City of Burnaby

Item	
Meeting	2019 May 27

COUNCIL REPORT

TO:	CITY MANAGER	**DATE:**	2019 May 22
FROM:	DIRECTOR PLANNING AND BUILDING	**FILE:**	90300 20
		Reference:	*Burnaby Mountain Gondola Transit Project*

SUBJECT: BURNABY MOUNTAIN GONDOLA TRANSIT PROJECT

PURPOSE: To update Council on the Burnaby Mountain Gondola Transit project.

RECOMMENDATIONS:

1. **THAT** Council support, in principle, a gondola link from SkyTrain to the top of Burnaby Mountain, subject to the core principles identified in Section 4.6 of this report.

2. **THAT** a copy of this report be forwarded to Sarah Ross, Director, System Planning, TransLink.

REPORT

1.0 INTRODUCTION

The concept of a gondola linking Simon Fraser University and UniverCity to a SkyTrain station has been the subject of three studies in the last decade. TransLink is now asking whether Burnaby Council wishes this planning work to continue, and is seeking Council's support-in-principle for the project. This report provides background information on the current status of the project, to assist Council in formulating a position on the proposed Burnaby Mountain Gondola Transit project.

2.0 POLICY SECTION

This project supports the following goals and sub-goals of the *Corporate Strategic Plan*:

- ***A Safe Community***
  - Transportation safety –
    Make City streets, pathways, trails and sidewalks safer
- ***A Connected Community***
  - Geographic connection –
    Ensure that people can move easily through all areas of Burnaby, using any form of transportation
  - Partnership –
    Work collaboratively with businesses, educational institutions, associations, other communities and governments

The project also supports numerous goals under all six themes of the *Burnaby Transportation Plan*: Accessible, Healthy, Prosperous, Safe, Green, and Connected.

3.0 PROJECT DESCRIPTION

Simon Fraser University is the biggest transit destination in Burnaby that is not located on a SkyTrain line. Of the ten busiest bus stops in the city, six provide service to SFU (either at the campus or at SkyTrain stations). TransLink carries 25,000 passengers to or from the mountain every weekday. Demand is expected to rise with continued growth of the campus and the UniverCity community.

The combination of snow and steep grades can make provision of transit service to Burnaby Mountain difficult in the winter months. Service is interrupted or significantly delayed on about ten days annually, sometimes necessitating the closure of the campus so that students and staff can evacuate before that day's transit service is cancelled.

Recognizing the above, there have been discussions over the past decade about linking the campus and UniverCity to SkyTrain via a gondola. In theory, this could provide shorter travel times, more frequent departures, greater winter reliability, and reduced noise and emissions.

3.1 2009 SFU Study

The gondola concept was initially explored in a 2009 study[1] funded by the SFU Community Trust, possibly inspired by the Portland Aerial Tram: a then-new link from rapid transit to a hilltop university in southern Portland. Similar to the proposed Burnaby Mountain project, the Portland line passes over residential and forested areas.

3.2 2011 Business Case

Arising from the SFU study, TransLink commissioned the 2011 *Business Case*[2] which provided a comprehensive review of possible technologies and alignments.

The list of technologies included: diesel bus (existing), trolleybus, light rail, funicular, SkyTrain, escalator, five types of gondola, and other options. Most were found to: offer little value (poor travel time savings), have practical constraints (not able to deal with the required grades or carry enough people), or have unacceptable surface impacts (topography, property, environment). The technology choice was thus narrowed to the existing diesel buses or a gondola. The latter would be supported by tall towers to carry it over buildings and trees. The technology being contemplated allows for long spans between towers, thus minimizing the number of towers needed.

For the gondola alignment, four conceptual options were considered, as shown in ***Figure 1***. All four would pass over private lands and the Burnaby Mountain Conservation Area. The four options were compared on the basis of numerous criteria. Among the more significant findings:

