Supports Item No. 5
P&E Committee Agenda
October 5, 2006

CITY OF **VANCOUVER**

ADMINISTRATIVE REPORT

Report Date:	September 22, 2006
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TO: Standing Committee on Planning and Environment

FROM: General Manager of Engineering Services and the Director of Current Planning

SUBJECT: Downtown Streetcar Project Update

RECOMMENDATION

A. THAT Council reaffirm the Vancouver Transit Strategy and that extending rapid transit along the Central Broadway corridor remains a City priority.

B. THAT Council reiterate its support for a Downtown Streetcar as a key element in helping the City achieve its environmental, transportation and liveability objectives as part of the Vancouver Transit Strategy, Downtown Transportation Plan, Community Climate Change Action Plan, and False Creek South and Southeast False Creek Official Development Plans.

C. THAT Council authorize the General Manager of Engineering Services to continue to seek Senior Government funding for the Downtown Streetcar project including cost-sharing opportunities with other potential funding partners.

D. THAT Council direct staff to continue the Downtown Streetcar project as follows:

i. Undertake a public process to receive broader input into the findings of the current Downtown Streetcar project update;
ii. Complete more detailed design for the section from Granville Island to Science World, including a maintenance facility, with funding of $300,000 to be provided from the 2005 Engineering Streets Budget for

the Downtown Streetcar, and staff to pursue a commitment from CMHC Granville Island regarding a $65,000 contribution towards this study;

iii. Report back to Council on the more detailed design and funding and implementation options for the section from Granville Island to Science World, including a maintenance facility; and

iv. Continue to work with TransLink on how to integrate the Downtown Streetcar with the regional transit system and transportation plans.

GENERAL MANAGER'S COMMENTS

The General Manager of Engineering Services and the Director of Current Planning recommend approval of A through D. The Downtown Streetcar is a key element of the Vancouver's Transit Strategy and a cornerstone of supporting Southeast False Creek as a transit-oriented development. Given the immediate timing of construction of both Southeast False Creek streets and the Olympic Village Canada Line station, it is important to finalize more detailed design that accommodates the future streetcar while minimising construction costs and neighbourhood impacts.

CITY MANAGER'S COMMENTS

In considering the recommendations in this report, Council should consider carefully the potential capital costs that will be necessary to bring the system to the kind of operation contemplated. Currently, the Downtown Historic Railway system is a single-track system on which volunteers operate two heritage streetcars on weekends from Granville Island to Science World. The Downtown Streetcar is a full transit system, including a double-tracked operation in a semi-dedicated right of way using modern equipment with the service integrated with the regional transit system.

To complete Phase 1 (Granville Island to Waterfront Station) will require an investment of $100 million for which no secure outside funding sources have been identified. The consultants indicated that the system as proposed will generate sufficient revenue to cover the operating costs but will have net operating revenues of just $1.2 to $1.6 million per year, sufficient to support capital financing of just $15 to $20 million if financed over 20 years. Even with a city contribution from transportation related DCLs of $30 million, it will be necessary to identify additional funding partners for up to 50% of the anticipated cost for the full Phase 1 from Granville Island to Waterfront or up to 20% for the Phase 0 from Granville Island to Science World. Finally, the success of the system - ridership and financial - will depend on integration with the regional transit system and to date, there is no commitment from Translink on this integration.

These comments are meant to put the expectations created by work related to the Downtown Streetcar system in some context. Undertaking additional work as recommended in the report will move understanding of the project forward, however, it will take committed funding partners to move the system to the next stage of development, even if that is restricted to the current Granville Island to Science World right of way.

The City Manager RECOMMENDS that Council approve this additional work, but in doing so, cautions that the Downtown Streetcar project as envisioned will not likely be easily or quickly realized.

COUNCIL POLICY

Since 1995, Council has consistently supported preserving rail corridors and the demonstration electric rail transit service along the south side of False Creek, with the potential of providing regular service linking the employment, residential and activity nodes in the Downtown core.

In 1997, Council approved the Vancouver Transportation Plan that supported the use of transit in meeting our transportation growth needs, including providing special transit rights-of-way, and preserving rail corridors for transit and greenway purposes.

In 1999, Council approved specific alignments and phasing for a Downtown Streetcar system and consideration of streetcar corridors to coincide with planning projects located along the routes. Council also authorized the General Manager of Engineering Services to seek Senior Government funding for the streetcar project from Granville Island to Waterfront Station.

In 2002, Council approved both the Downtown Transportation Plan and the Vancouver Transit Strategy recommending implementation of the Downtown Streetcar network with possible extensions to the False Creek Flats, Vanier Park, and along the Arbutus Corridor.

In 2003, Council approved proceeding with further planning for the Downtown Streetcar including applying for matching funds from the Federation of Canadian Municipalities.

