



## POLICY REPORT

Report Date: January 15, 2019  
Contact: Steve Brown  
Contact No.: 604.873.9733  
RTS No.: 12955  
VanRIMS No.: 08-2000-20  
Meeting Date: January 30, 2019

TO: Standing Committee on Policy and Strategic Priorities

FROM: General Manager, Engineering Services and General Manager, Planning, Urban Design and Sustainability

SUBJECT: Rapid Transit from Arbutus Street to UBC

### **RECOMMENDATION**

- A. THAT Council endorse a SkyTrain extension from Arbutus Street to UBC.
- B. THAT Council direct staff to work with partners to advance the design development including public consultation to determine station locations, vertical and horizontal alignment.
- C. THAT staff write a letter to the Mayors' Council on Regional Transportation ("Mayors' Council") to inform them of Council's support for the selection of SkyTrain and further design and consultation on alignment.

### **COUNCIL AUTHORITY/PREVIOUS DECISIONS**

- 1997: Council approved the City Transportation Plan which includes a rapid transit line along the Broadway Corridor with possible extension to UBC. The line should serve the needs of city riders as well as other regional users, and should not result in a loss of local transit service.
- March 2000: (Phase II Commercial Drive West) Council recommended that the SkyTrain continue west from Vancouver Community College, via the False Creek Flats and Broadway to Granville Street, with consideration to Arbutus, as part of the Millennium Line Construction Program. A rapid bus extension would connect the terminus (Granville or Arbutus) to UBC.
- April 2002: (Vancouver Transit Strategy) Council re-affirmed its support for the Millennium Line extension as a subway serving the Central Broadway Corridor to Granville Street.

- January 2008: Council passed a motion that the City of Vancouver opposes cut and cover construction for the completion of the Millennium Line through commercial, congested or confined rights-of-way.
- April 2010: Council approved Vancouver's rapid transit principles for the Broadway Corridor to guide staff involvement in the TransLink-led UBC Line Rapid Transit Study. At this time, Council also requested that staff report back at key study milestones including after the development and public review of TransLink's rapid transit alternative shortlist.
- October 2012: Council approved Vancouver's Transportation 2040 Plan which includes "Action T 1.1.1 Work with partners to deliver an underground Millennium Line extension serving the Broadway Corridor as a top regional priority."
- **June 2014: Regional Mayors' Council Vision was approved which calls for rapid transit between Commercial Drive and UBC. As the first phase, the Millennium Line Broadway Extension of SkyTrain in a tunnel under Broadway to Arbutus Street was approved to be delivered within the first ten years of the Vision.**
- November 2015: Council approved the Renewable City Strategy which includes priorities that shift Vancouver's transportation system towards renewable energy sources, including a Millennium Line extension under Broadway as a key priority.
- November 2017: Renewable City Action Plan approved by Council is based on assumptions of Green House Gas (GHG) reductions projected by the sustainable transportation actions from Transportation 2040, including a Millennium Line extension under Broadway.
- May 2018: Council endorsed the Broadway Subway, a primarily tunnelled Millennium Line SkyTrain extension from VCC- Clark to Arbutus; Council also endorsed a set of Principles and Strategies that identify the goals that the City will endeavour to achieve through the Broadway Subway Project and related City activities.

### ***CITY MANAGER'S/GENERAL MANAGER'S COMMENTS***

The City Manager recommends approval of the foregoing.

### ***REPORT***

#### ***Background/Context***

The Broadway Corridor is a regionally important corridor that connects the largest university (UBC) and the largest hospital (Vancouver General Hospital) in Western Canada. In 2016, there were 135,000 people living within the Corridor (including UBC) with 60,000 additional people expected by 2045. With approximately 113,000 jobs along the Corridor in 2016, Broadway is the second largest job centre in the Province, and a key source of employment for residents throughout Metro Vancouver. The demand for job space in the Corridor is high with nearly 30,000 new jobs anticipated by 2045.

The bus routes that serve UBC include 4 of the 5 highest ridership routes in the region as well as the 5 most crowded bus services. This means that there is often no space for Vancouver residents to board these buses and they are passed up by multiple full buses before they can board. The 11 bus routes that serve UBC, running primarily in Vancouver, carry 48% of the ridership in the Vancouver/UBC sub-area. One of these routes is the 99 B-Line which is the busiest bus route in Canada and the USA carrying over 60,000 daily riders. As UBC continues to increase its residents, jobs and student population, it is anticipated that the challenge to serve

the bus passengers on these routes will become even greater. A rapid transit solution is needed to solve the existing capacity challenges.