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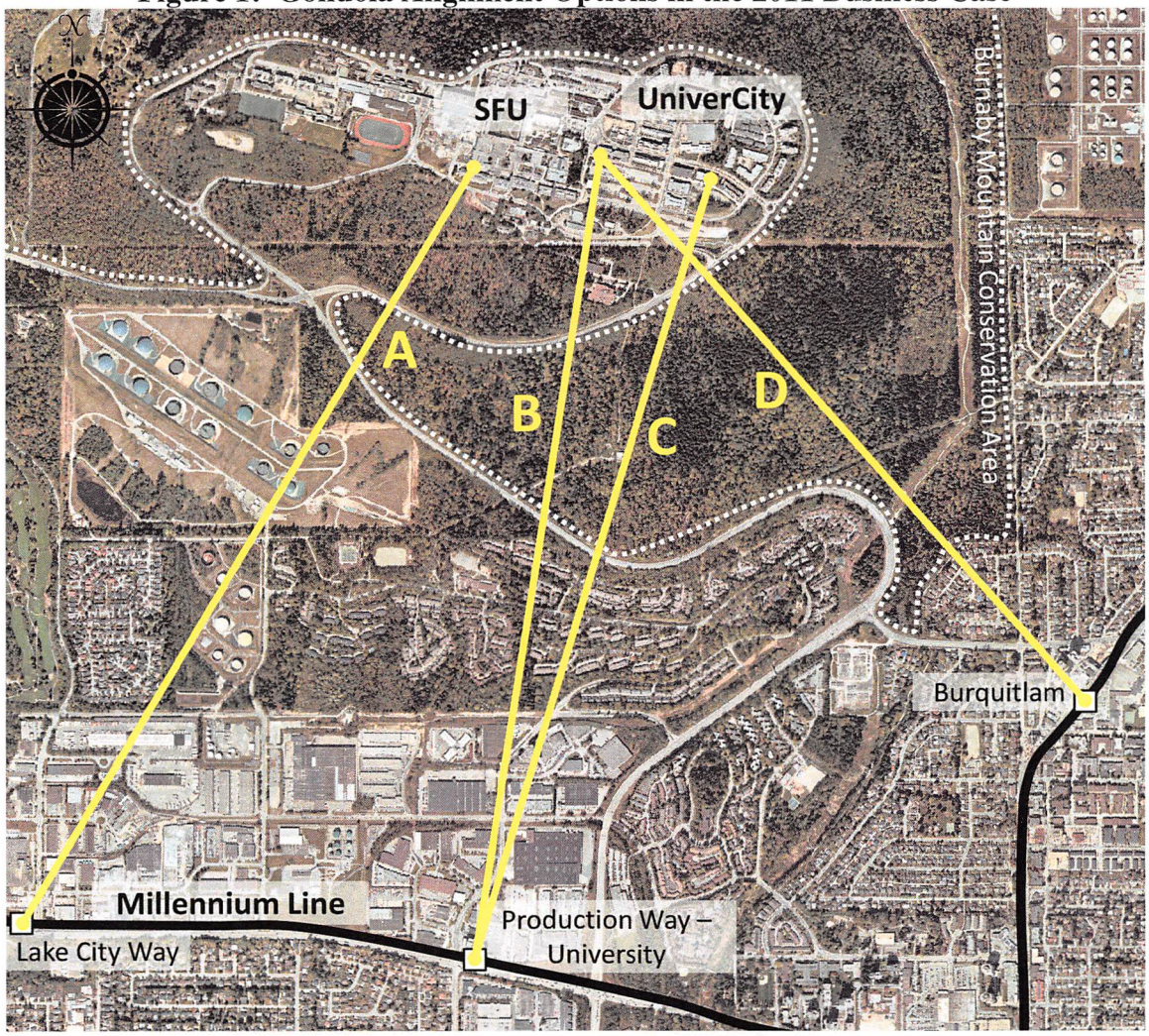
[1] Tupper, Bryce; *Proposed Burnaby Mountain Gondola Transit Project*; 2009 April 22.
[2] CH2M Hill; *Burnaby Mountain Gondola Transit – Business Case Report*; 2011 October.

Figure 1: Gondola Alignment Options in the 2011 Business Case



- Lake City Way Station to SFU entrance (Option A) would pass directly over two tank farms. The provincial safety regulator advised that they would not permit this alignment. Option A also had low ridership, partly due to less-convenient locations for both the upper and lower terminals.

- Production Way – University Station to SFU bus loop (Option B) would provide good access to both the campus and UniverCity. Option B was found to be the best option from a transportation perspective (shortest travel times and highest ridership).

- Production Way – University Station to UniverCity (Option C) had a less-central location for the upper terminal, and thus provided poorer service.

- Burquitlam Station to SFU bus loop (Option D) had poor integration with Burquitlam Station and greater impacts to Burnaby's conservation lands situated below the university.

