# Business Case for the Millennium Line Extension to UBC

**Evaluating the Strategic, Economic, and Financial Case Through A Multiple-Accounts Cost-Benefit Analysis**

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Extending the Millennium Line to the UBC campus (Figure 1.) will provide numerous benefits to the Vancouver community: **time savings of up to 20 minutes**[1] or more for users travelling along the entire extension, **improved access to jobs for 75 census tracts**, upzoning and land value capture opportunities around stations, greenhouse gas emissions reductions, and equity improvements.

For these reasons the Millennium Line should be extended to UBC campus. Although the cost is expected to be high (the comparable Broadway Extension cost $2.9 billion[2] for a similar length, other cost estimates equate to ~ **$4.8 billion**[3]*)*, other modes would struggle to handle the demand of the corridor. An extension of the Millennium Line would provide transit capacity for sustained growth while improving the commute of tens of thousands of daily riders.


*Figure 1. Proposed Millennium Line UBC extension*

This supports the expectation that serving a large university dramatically shifts ridership patterns and reduces pressure on parallel bus corridors, just as the Broadway–UBC corridor would.

## *Strategic Case*

The Millennium Line extension is estimated to serve an average of 130,000 daily passengers by 2050[1], with an estimated **85,545 daily passengers** in Year 1. Many of these riders are expected to be current users of the transit system, particularly from the bus routes serving Commercial-Broadway, the **third-busiest SkyTrain station in 2024**[4]. If the line opened today, its estimated opening day ridership would already account for nearly a quarter of the total 2024 ridership for both the Expo and Millennium lines, and nearly 18% of the total SkyTrain ridership[4].

New 2016 Link stations at Washington University and Capitol Hill in Seattle **overperformed expectations** and grew by 705% and 850% between 2016 and 2017, amassing ridership higher than all but one station[5]. This is relevant to Vancouver because UBC has a similar captive ridership base and constrained bus corridor, meaning rail investment is likely to produce similarly disproportionate ridership gains. The York University station in Toronto was so successful (27,500 daily boardings after one year of operation) that Metrolinx closed the York University GO station in 2021 due to a decline in GO boardings[6].

**Resident support** for the project is high, a TransLink survey showed that 92% of residents support the project [7]. Commuters between these two nodes are expected to save 20 minutes on their daily commute[1], with lesser but still significant time savings for those who do not travel along the full route. An extension of the Millennium Line to UBC campus would satisfy several goals outlined in the Vancouver Plan, namely creating convenient transit, supporting economic strength, addressing the spatial mismatch between jobs and housing, and combating underutilized neighbourhoods[8].

## *Economic Case*

The extension's largest benefit comes from fare revenue. Fare revenue would bring in **$3.1B** over 30 years and the extension would have a farebox recovery ratio of 0.48 in the first year of operation, exceeding the 0.45 threshold. The second largest benefit would be experienced through travel time savings, which could be as high as 20 minutes[1] for many users, but are approximated at 13.75 minutes for all users of the line.

Since detailed rezoning and land value capture (LVC) forecasts for the Broadway–UBC corridor are not available, this analysis applies TransLink's own conservative estimate

that LVC mechanisms could generate approximately $25 million annually region-wide[9]. Given that the Millennium Line extension would be one of the region's largest transit-induced rezoning catalysts and the line is following employment areas in need of densification, it is reasonable to assume the project could capture a similar order of magnitude of revenue. This is seen globally, more than half of Hong Kong's transit revenue comes from development along stations[10]. Examples from the UK have seen the Northumberland line raise 37% of its capital cost and the Elizabeth Line is expected to raise at least £4.2 billion from land value capture strategies by 2041[11]. These illustrate that LVC for rail is not theoretical; Western cities have successfully applied it at scale.

### *Financial Case*

Based on the cost and benefit assumptions used in this analysis, the extension does not generate a positive internal rate of return, and would rely on sustained public operating and capital funding. In order to be financially sustainable, the Millennium Line extension would need an annual subsidy of at least $48 million, peaking in year 30 at $95 million.

Assuming the same investment proportions as the Broadway Subway Extension, Vancouver would need $4.64 billion in funding from the federal and provincial governments. UBC has pledged to contribute to the construction of the line, but exact contributions remain uncertain. Assuming a 4% discount rate, the net present value for the project sits at -$3.9 billion. TransLink would require operating subsidies of approximately $1.81 per boarding over the first 30 years of the project. This figure is low compared to the $4.30 per boarding in subsidies and other income that TransLink currently requires systemwide.