Rapid transit for Broadway has been prioritized in City and regional plans for over twenty years, and is considered critical to achieving key City goals including mode share and GHG reduction. In 2012, the UBC Line Rapid Transit Study was completed by TransLink and the Province with the City as a partner agency. This study screened close to 200 combinations of technology, vertical alignment and route alternatives that narrowed down to 7 options for further exploration. Three options were shortlisted and the results found that a SkyTrain extension to UBC was the highest performing alternative in every category assessed. A SkyTrain extension to UBC was also the preferred option for the public – 67% of respondents felt SkyTrain was somewhat or very acceptable (the next closest was LRT1, entirely along Broadway, with 53% of people finding it somewhat or very acceptable). More recently, in 2017 during engagement for the Broadway Subway Project, the online questionnaire found 80% of respondents were very supportive of the extension to Arbutus and the top message heard by City staff was for the line to extend all the way to UBC as part of the first stage. Support for this project remains high.

In 2014, in response to the Minister of Transportation and Infrastructure's request to confirm its transportation vision and to clarify the costs, priorities and phasing for investments and actions, the Mayors' Council on Regional Transportation approved a regional transportation vision "Transportation Investments: A Vision for Metro Vancouver". The Vision includes a range of transportation improvements to be delivered across the region in the next ten years. The Vision also prioritized rapid transit between Commercial Drive and UBC to be constructed in two phases. The first phase is the Broadway Subway Project, a primarily tunneled Millennium Line SkyTrain extension under Broadway from VCC-Clark Station to Arbutus Street. This phase is being delivered now. The Mayors' Council Vision also called for TransLink to work with the City, and other stakeholders during the design process for the first phase, to conclude how and when to complete the next phase of rail to the University of British Columbia's Point Grey campus. Since late 2017, TransLink has been collaborating with the City of Vancouver and UBC on updating the initial 2012 alternatives analysis with new information. The results of this analysis are outlined in this report.

### ***Strategic Analysis***

A technical study titled "Rail to UBC" was recently undertaken to update the 2012 UBC Line Rapid Transit Study with a goal of completing a rapid transit connection from Commercial Drive all the way to UBC. The following provides a summary of the updated technical analysis, a review of a network LRT scenario and next steps for further technical work.

### **Summary of Updated Analysis**

The primary updates for the Rail to UBC study from the 2012 study include the following revisions:

- Options that include the Broadway Subway Project to Arbutus which is now fully funded with an anticipated opening in 2025;
- Ridership forecast modelling using the Region's latest transportation model including new population and student numbers for UBC;
- Review and update of technology assumptions; and
- Updated high-level capital cost estimates.

Bus rapid transit and streetcar systems were not considered as the 2012 Study found that they do not provide the capacity needed for the corridor today. The revised options from the 2012 UBC Line Rapid Transit Study are outlined below with figures provided in Appendix A.

- Baseline – truncated 99 B-Line bus service between the Broadway Subway terminus station at Arbutus Street and UBC
- Modified LRT1 – Surface running Light Rail Transit operating in-street along West Broadway and West 10<sup>th</sup> Avenue between Arbutus Street and UBC
- Combo1 – Light Rail Transit operating from Main Street-Science World Station to UBC via the existing rail right of way south of False Creek and in-street at grade along West Broadway and 10<sup>th</sup> Avenue west of Arbutus Street
- SkyTrain – An extension of the Millennium Line from Arbutus Street to UBC

To ensure comparable results, all options assumed the same station/stop locations which were approximately every 800 to 1000 metres to ensure travel times competitive with the automobile. All options were based on existing zoning and anticipated growth in the corridor and were assumed to begin operations in 2030.

The Mayors' Council will be presented with the results of the Rail to UBC Rapid Transit Study Technical Report on Thursday, January 24. The agenda for this meeting includes a summary report and presentation slides by TransLink and can be viewed at this [link](#). A summary of the key metrics from the technical report can be found in Appendix B. The full technical report can be found in Appendix C. Key findings include:

- The 99 B-Line between Arbutus Street and UBC (Baseline) will be overcapacity by opening day of the Broadway Subway (2025).
- The LRT based options (Modified LRT1 and Combo1) will be operating at, or over practical capacity within 10 to 20 years of opening (2045) with no ability to easily expand capacity in the future.
- SkyTrain was the only option that provided the scalable capacity needed to address the immediate transportation needs for the corridor, encourage transit ridership and provide for long-term growth.

Another key benefit of the SkyTrain option is that it draws riders from across the region off of parallel bus services on 4th Avenue, King Edward Avenue, 16th Avenue, 41st Avenue and 49<sup>th</sup> Avenue, relieving crowding on these routes and freeing up space on these busy corridors. Drawing regional riders from the other east/west routes to SkyTrain means that there is capacity well beyond 2045 to accommodate growth on these routes. All other options found that by 2045 almost all parallel bus services were crowded or overcapacity with minimal room for growth.