In 2004, Council approved undertaking the Downtown Streetcar Market Research Study, Streetcar Benchmarking Study, and Design, Layout, and Ridership Study.

In 2005, Council approved the Official Development Plan for Southeast False Creek including providing space for double-track segregated streetcar operation on 1st Avenue.

In 2005, Council approved the Community Climate Change Action Plan, including program initiatives focused on promoting alternative transportation and expanding transit service.

SUMMARY

The purpose of this report is to report back as directed by Council with a project update on the Downtown Streetcar. The results of four separate reports are presented:

- a benchmarking report on streetcar systems
- a tourist and recreational market research study
- a design and layout study (for Phase 1, Granville Island to Waterfront Station)
- a comparative review of streetcars and local buses

The project update streetcar studies and related ridership, revenue, and cost estimate updates have been a valuable exercise. Council, staff, and the public will now have a much better understanding of the Downtown Streetcar initiative in providing Vancouver with more sustainable transportation modes.

Modern, high density and transit-oriented cities require a wide range of transit services to respond to the full range of transit demand. Each transit mode provides a different level of service and capacity. The Vancouver Transit Strategy emphasises the need for the City to

pursue a network of transit services over the long term. Extending rapid transit to serve Central Broadway remains a City priority for transit expansion [Recommendation A].

Experiences in other cities have shown that streetcars provide a high level of service and can be extremely popular with residents, commuters and tourists alike. Streetcar systems in some European cities are the dominant transit service. Examples in North America include streetcars in cities such as San Francisco, Portland, Tacoma, New Orleans, and Toronto.

The Downtown Streetcar initiative is a key element of the City's continuing transition to a transit-oriented city. The intent is that seamless connections to existing transit services will be provided with integrated fares, thereby enhancing the overall regional transit network. The Downtown Streetcar will be a fully accessible service that provides a level of service and capacity in between that of local bus and regional scale rail transit (i.e. SkyTrain, Canada Line, or Evergreen Line).

Also consistent with the Vancouver Transit Strategy as well as the Downtown Transportation Plan, Community Climate Change Action Plan, and False Creek South and Southeast False Creek Official Development Plans, the Downtown Streetcar is a key element in helping the City achieve its environmental, transportation and liveability objectives [Recommendation B].

While to date the city continues to take the lead role in the Downtown Streetcar project, its longer term capital costs are expected to need multiple funding sources and partners. Senior levels of government and available funding programs should be investigated as potential funding sources [Recommendation C].

The project update has identified a strategic opportunity to stage the implementation of the Downtown Streetcar in more manageable components beginning with a Phase "0" section from Granville Island to Science World. The capital cost estimate for Phase 0 is less than $60M including a start-up maintenance facility.

The Phase 0 section produces the highest ridership for the Downtown Streetcar as it would serve Granville Island with over 10 million visitors a year and provide a direct connection to two regional rapid transit lines, both the Canada Line and Expo Line. Streetcar travel times between Science World and Granville Island would be less than 10 minutes and would be highly reliable as the entire Phase 0 alignment is in dedicated rights-of-way. It would provide SEFC residents with quality transit service that will help reduce transportation related GHG emissions and vehicle-kms by 25% to 50%.

The report outlines many compelling reasons to begin more detailed design for the Downtown Streetcar system for the Phase 0 section including the complete reconstruction of 1st Avenue as part of SEFC, the construction of the Olympic Village station for the Canada Line, and Granville Island's keen interest in the Downtown Streetcar as an important high-capacity transit solution needed for their visitors, patrons, students, and employees.

This report seeks Council approval for next steps to be taken for the Downtown Streetcar project including undertaking a public process [Recommendation D (i)] and completing and reporting back on more detailed design. The cost for more detailed design cost for Phase 0 is estimated to be $365,000 of which Granville Island is expected to contribute $65,000 [Recommendation D (ii)]. Staff will report back on the more detailed design for Phase 0 and possible funding and implementation options [Recommendation D (iii)]. Staff will also

continue to work with TransLink on how to integrate the Downtown Streetcar with the regional transit system and transportation plans [Recommendation D (iv)].

PURPOSE

The purpose of this report is to report back as directed by Council with a project update on the Downtown Streetcar including the results of four separate reports. This report seeks Council approval for next steps to be taken for the Downtown Streetcar including undertaking a public process and completing and reporting back on more detailed design.

BACKGROUND

In 1996, a right-of-way along the south shore of False Creek from Granville Island to Cambie Street was purchased by the City from Canadian Pacific Rail (CPR). The City has developed this right-of-way into a demonstration streetcar line. Operating since 1998, the Downtown Historic Railway (DHR) has enjoyed strong support from the public and numerous stakeholders.