When converted to monetary values for comparison, the benefits of a Millennium Line extension cover 71% of the 30-year costs of the project (Figure 2). Even without land value capture, travel time savings and fare revenues cover 62% of the 30-year costs. Although substantial, these quantified economic benefits do not exceed the 30-year financial costs of the project, resulting in a negative net present value. This is typical for major rapid transit investments in Canada, where strategic and societal benefits justify public funding despite financial shortfalls. A 2012 study of the Eglinton Crosstown Line in Toronto estimated that the most financially productive option would only recover ~52% of the capital investment[12].

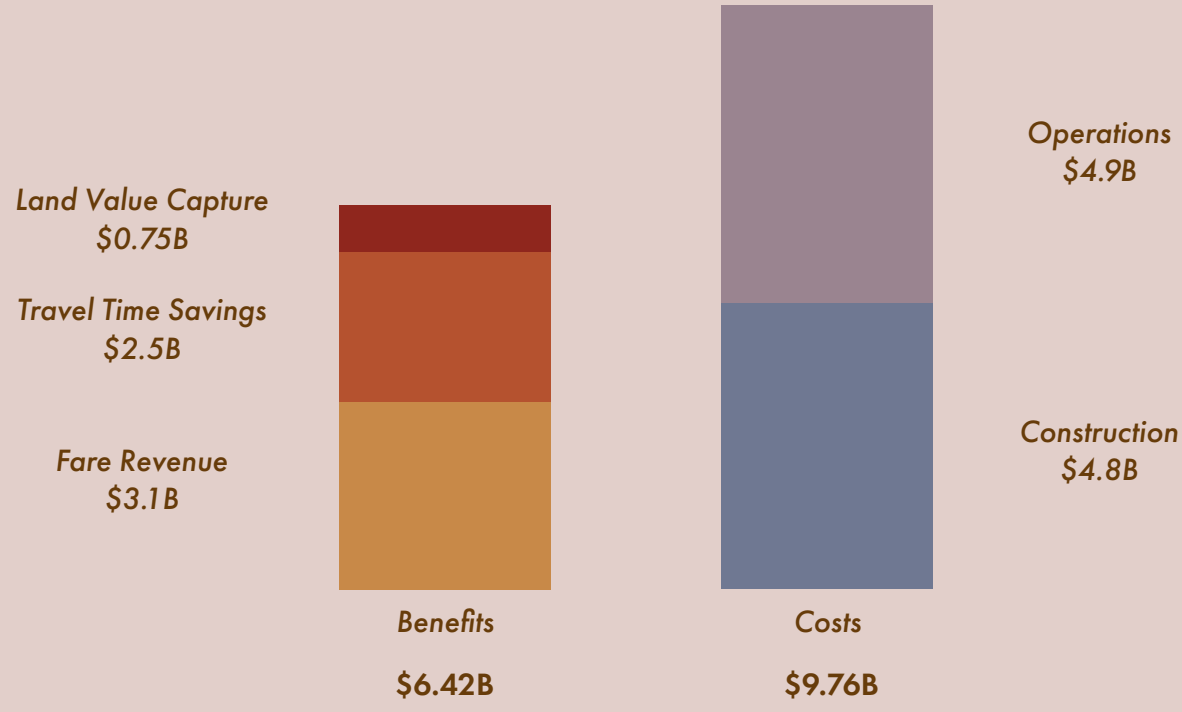


**Figure 2.** *Total costs and total benefits associated with the Millennium Line extension over 30 years*

### *Multiple Accounts Cost Benefit Analysis*

For this analysis, greater weight is placed on customer service and social accounts, consistent with Vancouver's stated objectives around accessibility, housing affordability, and equity. Financial, economic development, and environmental considerations follow. Overall, the project generates substantial societal benefits but does not fully recover its capital or operating costs.

**Financial Account:** The extension performs poorly in the NPV and IRR calculations, resulting in a large negative financial return even after including fare revenue, travel-time savings, and land-value capture. Capital cost impacts (score: 4, negative) and ongoing operating costs (score: 3, negative) weigh heavily against the project. However, two financial indicators are moderately positive: the required subsidy per boarding is lower than TransLink's current systemwide subsidy, and strong long-term demand slightly offsets annual deficits. Despite these modest positives, the overall financial case remains negative.