### **Review of Network LRT**

Given the capacity constraints on the LRT based options that focussed on the Broadway Corridor, four Network LRT concepts were explored as illustrated on pages 99 and 100 of Appendix C. These concepts added an additional LRT line along 41st Avenue to relieve pressure on the Broadway LRT. While the concepts attracted new riders to 41st Avenue and some attracted more overall new regional daily transit trips than a single SkyTrain line to UBC, they provided little relief to the Broadway LRT, which would still be crowded or overcapacity by 2045, approximately 15 years from opening day. The cost of the Network LRT concepts were greater than the cost of extending the SkyTrain under Broadway and the two LRT lines in the

Network LRT concepts would only provide 55% of the practical capacity of the less expensive SkyTrain to UBC. Both LRT lines in the Network concepts would be at capacity between 15 and 40 years from opening (2030) and as with the LRT on Broadway, the Network LRT concepts are not easily expandable.

### **Next Steps**

The updated technical analysis indicates that a SkyTrain extension from Arbutus to UBC is the one option that meets the long term capacity needs of the corridor and provides capacity on other east-west bus routes to address overcrowding well into the future. Based on these results TransLink is expected to report back to the Mayors' Council and will be seeking endorsement to move forward with a work plan that furthers the design development of SkyTrain west of Arbutus Street. The work is expected to review both horizontal and vertical alignments as well as include a comprehensive public consultation component.

A Council endorsement supporting SkyTrain technology west of Arbutus is consistent with the Mayors' Council plan and feedback received through public consultation. Council support for the extension of SkyTrain to UBC will allow TransLink and its partners to continue to advance the design and the delivery of a regional rapid transit connection to UBC. Recommendations, station and alignment options and engagement findings coming out of the further technical work will be brought to Council.

It is important that this work continues to move forward. This will ensure the region has a well-defined project with an understanding of project costs, benefits and public support. This will help to position this project along with other regional transportation priorities that will be submitted to federal and provincial governments to advocate for funding in upcoming investment packages, in advance of the next federal election in October 2019. Moving ahead to the next stage of the UBC SkyTrain project as this report recommends will send a signal to the federal government that this project should be considered a priority for new transit funding. Delaying this project could delay future federal funding by four years or more and will lead to further overcrowding on our transit system, increased car congestion and increased GHG emissions.

### ***Public/Civic Agency Input***

The University of British Columbia strongly supports moving towards business case development of SkyTrain west of Arbutus Street and advocating for senior government commitment to the extension. There is well documented evidence to support SkyTrain as the only option that will meet the long term transportation demands of the corridor and the growing region, and at the same time strongly supporting the affordability, sustainability and prosperity goals of our communities. UBC is committed to pursuing the line's completion to the Pt. Grey campus through the Board of Governors' approved strategy of business partnerships, technical collaboration and coordinated advocacy.

### ***Implications/Related Issues/Risk***

#### ***Financial***

TransLink or the Province will ultimately own and operate the extension to UBC. City staff will explore opportunities to support the project as the design development occurs similar to past rapid transit projects and will report these to Council.

**CONCLUSION**

A Network LRT concept costs more than SkyTrain, provides less overall capacity to UBC, and cannot be expanded. Therefore, staff recommend endorsement of a SkyTrain extension west of Arbutus to connect with UBC as:

- SkyTrain is the only option that provides the capacity for the long term needs of the corridor;
- SkyTrain provides the greatest improvements to travel time and reliability and attracts new transit riders;
- Overcrowding will be relieved on parallel bus routes that will create capacity well beyond 2045 to accommodate growth on these corridors;
- SkyTrain will allow room for increased ridership;
- SkyTrain has a high level of public support; and
- SkyTrain is a critical component of the City's transportation network and is required to achieve our mode share and GHG reduction goals.

Staff recommend moving forward with further SkyTrain design and consultation to determine the vertical and horizontal alignment from Arbutus to UBC and will report back to Council with results.