The three technically-viable options (i.e., with Option A eliminated by the safety regulator) all had residential impacts in that they pass over people's homes. Ultimately, the *Business Case* recommended Option B as the preferred alignment because it:

- minimized impacts on the City's conservation areas;
- minimized residential property crossings;
- minimized route length and travel time;
- maximized integration with transit facilities and SFU / UniverCity;
- limited the conflicts with utilities; and,
- had good potential for low-impact tower locations.

For this alignment, it was estimated that five towers would be required.

The use of gondola technology was also found to have the following benefits over bus:

- shorter travel times (6.5 minutes versus 15 minutes), effectively bringing SFU and UniverCity "closer" to the Lougheed Town Centre and the rest of Burnaby;
- more frequent service, with peak-hour departures estimated to be every 34 seconds (as compared with every four or five minutes for the #145 bus service that presently links the mountain to Production Way – University station);
- reduced noise and emissions via elimination of route #145 (it was assumed that bus routes from other directions would be retained);
- corresponding reductions in operating costs;
- increased reliability in snowy conditions, reducing the need for weather-related campus closures; and,
- ability to accommodate forecasted ridership increases.

There was a positive Benefit / Cost Ratio for the preferred option, based primarily on benefits from reduced travel times and operating costs.

TransLink conducted a public consultation process in 2010 and 2011 to seek preliminary input on the concept. Key themes in the responses included:

- resident concerns regarding privacy, safety, noise, and neighbourhood character;

- environmental concerns regarding impacts to the conservation areas and the need to minimize impacts on trees and wildlife;

- support for the project's ability to deliver faster and more reliable transit service with reduced greenhouse gas emissions;

- safety and security concerns for riders; and,

- the cost of the project and its relationship to other projects in TransLink's plans and priorities.

Council received a report on the concept on 2011 January 24, prior to the completion of public consultation or release of the *Business Case*. Council instructed staff to continue working with TransLink on developing the project to the point where Council could consider whether or not to endorse it.

3.3 Ten-Year Vision

TransLink's current guiding document for investments in the short- and medium-term is the *Ten-Year Vision*[3]. Released in 2014, it did not include the gondola as a capital project but supported continued work on the concept, stating:

> "There are currently 25,000 daily bus trips to and from Burnaby Mountain, and demand is expected to grow by 60% in the next 20 years. This may require a high-capacity connection from the mountain to the nearest SkyTrain station. This initiative requires further investigation and consultation, and could be advanced subject to the business case, funding, partner contributions and achievement of other initiatives contained in this Vision."

3.4 2018 Feasibility Study

Following through on the statement in the *Ten-Year Vision*, TransLink has recently released a new *Feasibility Study*[4] for the gondola.

The *Feasibility Study* has a project purpose and objectives that are largely unchanged from the earlier *Business Case*. The project purpose is "to improve travel time, frequency, and reliability compared to existing bus service, and to reduce environmental impacts." A list of 23 project objectives is grouped into seven categories: transportation, financial, environmental, urban development, economic development, social and community, and deliverability.

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[3] Mayors' Council on Regional Transportation; *Regional Transportation Investments – a Vision for Metro Vancouver*; 2014 June.
[4] CH2M Hill Canada Ltd.; *Burnaby Mountain Gondola Transit – Feasibility Study*; 2018 April.

Among the new findings:

- Demand continues to increase, and peak-hour travellers now report that up to four full buses will pass them by before they can board.

- A gondola could provide an emergency evacuation route from the mountain if road access were cut off due to an incident at the tank farm (which is adjacent to the only two roads serving the campus).

- The capacity of a gondola car would depend on the choice of supplier, but a 33-passenger car is considered illustrative.

- Production Way – University station was still considered the preferred southern terminal and the existing SFU bus loop the preferred northern terminal.

- Towers would be 30 to 80 metres tall, and would typically have a footprint of 20 metres by 20 metres. Mid-span between towers, the gondola cars would typically be about 30 to 35 metres above the ground, to keep them above the trees.

- Recognizing resident concerns about a gondola over their homes, the original straight alignment was compared with a new option that avoided people's homes by bending around the residential area. The two options are shown in ***Figure 2***. Option 1 (direct alignment) is equivalent to TransLink's preferred Option B from the 2011 *Business Case*.

- Option 2 (two-stage alignment) follows Gaglardi Way for a significant distance, passing near multi-family residential properties to the north and south. It would require a mid-station where gondola cars would decelerate, make the 90-degree turn, and then re-accelerate. The mid-station would be located in the Burnaby Mountain Conservation Area.