**Economic Development Account:** Economic impacts score consistently positive. The extension supports elements like employment growth, business development, infill, university reach, and regional economic productivity. By connecting UBC, which is one of the region's largest employers and research hubs, the project strengthens the reach of the university, housing options for researchers and students, and ability for research partnerships. Land value capture around stations leads to sustained revenue streams for local governments. Overall, economic development scores moderately to strongly positive.

**Customer Service Account:** The customer service account scores highest because the extension addresses the region's most overcrowded bus corridor and improves reliability for more than 85,000 daily riders. Accessibility gains are substantial, with 75 census tracts seeing improved access to jobs and education within 60 minutes (Figure 3). Multimodal integration with the existing SkyTrain network and the future Broadway extension further strengthens systemwide connectivity.

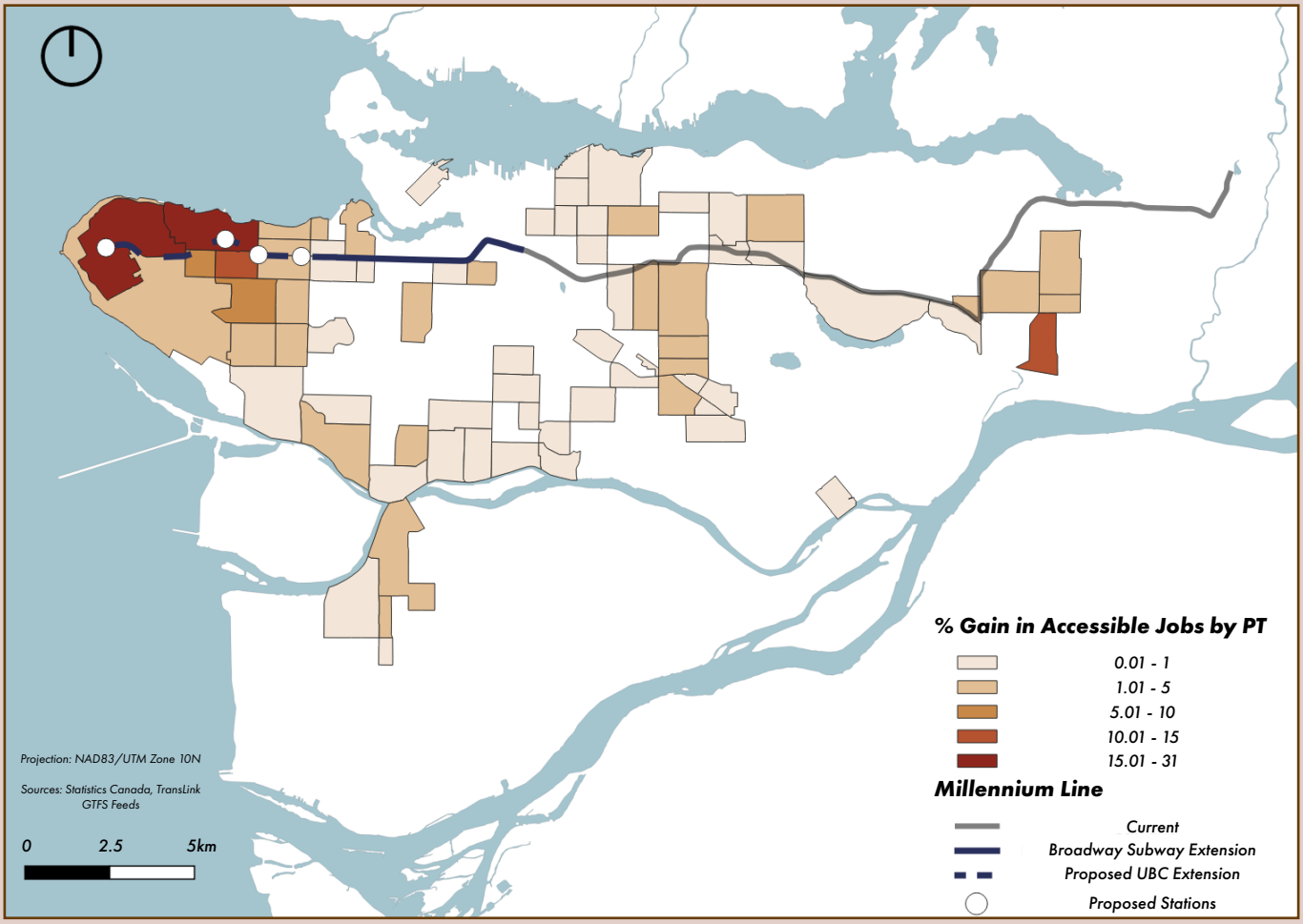


*Figure 3. Accessibility gains to jobs by public transit with a 60 minute travel time*