As the downtown develops to the edges of False Creek and Burrard Inlet, the resulting high-density areas need to be served with transit. In 1999, Council approved a concept plan for a Downtown Streetcar system following a consultant study and an extensive public consultation process. The primary purpose of the Downtown Streetcar is to link a number of activity centres in the Metropolitan Core that are beyond comfortable walking distance for many.

Approximately 30 routings were considered as part of the 1999 Vancouver Downtown Streetcar Study. In the analysis, only 3 routings achieved 100% cost recovery when existing transit users were discounted from the revenue generation. The study showed these 3 routes have a very favourable operating cost recovery due to the high levels of expected ridership for the system and its ability to attract commuters as well as tourist and recreational users. On each of these corridors, the Downtown Streetcar would connect several high capacity transit services and provide new transit service to the significant increase in development along the routes. These corridors were approved in 1999 as the concept plan for a Downtown Streetcar system.

The public, City Council, and numerous stakeholders confirmed their support for the Downtown Streetcar when the City's new Downtown Transportation Plan and Vancouver Transit Strategy were approved in 2002. In 2003, Council approved proceeding with further analysis and planning for the Downtown Streetcar. Matching funds from the Federation of Canadian Municipalities (FCM) were applied for the project update studies and received in 2004.

For an updated Downtown Streetcar system map and more on the vision, land use and transportation context, and previous streetcar work, please see Appendix A.

DISCUSSION

Vancouver Transit Strategy

Vancouver area residents continue to identify transportation issues such as congestion and lack of transit service as one of their primary concerns. The Vancouver Transit Strategy provided the City with a comprehensive long term plan for future city and regional transit services. Most of the Vancouver Transit Strategy initiatives are not new and some progress has been made on each initiative since 2002. Over time, completing all of these initiatives will provide a network of transit services between Downtown, neighbourhood centres, and regional destinations that will improve accessibility and sustainability by encouraging people to use transit.

Table 1: Overview of Vancouver Transit Strategy Initiatives

Initiative	Progress
Trolley Fleet Replacement	Underway
Vancouver/UBC Area Transit Plan	Implementation underway
Rapid Transit to Richmond and Airport	Construction underway
Downtown Streetcar	Project Update complete
Rapid Transit to Central Broadway	Study to begin in 2007

This project update intentionally does not attempt to prioritize the streetcar over other important transit projects such as the replacement of the trolley fleet or continued expansion of bus services. Extending rapid transit to serve the Central Broadway corridor remains a City priority for transit expansion in Vancouver. TransLink has committed to begin planning the Broadway rapid transit extension in 2007.

However, Council's approved Vancouver Transit Strategy emphasises the need to pursue a long-term transit strategy that includes a network of transit services. Each of the City's transit initiatives will need to be completed to achieve our citywide transit mode split targets and to make transit a preferred mode choice for all types of trip purposes and destinations. It is particularly important that we continue to advance the detailed design of the Downtown Streetcar given the timing of construction of streets in Southeast False Creek.