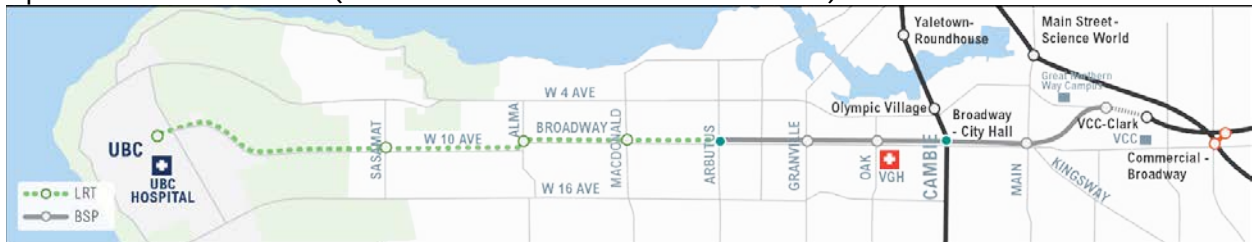
\* \* \* \* \*

## Appendix A: Rail to UBC Rapid Transit Study Options

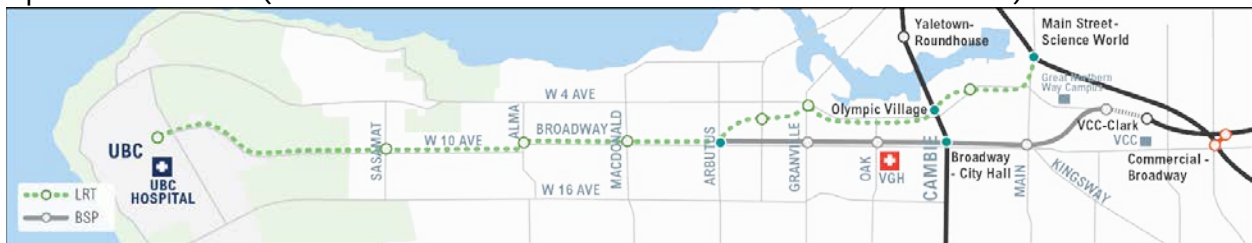
Option 1: Baseline (B-Line between Arbutus Street and UBC)



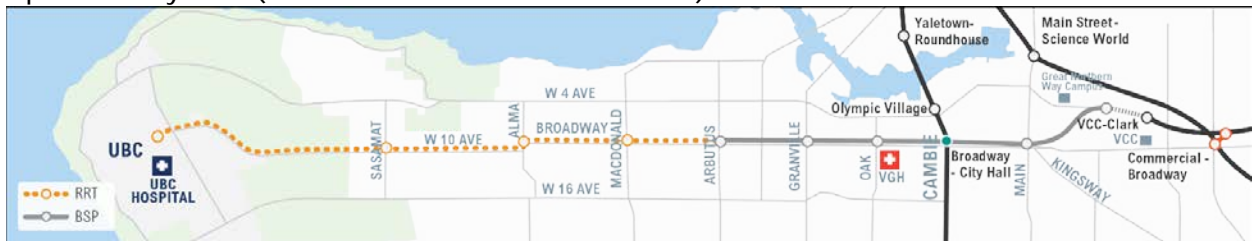
Option 2: Modified LRT1 (LRT between Arbutus Street and UBC)



Option 3: Combo 1 (LRT between Main Street Science World Station and UBC)



Option 4: SkyTrain (between Arbutus Street and UBC)



NOTE: All options assume the Broadway Subway from VCC-Clark Station to Arbutus Street

## Appendix B: Summary of 2018 Study Findings

	Baseline	Modified LRT1	Combo 1 (RRT/LRT)	SkyTrain
Travel time (min.s) <sup>1</sup>	20-22	17-19	17-19	10-11
Reliability	-	☑☑	☑☑	☑☑☑
Daily Boardings (2045) <sup>1</sup>	29K	66K	101K	119K
Practical Capacity (people per hour per direction)	2,100	6,120	6,120	10,600
% Practical Capacity (2045)	124%	96%	108%	94%
Expandable Capacity	Yes (up to 3,000)	No	No	Yes (up to 22,100)
Street level impacts	-	Yes	Yes	No
Number of Parallel Bus Services Crowded or Overcrowded (2045)	9/10	8/10	8/10	2/10
Capital Cost <sup>2</sup>	-	\$1.7-2.0B	\$2.8-3.2B	\$3.3-3.8B <sup>3</sup>

1. Arbutus Street to UBC
2. Preliminary estimates are in 2018 dollars for purposes of comparison. Costs at the actual time of construction would be impacted by inflation between 2018 and construction period. For example, assuming procurement in 2025, and 2.5% annual inflation, eventual Year of Expenditure dollars would be roughly 25% higher.
3. SkyTrain cost range assumes a fully tunneled alignment to UBC. Preliminary work to explore a partially elevated alignment suggests this range could be reduced to \$3.1 to 3.5B - to be further explored through upcoming concept design development.



## Appendix C: Rail to UBC Rapid Transit Study Technical Report