Moderate travel-time impacts for shorter trip riders (10–20 min savings) provide widespread benefits. Overall, this category is strongly positive.

**Social Account:** Social impacts are mixed. Some residents will be negatively impacted by the noise and vibrations of a new rail line, however the line serves many students and low income riders which creates a strong overall score for vulnerable populations. Concerns exist about the potential for fragmentation and gentrification but these can be mitigated through strong place-based planning approaches and inclusionary zoning policies. The net score is slightly negative but that could change with successful mitigation strategies.

**Environmental Account:** Environmental outcomes are mildly positive. Mode shift from private vehicles to SkyTrain results in lower carbon emissions and reduced regional pollution. However, construction-related impacts such as vibration, noise, and local ecosystem disruption along the corridor produce small negative effects. Over the long term, operational emissions are low and consistent with regional climate goals. This account scores overall slightly positive but not transformative.

## Conclusion

The Millennium Line extension's projected costs are significantly more than its projected benefits. Despite the costs, the project has the potential to recoup 71% of the 30-year costs through accrued benefits, land value capture, and fare revenue. An accessibility analysis shows that the UBC link would be an invaluable addition to the city's network and would allow university students and staff to access a wider range of housing choices, be better equipped to participate in the city's economy, and have a wider range of research opportunities. A multiple accounts analysis suggests that the project would perform particularly strongly in customer service and economic development, moderately in environmental impacts, unevenly in social impacts, and poorly in financial impacts. This is typical for Canadian rapid-transit projects that rarely produce positive financial returns but provide societal, accessibility, and productivity benefits.

The City of Vancouver should place particular emphasis on continued use of land value capture as a tool for realizing property value gains around new rapid transit stations. The Millennium Line extension aligns with Vancouver's long term plans; it sensibly adds to the existing transit network, significantly increases accessibility around the line, allows for neighbourhood intensification, and creates a reliable connection to the city's largest university.