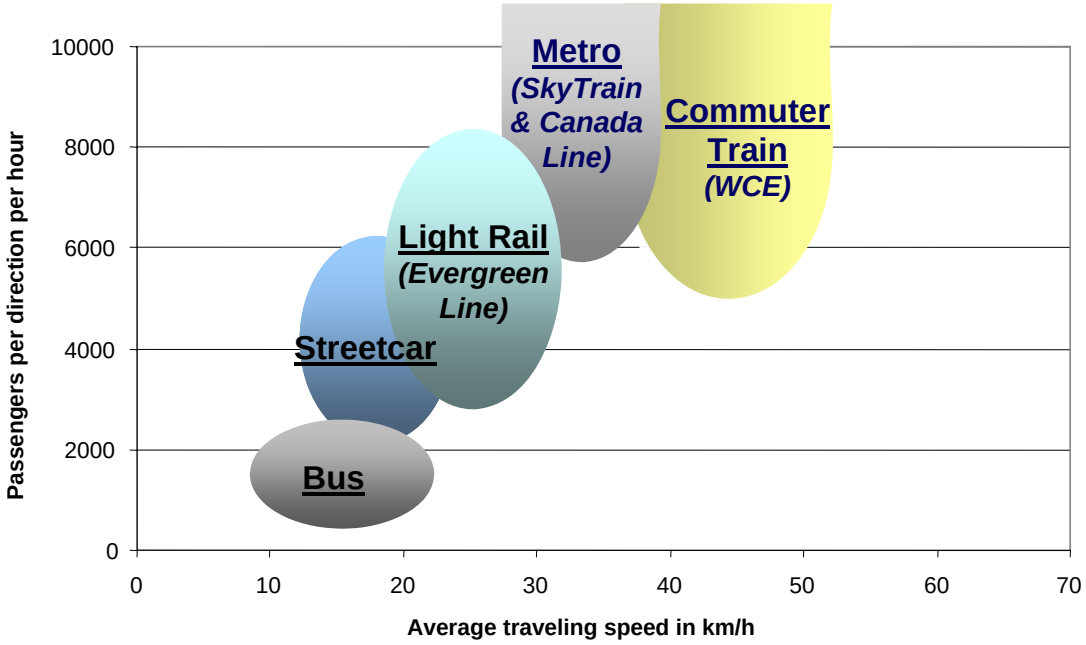
Transit Hierarchy and Capacity

Modern, high density and transit-oriented cities require a wide range of transit services to respond to the full range of transit demand. Each transit mode provides a different level of service and capacity. The regional transit network is already a well established system of nine unique transit modes serving different customer markets as follows:

1. SkyTrain – Rapid and frequent automated rail service linking regional centres and downtown
2. SeaBus – High capacity passenger ferry link between North Shore and downtown
3. B-Line – Frequent, limited-stop, high capacity bus service in major travel corridors
4. West Coast Express – Commuter rail service for long distance trips to downtown
5. Express Coach – Longer distance express service with highway coaches
6. Bus – Local services by standard or articulated buses, including electric trolleys for short/medium length trips
7. Community Shuttle – Minibus service serving short distance local trips in communities
8. Night Bus – Limited network of bus routes providing a late night transit service
9. HandyDart - Custom transit for people with reduced mobility

Experiences in other cities have shown that streetcars provide a high level of service and can be extremely popular with residents, commuters and tourists alike. Streetcar systems in some European cities are the dominant transit service. Examples in North America include streetcars in cities such as San Francisco, Portland, Tacoma, New Orleans, and Toronto.

The Downtown Streetcar initiative is a key element of the City's continuing transition to a transit-oriented city. The intent is that seamless connections to existing transit services will be provided with integrated fares, thereby enhancing the overall regional transit network. Downtown Streetcar will be a fully accessible service, integrating it with the rest of the transit network which will become fully accessible by mid-2008 with the renewal of the electric trolley fleet. The following figure shows how the streetcar is a transit system that provides a level of service and capacity in between that of local bus and regional scale rail transit (i.e. SkyTrain, Canada Line, or Evergreen Line).



In 2005, TransLink completed a Transit Capacity Study to determine if there is adequate capacity in the transit system to meet ridership goals. Over the past three years, transit ridership has increased by over 20% resulting in a transit system that is at or nearing capacity on key corridors. This is most noticeable in Vancouver as peak period SkyTrain service between Broadway Station and Main Street Station is at maximum capacity (99%), resulting in passengers experiencing crowded trains or pass-ups.

The Transit Capacity Study also confirmed that overcrowding on the bus network is occurring on 58 corridors (defined as exceeding the Transit Service Guidelines comfort levels). The majority of the routes serving Vancouver and UBC experience overcrowding , including the #98 and #99 B-Lines and the bus routes serving universities and colleges.

TransLink is dealing with the current overcrowding by accelerating vehicle purchases and service improvements for both SkyTrain and buses. Note, this is an acceleration strategy to deal with existing demand for transit rather than an expansion strategy as the total number

of buses to 2009 remains unchanged. In the long term, additional transit service vehicles (buses, streetcars, and rapid transit) will still be required to adequately serve Vancouver residents.

Streetcar Integration with TransLink

The Downtown Streetcar will serve a regional customer base and link existing transit hubs, stations, and bus services. It is essential that TransLink be involved in both the operations and construction of the system. The GVTA Act contains provisions restricting independent transit services other than those approved by TransLink.

When first presented with the proposed 1999 Downtown Streetcar concept, TransLink responded to staff with a list of requested clarifications about the project. TransLink staff were subsequently involved in the Downtown Streetcar project update in an advisory capacity as part of the Vancouver/UBC Area Transit Plan. The project update provides answers to questions raised by TransLink staff.

While the streetcar would increase transit capacity and ridership across the regional transit system, TransLink has expressed concern with the streetcar project. This is primarily because TransLink does not wish the City and TransLink to compete for funding, but instead to be able to agree on regional transportation priorities since there is limited availability of regional transit capital funding. TransLink and City staff discussed a draft copy of this report to ensure that TransLink's perspective is accurately represented to Council.

A copy of the letter from TransLink to the city regarding the Downtown Streetcar project update is attached as Appendix B.

DOWNTOWN STREETCAR PROJECT UPDATE

Approved by Council in 2004, the Downtown Streetcar project update focused on liaising with key stakeholders along the approved streetcar routings and producing three separate technical reports & studies.