- To keep from passing over any homes, Option 2 would have a southern terminal located some distance away from Production Way – University station. People would need to walk about 200 metres between the gondola and the SkyTrain station.

- Option 1 would be 2.7 kilometres long and Option 2 would be 3.4 kilometres (26% longer). As a result, Option 2 was found to have significantly higher travel times, capital costs, and operating costs. Ridership was projected to be lower. Option 2 would require an additional building, namely the mid-station at the 90-degree bend. It would also span a greater distance across the Burnaby Mountain Conservation Area and would thus likely need a tower (with an on-going requirement for an access road) in the middle of the Burnaby Mountain Conservation Area. While it would not pass directly *over* any homes, it would pass *close* to more homes than the straight alignment. For these reasons, the *Feasibility Study* concluded that Option 1 was still the preferred option.

- The Benefit / Cost Ratio for Option 1 was 1.8. That is, over the project lifetime, project benefits are expected to exceed costs by 80%. This is a better result than most rapid transit projects in the region.

Figure 2: Gondola Alignment Options in the 2018 Feasibility Study

3.5 Proposed Next Steps

TransLink is now seeking senior government funding to continue the planning process. They have outlined a nine-point plan leading to a decision on whether or not to build a gondola. Their proposed steps are:

1. Seek more certainty around funding options.
2. Form a project team.
3. Confirm the project definition.

4. Conduct environmental and community impact assessments, including substantial stakeholder engagement with local residents.

5. Refine the project design to mitigate any impacts.

6. Update the analysis of procurement options.

7. Finalize the business case.

8. Incorporate the project into an Investment Plan (which could include other projects around the region) with region-wide public engagement. Under their legislation, this is the process by which TransLink obtains approval for major expenditures.

9. Deliver the project, if confirmed by the preceding tasks.

TransLink is prepared to advance consideration and review of both Options 1 and 2 at this time. After public consultations in step 4, TransLink and the City would need to agree on a single option to advance through the rest of the steps in the work program.

4.0 DISCUSSION

This section provides Burnaby staff commentary on the project.

4.1 Purpose and Objectives

The project purpose inherently prioritizes traveller benefits over other objectives. The project would not be worth pursuing if it did not provide traveller benefits. However, as with most transportation projects, the people experiencing the negative impacts are not necessarily those that receive the project's travel benefits. It is therefore important to consider the benefits and impacts of the proposed project at a broader level.

4.2 Technology Options

Work to date has demonstrated that gondola technology is the only viable alternative to buses for transit access from SkyTrain to SFU and UniverCity. This is a reasonable conclusion given the constraints on access to the top of Burnaby Mountain (topography, property, environmental, etc.).