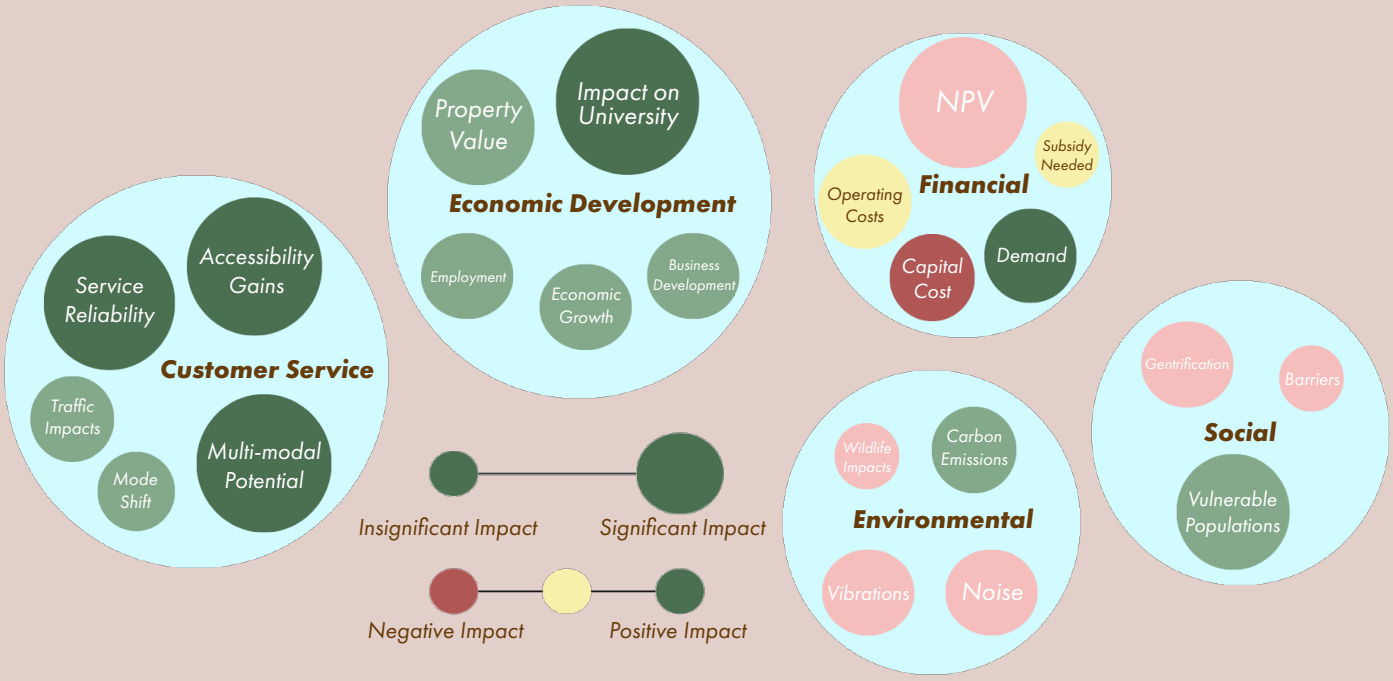


*Figure 4. Visualization of multiple account cost benefit analysis*

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## Appendix

### Ridership Calculations

Expected ridership for the UBC extension was based on the TransLink projection of 130,000 daily riders by 2050. The extension was assumed to be completed in 2035 meaning that 2050 would be year 15 of operations. Ridership was backwards calculated assuming a 6.8% ridership growth from year 1-6 and a 1% growth beginning in year 7 of operation.

### Economic Calculations

The average fare per boarding was calculated indirectly because TransLink reports fares on a per-journey basis[9]. First, the ratio of boarded passengers to journeys was used to determine the average number of boardings per journey. Then, the reported average fare per journey was divided by this ratio to obtain the average fare per boarding ($1.65). This value was applied to the total number of boardings to estimate annual fare revenue for the UBC extension. Fare revenue was assumed to grow by 2.6% annually over 30 years, consistent with the growth seen between 2023-2024 for TransLink[9]. Fare revenues equal $45,591,207 in the first year of operations.

Time savings were derived from a TransLink estimate of 20 minute savings between UBC and Commercial-Broadway[1]. Full 20 minute travel time savings were assumed for 50% of riders given UBC's prominence as a terminus. 10 minute travel time savings were assumed for 25% of riders and 5 minute travel time savings were assumed for the final 25% of riders.

The average cost per boarding was calculated indirectly as well because TransLink reports total expenditure by transit mode, and the total number of boardings on an average daily basis per day type (weekday, Saturday, Sunday)[9]. 2024 expenditure on rail operations ($457,705,000) was used as the total cost. Rail boardings were calculated by assuming 260 weekdays, 52 Saturdays, and 53 Sundays with the totals added proportionately. Annual rail cost was then divided by annual rail boardings (158,143,416) to determine the average cost per boarding ($2.89)

### Financial Calculations

Construction costs were assumed to be $4.8 billion, based on the results of a 2019 TransLink report, adjusted for inflation to 2024 currency[3]. An assumption was made that the federal government would contribute $1.46 billion (30.3% of total), the provincial government would contribute $3.18 billion (66.2% of total) which is consistent with the contribution proportions from the Broadway Subway Project[13]. The remaining costs would be financed through a 30-year fixed-payment loan financed at a rate of 8%. This would result in annual payments of $14.5 million for the first 30 years of the project. No cost overruns were factored into the capital cost calculation.

### Accessibility Analysis

To evaluate the accessibility impacts of the Millennium Line extension, a travel-time matrix was generated using the r5r package in R for all census tracts (CT) in the Vancouver CMA. This matrix was joined with 2016 CT-level employment data to calculate the total number of jobs reachable within 60 minutes by public transit. Because the standard TransLink GTFS feed does not yet include the Broadway Subway or the proposed UBC extension, custom GTFS feeds were created to model both scenarios. The Broadway Subway GTFS was applied to estimate current accessibility, while an additional custom GTFS file including the UBC extension was used to produce projected accessibility outcomes. Travel times were estimated using multimodal (walk–bus–rail) paths under peak-period assumptions.