1. Streetcar Benchmarking Report (by Halcrow with TSi Consultants)

A streetcar benchmarking exercise was conducted to provide information on the characteristics of streetcar systems that might be comparable with the Downtown Streetcar. Implications for the Downtown Streetcar project are also briefly discussed. The key findings of the benchmarking highlight the importance of providing some sections for the Downtown Streetcar where it is segregated from the roadway. The exercise also concludes that high levels of ridership should be attainable for a Vancouver streetcar system because of the diverse purposes of trips served.

A sample of both restored historic streetcars and modern urban transit systems were reviewed including: San-Francisco, New Orleans, Portland, Sacramento, Toronto, Sydney, Melbourne, Nottingham, and Manchester. Photographs, system maps, ridership, and other technical data where possible, were summarised. Vancouver's proposed Downtown Streetcar system should build upon these key benchmarking results from successful streetcar systems elsewhere. These include:

- o Network Characteristics: Specific routes range between 5 and 8 route kms (Portland, Sydney, and San Francisco) to systems of over 150 kms (Toronto and Melbourne)
- o Dedicated rights of way: The extent to which systems have priority over other traffic is important and almost all systems reviewed have some segregated running sections
- o Stations: New streetcar systems have been built with platforms that allow easy wheelchair access. Station spacing average between a few blocks and 1km apart
- o Frequency: Peak services typically operate between 6 and 10 minute headways and off-peak services are generally half the frequency of peak periods.
- o Ridership: The systems reviewed have healthy ridership level proportional to their size and transit coverage and in some cases demand has exceeded initial expectations.

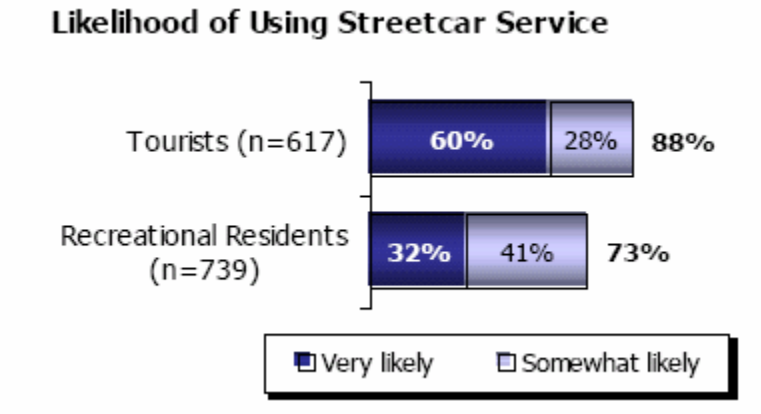
The Vancouver system would have comparable ridership and system length to the San Francisco F-Line and a sample benchmarking exercise is included in Appendix C.

2. Tourist and Recreational Market Research (by Mustel Group with TSi Consultants)

Tourism and recreational market research was conducted to gauge the interest of visitors and local residents on their likelihood of using the Downtown Streetcar. The study clearly revealed that the streetcar concept has significant support among those who visit downtown – both tourists and recreational residents. The market research confirmed that the Downtown Streetcar is serving the right destinations and that its attractiveness is dependent on its frequency and integration with the rest of the transit system.

Two market research surveys were conducted during the summer of 2004:

- o Tourists: On-site survey among over 600 out-of-town tourists at six streetcar tourist destinations along the Phase 1 route and Stanley Park extension
- o Residents: Random telephone survey among 1,200 Greater Vancouver residents whereby over 700 qualified as recreational travelers to the downtown in the past three months



Survey respondents were presented the streetcar concept and questioned about their level of enthusiasm for the idea and their likelihood of use. Tourists are generally more enthusiastic and committed about using the streetcar, suggesting that the streetcar also has potential to enhance greater tourist growth. Both tourists and recreational residents ranked Stanley Park and Granville Island as being the top two streetcar destinations, consistent with being the tourist and recreational areas most often visited (8 to 11 million visits per year).

For the executive summary of the Tourist & Recreational Usage of the Proposed Downtown Streetcar, please see Appendix D.

3. Phase 1 Design and Layout (by IBI Group with HDR, Ward, LTK, and VIA Architecture)

For the Phase 1 route from Granville Island to Waterfront Station, alternative track alignment and station location options were examined. Illustrative cross-sections, plans, and intersection treatments were prepared for each concept. Perspectives were produced to illustrate the streetcar and its relationship to the streetscape.

For samples of Downtown Streetcar perspectives, please see Appendix E.

The alternatives were then evaluated with both qualitative and quantitative criteria so that a preferred solution can be recommended. Preliminary recommendations by the consultant team have been developed for each segment. In short, the preferred streetcar design concept is generally segregated from traffic from Granville Island to Pacific Boulevard, a combination of segregation and mixed on-street traffic on Columbia Street, and mixed with traffic east/west along Cordova Street and Water Street respectively.