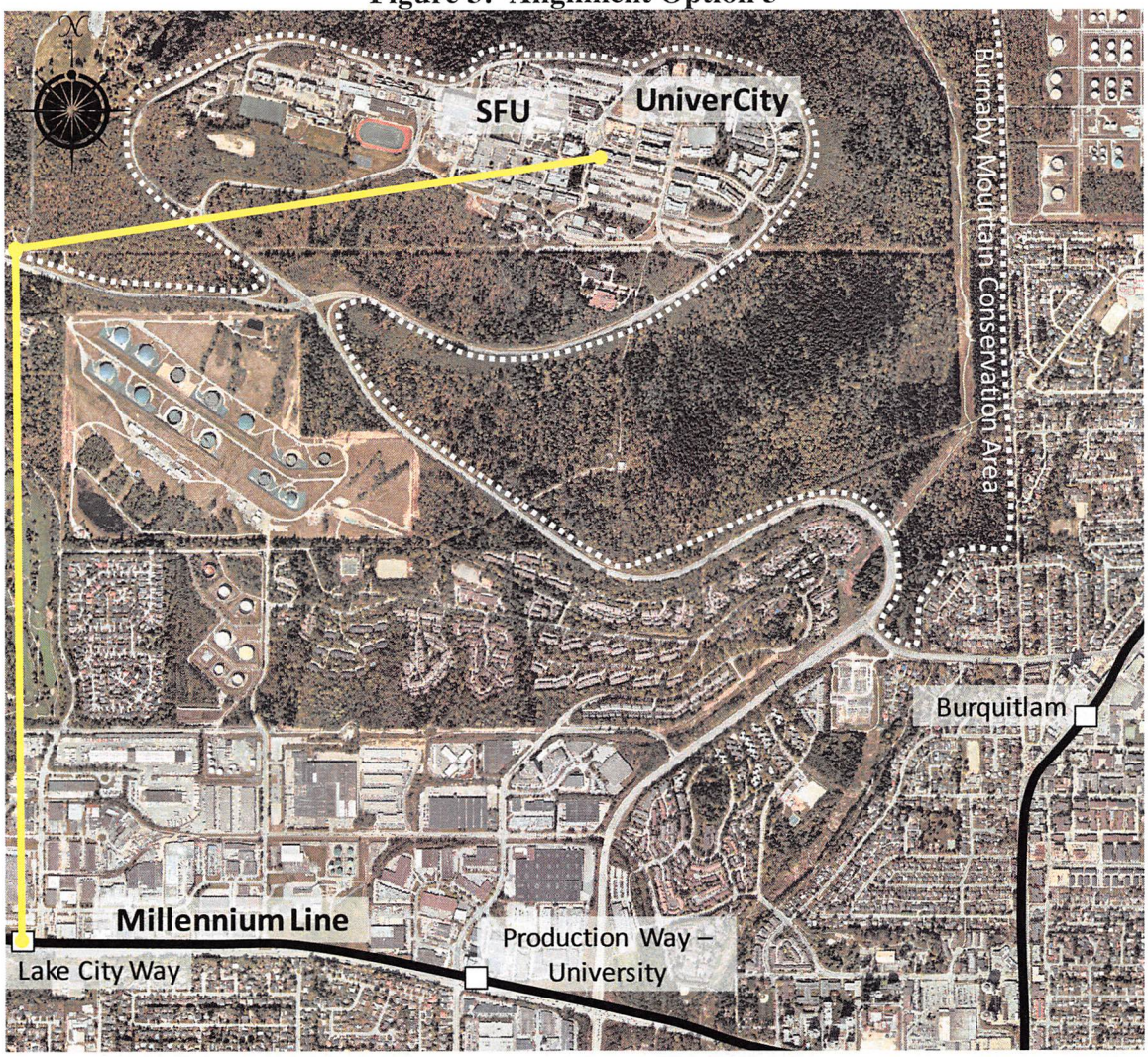
4.3 Alignment Options

Any gondola should connect to SkyTrain, which brings people in from across the region. For maximum traveller benefits, the clear preference is for a connection at Production Way – University station. This station is on both the Expo and Millennium Lines, thus providing the best service to the most people. It maximizes the travel benefits of the project, including a mode shift away from cars to transit.

It should also be noted that some of the options examined in the 2011 *Business Case* may no longer be feasible due to ongoing development at Burquitlam and UniverCity.

There are other alignment options beyond those considered in studies to-date. For example, one of the options explored in the 2009 SFU study was similar to that shown in ***Figure 3***. This alignment, referred to herein as Option 3, would stay further away from homes by passing over Burnaby Mountain Golf Course, west of the tank farm. At 4.3 kilometres, this concept would be 59% longer than Option 1 and 19% longer than Option 2. Though not essential, Option 3 would attract higher ridership if Expo Line service was extended from Production Way – University Station to Lake City Way Station. As will be seen below, Option 3 would appear to offer an alternative with lower impacts to residents, riparian areas, and the Burnaby Mountain Conservation Area.

Figure 3: Alignment Option 3



4.4 Benefits and Costs

It is clear that a gondola project would have many benefits, including:

- shorter travel times;
- more frequent departures;
- higher ridership;
- higher capacity;
- reduced noise and emissions, by eliminating route #145 which has fully-loaded diesel buses climbing an 8% grade;
- lower operating costs;
- increased reliability in winter weather; and,
- increased resilience by creation of a third route off the mountain.

Those benefits are generally higher for Option 1.

Aside from capital and operating costs, the cost estimates include the costs to purchase aerial rights for the gondola to pass over private property. This applies to businesses in all three options and homes in Option 1.

As noted previously, the Benefit / Cost Ratio for Option 1 was found to be 1.8. The *Feasibility Study* did not determine a Benefit / Cost Ratio for Option 2, since it was not favoured. However, it would clearly have lower benefits and higher costs (both capital and operating) than Option 1. Using information in the *Feasibility Study*, City staff have *estimated* a Benefit / Cost Ratio of 0.7 for Option 2. That is, costs would exceed benefits.

