none"> No connection (27% support).

October 2016

The second round of consultation sought input on the development of the wider cycling and pedestrian network to/from the Pattullo Bridge, in addition to confirming feedback on the type of connection (overpass or at-grade underpass) at 125A Street, as illustrated in Appendix “V”.

Similar to the June consultation, 2,233 participant interactions were recorded in this round, primarily from online or hardcopy forms (2,002), with lower levels of attendance at five open houses (176). The community provided feedback on:

Consultation Topic	Results
<ul style="list-style-type: none"> General pedestrian/cycling network connections to/from the new Pattullo Bridge 	<ul style="list-style-type: none"> New connections: <ul style="list-style-type: none"> Majority supported (60%) Improvements to existing connections: <ul style="list-style-type: none"> Majority supported (59%) 21% disagreeing in both cases.
<ul style="list-style-type: none"> Type of connection for the 125A Street crossing from the Bridgeview community to Scott Road SkyTrain station 	<ul style="list-style-type: none"> Overpass solution: <ul style="list-style-type: none"> 61% support / 24% disagree At-grade Underpass solution: <ul style="list-style-type: none"> 52% support / 33% disagree