The functional requirements of a streetcar operating and maintenance facility were also revisited. It is important to build a facility along the Phase 1 route that is adequate for the initial line, but that can also grow with the maintenance needs of the streetcar system as it grows. Similar to the Portland Streetcar experience, the preferred location for a maintenance facility is on City-owned land underneath a viaduct (Georgia viaduct just east of Quebec). Additional storage facilities can be located underneath the Alder Crossing along the False Creek South line, or in the False Creek Flats, if future system growth requires it.

Stakeholder Liaison

The preferred design and layout streetcar options presented at the stakeholder meetings conducted to date have received very positive support. The most often asked question was "When are you building it?". Residential associations along the line generally felt that the system would provide benefits for their access around downtown, with their biggest concern being the design and look of the system. Business groups felt that it would support economic revitalization and their major concern was that it fit well into the streetscape and have limited parking and loading impacts. The preferred option was viewed favourably in these regards. The balance between mixed and segregated sections was understood and viewed as a reasonable plan to achieve minimal impacts with maximum operation efficiency.

Downtown Streetcar Ridership Forecasting Update

The three completed project update studies have provided new information on which to have revised total daily and annual streetcar boarding forecasts. The more detailed streetcar ridership forecasts show higher levels of use than the 1999 streetcar study. By attracting a broader range of transit users throughout the day, seven days a week, fleet utilization and cost efficiency is optimized. Based on boardings per revenue hour, the streetcar could possibly become the most productive local transit route in Vancouver.

The following highlights the projected 2021 total daily boardings for the Downtown Streetcar:

- o Phase 1 (Granville Island to Waterfront Station) = 13,000 to 19,000
- o Phase 1 plus Stanley Park extension = 18,000 to 27,000
- o Phase 1 plus Pacific Boulevard extension = 19,000 to 29,000
- o Phase 1 plus Stanley Park and Pacific Blvd. extensions = 25,000 to 35,000

These ridership forecasts exceed existing ridership for some of Vancouver's most heavily used transit corridors and confirm a significant transit demand for a streetcar network to serve a variety of purposes of trip.

Appendix F includes a table that shows the Downtown Streetcar forecasts for the year 2021 and compares them to some of the best performing 2004 weekday bus routes in the city.

Downtown Streetcar Revenue and Costs Update

Capital, operating costs, and revenue for the streetcar system were estimated in 2005 dollars. Capital costs include the track, overhead wiring, stations, design engineering and construction management, and contingency. They also include the cost for providing a new streetcar maintenance facility and vehicles including spares.

The following summary highlights the total Downtown Streetcar capital costs for Phase 1 (Granville Island to Waterfront Station):

Construction (track, stations, signals, electrification)	= $36.1M
Maintenance Facility	= $ 6.1M
TOTAL CONSTRUCTION ESTIMATE	= $42.2M
Program Costs @ 48% (Design, Engineering, Management)	= $20.3M
Contingency @ 30% (Design and Cost)	= $18.7M
TOTAL CONSTRUCTION INCLUDING ADD-ONS	= $81.2M
Vehicles	= $17.3M
Contingency @ 20%	= $ 3.5M
TOTAL CAPITAL COST	= $102 M

When capital costs are annualized on a life cycle assumptions for vehicles and construction, the Phase 1 streetcar system is estimated to cost approximately $7.1M/yr.

Annual operating and maintenance (O&M) costs were based on the most recent revenue per service hour costs of the Portland Streetcar. The following summary highlights the Downtown Streetcar annual O&M costs, revenues, and operating cost recovery:

	Annual O&M Costs ($M/yr)	Annual Revenue ($M/yr)	Operating Cost Recovery (%)
Phase 1 (Granville Island to Waterfront)	3.6	4.8 to 5.2	133% to 144%

This preliminary financial picture for the Downtown Streetcar project suggests a better than break-even operating scenario (i.e. 100%) as compared to TransLink's 2005 operating cost recovery of 56%. This is a significant finding as the additional revenues beyond the annual

O&M costs represent an annual revenue stream that could support the higher capital costs of implementing a streetcar system over a bus system.

For example, the Phase 1 system (Granville Island to Waterfront) could generate a net $1.2M/yr to $1.6M/yr while still recovering all of its operating and maintenance costs. If the region's operating cost recovery of 56% was the benchmark, this represents an annual revenue stream of approximately $3M/yr.

4. Comparative Review of Streetcar and Local Bus (by IBI Group)

In addition to its direct revenue and costs, there may be some operating and cost savings with implementation of the streetcar relating to rationalizing or truncating existing bus routes that would provide parallel or duplicate service. To better understand how the streetcar would integrate with the transit system, various integration and bus alternative scenarios were conceptually developed by TransLink and City staff.