City staff have similarly estimated the performance of Option 3, though to a lower level of accuracy than the Option 2 estimate. Option 3 has a similar travel time to Option 2 (more on-board time but it eliminates the 200-metre walk between the gondola and SkyTrain. The longer route results in higher capital and operating costs. The City's analysis did not include an extension of the Expo Line to Lake City Way Station, and therefore requires an additional transfer for travellers using the Expo Line (which would reduce gondola ridership). Option 3 was estimated to have a Benefit / Cost Ratio of 0.6. A variation that included extending Expo Line operations to Lake City Way Station would have higher benefits and costs, and might result in a better Benefit / Cost Ratio.

4.5 Impacts

Conversely, the project would also have impacts which require careful consideration:

- **Privacy:** Existing SkyTrain lines have been routinely built next to existing or future homes, and provide views into people's back yards and windows. A gondola could potentially have similar impacts. Option 1 could have the highest privacy impacts, as it would pass over townhomes and close to others. Options 2 and 3 do not cross directly

over any homes, but are close to some. Impacts would vary with the alignment details and presence or absence of screening trees.

There are also design options for the gondola cars that could reduce the privacy impact on any alignment. Examples include:

- positioning or angling of the windows to restrict downward vision;
- use of fixed horizontal blinds that allow passengers to look out but not down; and,
- privacy glass, in which an imbedded layer can be used to instantly switch the window between transparent and opaque, blocking views in specific directions only when necessary.

TransLink will need to review and identify how to appropriately mitigate privacy impacts to residents and businesses.

- **Aesthetics:** Mid-span, a gondola would have a much smaller visual impact than a SkyTrain guideway: three wires instead of a large concrete girder. Visual impacts in the parks and, to a lesser extent, the residential areas would be screened by trees. The unique aesthetic impacts are largely due to the height at which the gondola would operate. There would likely be five tall towers in Option 1 (more in Options 2 and 3), though at many locations the visual impact would be softened by the presence of tall trees.

- **Noise:** As noted above, there would be noise reductions from the elimination of one of the busiest diesel bus routes in Burnaby. Without a gondola, bus noise would increase commensurate with the projected 60% increase in demand. In contrast, the gondola cars are expected to be largely silent. Shielding residents from passenger noise would need to be considered during design of the gondola cars. The primary noise from a gondola is associated with the cars passing each of the towers, which generates a rumbling sound. It would be important to position the towers to minimize the noise impacts to residents in Forest Grove and UniverCity. There would also be mechanical sounds at the terminal stations and, in Options 2 and 3, at the mid-stations.

- **Parks:** Options 1 and 2 pass over City green spaces for about one kilometre, and Option 3 for about two kilometres (including Burnaby Mountain Golf Course). All three options cross the Burnaby Mountain Conservation Area, heavily forested with a mix of coniferous and deciduous trees. This provides an urban "wilderness" environment for park users.

  People hiking or cycling would probably be unable to see the gondolas passing overhead in the summer, though more so in the winter when trees have shed their leaves. As noted, there would be some rumbling noise at the towers.

Option 2 has the largest park impacts. It would have a mid-station in the Burnaby Mountain Conservation Area, near Gaglardi Way. It would also likely have a tower located in the heart of the Burnaby Mountain Conservation Area, plus an access road for maintenance. The tower and access road would detract from the "wilderness" experience in that area.

The Burnaby Mountain Conservation Area has two forms of legal protection that restrict what can be built there. The first consists of City park dedication bylaws spanning most of the conservation area. These restrict the use of the land to park purposes, though some exceptions are permitted. It is unlikely that the park dedication bylaws would need to be repealed, though this would be the subject of further review if the project advances. It would therefore be important to minimize the physical footprint of the gondola system within Burnaby parks.

The second form of protection is in the form of a restrictive use covenant registered in favour of the Province. This covenant covers more than half of the conservation area, and states that "the Land will be used as public park, within which the [City] may develop only a public trail system, paths, small parking lots and other support facilities (which may include picnic facilities) for the trail system but the [City] will otherwise use the Land only as a conservation area" unless the Province provides a waiver. It is thus likely that any gondola alignment would be contingent on obtaining the Province's waiver.

- **Environmental:** Option 1 crosses several road allowances which would provide easily-accessible tower locations while minimizing impacts to environmentally-sensitive lands. Conversely, Option 2 may have the above-noted impact of a tower and access lane in the Burnaby Mountain Conservation Area.