Integration options that assumed a Phase 1 streetcar system (Granville Island to Waterfront) are estimated to provide annualized vehicle operating and capital cost savings in the range of $2.3M/yr to $4.5M/yr. This is mostly due to a rationalization of the #50 False Creek South bus service. The range of savings depends on the base case assumption for the #50 which could be as much $4.5M/yr when compared to today's route or as little as $2.3M/yr if the downtown portion of the #50 is discontinued given the route's connection to the Canada Line at Olympic Village station.

If no streetcar system is implemented, TransLink determined that it would likely need to provide at least an estimated $0.5M/yr to $0.8M/yr of additional bus services. However, this bus alternative scenario would neither attract as many transit riders nor as much revenue as compared to the streetcar integration options.

On the surface, serving an area by bus appears to be less expensive than rail since buses cost less than streetcars and do not require track infrastructure. However, the question then needs to be asked, "Why are so many cities building streetcar systems?". What the research shows is the decision to implement a streetcar system over bus alternatives needs to be made in consideration of more than just initial capital costs. As such, a review was undertaken to compile a direct set of quantitative and qualitative indicators that compare streetcars to buses.

Factors such as the longer life span and lower average maintenance cost of a streetcar need to be weighed against their higher purchase price. Part of the streetcar system higher cost relates to rebuilding streets, which provides a significant opportunity to improve the public realm, foster urban revitalization, and benefit many more than just transit users. In addition, the higher passenger capacity of streetcars over local bus allows for added flexibility in service levels but also improved operator to passenger ratios.

Personal comfort levels also need to be considered where smoother rides, easier access, and better viewing often translate into more riders due to the increased level of passenger comfort. Finally, the design of streetcar systems is very flexible and can to be incorporated into parks, plazas, green spaces, and boulevards where bus routes would not be acceptable.

In summary, running a bus service might have lower average capital and operating costs, however, there are numerous transit operations, personal mobility, urban environment and economic spin-off benefits from a streetcar service that support its implementation in a well-chosen corridor.

A copy of the Streetcar and Local Bus Comparative Review is attached as Appendix G.

NEXT STEPS AND RECOMMENDATIONS

The project update streetcar studies and related ridership, revenue, and cost estimate updates have been a valuable exercise. Council, staff, and the public will now have a much better understanding of the Downtown Streetcar initiative in providing Vancouver with more sustainable transportation modes.

Reaffirm Vancouver Transit Strategy and Streetcar's Role (Recommendations A & B)

The Vancouver Transit Strategy emphasises the need for the City to pursue a network of transit services over the long term. Extending rapid transit to serve Central Broadway remains a City priority for transit expansion [Recommendation A].

Also consistent with the Vancouver Transit Strategy as well as the Downtown Transportation Plan, Community Climate Change Action Plan, and False Creek South and Southeast False Creek Official Development Plans, the Downtown Streetcar is a key element in helping the City achieve its environmental, transportation and liveability objectives [Recommendation B].

Pursue Funding Opportunities and Partners (Recommendation C)

In 1996, Council approved the purchase of the rail right-of-way from the CPR along the south shore of False Creek. While the Downtown Streetcar was not approved as part of City Capital Plan submissions for 2006-2008, alternative funding and timing options for the Downtown Streetcar project will continue to be investigated. For example, future developments requiring road and/or infrastructure investments could be a source for Downtown Streetcar funding.

The City's Financing Growth Strategy has previously identified the Downtown Streetcar as a specific project that was projected to receive Engineering city-wide DCL funding if the project proceeded. Over the 25 year planning horizon, a net of $105M in DCL funding is anticipated for Transportation. Based on the estimated demand for all growth related transportation projects, approximately $30M is assumed for street-related infrastructure to support a streetcar line between Science World and Stanley Park.

Given that streetcars benefit more than just transit users by improving the public realm, fostering economic growth, and supporting tourism, it is appropriate for the City to contribute some funding to the development of a Downtown Streetcar system. Competition for transit funding will make early construction of the Downtown Streetcar unlikely without the City contributing some funding to build it sooner.

While to date the city continues to take the lead role in the Downtown Streetcar project, its longer term capital costs are expected to need multiple funding sources and partners. As the

proposed alignment will serve locations such as Granville Island, the Olympic Village and Canada Line, BC Building Corporation sites, Waterfront Station, and Canada Place, senior levels of government and available funding programs should be investigated as potential funding sources [Recommendation C].