  Option 2 has another impact: the mid-station would almost certainly be located within the riparian area of tributaries feeding Stoney Creek and would significantly impact that area. Stoney Creek is the healthiest and most productive stream in Burnaby, and the surrounding riparian area is of particularly high ecological and aesthetic value. Though not currently proposed, the stream impacts would be more severe if Option 2 incorporated a bus loop at the mid-station for a bus link to Burquitlam station.

  It is anticipated that all alignments would cross above existing trees, minimizing or eliminating damage to trees in the park and conservation areas. However, depending on the gondola height, it may be necessary to manage tree heights in the future to keep them from growing into the space used by passing gondola cars.

- **Businesses:** Any of the three alignments would pass over several existing buildings, typically warehouses or light industrial sites. Impacts are likely to be minor. Option 1 also passes near a couple of existing office developments, though the privacy strategies identified earlier for the residential properties would also work to the benefit of offices.

The business properties are located within the Lake City Mixed-Use Area, and the City's plans designate this as a Business Centre district. Consideration must be given to how the gondola might affect the redevelopment of these sites, such as building placement and height, as the area transitions in fulfilment of the *Lake City Business Centre Guide Plan.*

Conversely, a stronger linkage to SFU would be desirable for some businesses. The Burnaby Board of Trade is among the organizations that have expressed support for the project.

- **City infrastructure:** Some of the gondola towers would likely be located adjacent to City streets, potentially within the road allowance. At the design stage, it will be important to protect for existing and future City requirements for roadways, utilities, etc.

At this stage of the project, it is difficult to evaluate the magnitude of the various impacts. These will vary with the location and footprint of the towers, gondola height at any given location, gondola car design, etc. There is still a considerable degree of uncertainty as to how extensive the impacts would be, and to what degree they could be mitigated through good project design. Should the project advance, it would be important for TransLink to provide more details on specific project impacts, and communicate that information effectively to the public.

4.6 Core Principles

The work to-date has demonstrated that there are significant benefits from providing a high-capacity rapid transit link from the top of Burnaby Mountain to the rest of the rapid transit network. It has also been demonstrated that, in view of the surrounding land uses and topography, a gondola is the only viable technology (other than buses) for achieving that link.

However, a gondola also has a range of potential impacts as explored above. If TransLink opts to pursue the work program described earlier, the City considers it important that the project be guided by the following core principles:

1. **Residents** – minimize impacts to residents living near the gondola. This should be considered in all stages of the project, including alignment selection, tower locations, gondola car design, construction, etc.

2. **Environment** – minimize impacts to areas with high ecological value, including important fish-bearing streams and their surrounding riparian areas.

3. **Compensation** – provide fair compensation to affected property owners for intrusion of the gondola, both for its physical footprint on their lands and its aerial passage over them.

4. **Options** – as Option 3 appears to have lower residential and environmental impacts than Options 1 or 2, all three options should be considered on an equal basis in the next stage of analysis and public consultation. Option 3 should be considered both with and without the extension of Expo Line operations to Lake City Way Station.

5. **Consultation -** engage the community in meaningful consultation, especially with respect to alignment options, and report back to Council on the results prior to beginning the nine-point work program noted above.

It is recommended that Council express support, in principle, for the gondola project provided that the above core principles form the basis for further analysis and stakeholder engagement.

5.0 CONCLUSION

At this time, TransLink is seeking support in principle from Burnaby Council, indicating a willingness to begin the nine-point work program identified by TransLink as described in Section 3.5 ("Proposed Next Steps"). In the absence of that support from Council, it is likely that TransLink would terminate the project.

TransLink has undertaken studies that indicate that there are strong traveller benefits from a rapid transit link from Burnaby Mountain to SkyTrain, and that a gondola is the only viable technology for achieving that link. Various alignments and design options are available for consideration, and it should be emphasized that Council's support-in-principle does not extend to the selection of a preferred alignment at this time, but rather is limited pending the outcome of community consultation.

It is recommended:

1. **THAT** Council support, in principle, a gondola link from SkyTrain to the top of Burnaby Mountain, subject to the core principles identified in section 4.6 of this report.

2. **THAT** a copy of this report be forwarded to Sarah Ross, Director, System Planning, TransLink.

E.W. Kozak, Director
PLANNING AND BUILDING

SR:sa/tn

cc: Director Engineering
Director Corporate Services
Director Parks, Recreation and Cultural Services
Director Public Safety and Community Services
City Clerk