Undertake a Public Process [Recommendation D (i)]

While staff have reviewed and agree with the preferred Phase 1 streetcar concepts proposed by the City's consultants, the designs to date have only been briefly discussed with key stakeholders along the route. Before staff make any recommendations to Council on final track design configurations, broader public input is necessary. Feedback will be solicited from the general public, stakeholders, and Council's advisory committees [Recommendation D (i)].

The 1999 study had significant interest from all levels of the public and it is expected that this would be the case again. To that end, some open houses and public meetings are proposed in the fall of 2006. The public process costs are expected to be $11,000 and will be funded from within Planning Department's 2006 operating budget.

Complete and Report Back on a Detailed Design for Phase 0 (Granville Island to Science World) [Recommendation D (ii) and (iii)]

Complete reconstruction of 1st Avenue is scheduled to begin in the fall of 2007 so that the Downtown Historic Railway (DHR) service can continue to run in the summer months between Granville Island and Science World this year as well as 2007. The existing DHR track infrastructure and maintenance and storage barn will then need to be removed for the 1st Avenue reconstruction. The work will take over a year to finish and includes:

- Installation of sewer, water, and the new energy precinct utility
- Re-grading the street to integrate with the private lands to the south
- Construction of the sidewalk and street infrastructure
- Public realm enhancements such as street trees and permeable pavers
- Relocation of the DHR single track to the green centre median

As such, the DHR will unfortunately not be able to operate through SEFC in the summer of 2008. Staff will work with the DHR volunteers on providing a truncated service between Cambie Bridge and Granville Island for the summer of 2008 and where to relocate the maintenance and storage barn. A single track will be reinstalled within the centre median for continued operation of the DHR to Science World for the spring of 2009.

However, the scope of work for 1st Avenue does not include the installation of modern streetcar track infrastructure within the centre median. From a budget perspective, it is only feasible for the SEFC project to replace the single track for the DHR into the centre median for heritage rail operation. However, this would not allow for the system to meet the City's policies on accessibility, unless raised platform stations were also constructed. Additional sources of funding beyond the SEFC project are therefore required to upgrade the track system to accommodate fully accessible modern streetcars, as envisioned for the Downtown Streetcar system.

Given the investment required to construct 1st Avenue, it is important to complete more detailed design for the modern streetcar system now. The centre median should be designed to accommodate future modern infrastructure so that existing and future construction costs and neighbourhood impacts are minimized, and that the track system meets the high quality of the planned streetscape design. In addition, conducting more detailed design now could determine that the incremental cost of upgrading the DHR track infrastructure to modern track is marginal. If feasible and a source of funding is identified, this additional investment would eliminate a significant amount of reconstruction and impacts to SEFC residents in the future.

During this same time frame, the City and InTransit BC will be completing Olympic Village station for the Canada Line, just west of Cambie Bridge. The remainder of the site where the station is located is planned to be redeveloped following completion of the station. Conducting a detailed design of the Downtown Streetcar now would allow the dedication of streets and rights-of-way, including dedicated tracks, to be included into the early stages of planning for this site.

The Phase 1 Downtown Streetcar system is intended to connect Granville Island to Waterfront Station, approximately 5 kms. However, the project update findings have identified a strategic opportunity to stage the implementation of the Downtown Streetcar in more manageable components beginning with a Phase "0" section from Granville Island to Science World, approximately 3 kms. A single track from Science World to the maintenance facility underneath the viaduct would also be included but the size of maintenance facility could be smaller in scale for a Phase 0 operation as there would be fewer vehicles required. The capital cost estimate for Phase 0 is less than $60M.

	# of Vehicles	Peak Headway	Maintenance Facility	Total Cost
Phase 1 Granville Island to Waterfront	6	8 min	Full-size	$102M
Phase 0 Granville Island to Science World	3	12 min	Mid-size	$58M

For an illustration of the Phase 0 alignment, please see Appendix H.

The Phase 0 section produces the highest ridership for the Downtown Streetcar as it would serve Granville Island with over 10 million visitors a year and provide a direct connection to two regional rapid transit lines, both the Canada Line and Expo Line. Streetcar travel times between Science World and Granville Island would be less than 10 minutes and would be highly reliable as the entire Phase 0 alignment is in dedicated rights-of-way. It would provide local transit service for the residents of Southeast False Creek, a particular concern expressed by the SEFC Stewardship Group's response to the SEFC ODP.

Granville Island is keenly interested in the proposed Downtown Streetcar Line and is presently undertaking a comprehensive transportation planning study that will determine how to best address challenges with access, circulation and parking. The existing modal split on Granville Island reflects a diversity of transportation options available to both visitors and employees. However, in the future Granville Island would like to see their combined **non-vehicle** modal split achieve a mode split comparable to the sustainable transportation targets set out for Southeast False Creek.

To achieve this, Granville Island would need to see a significant increase in transit use in the future for visitors/patrons, which at 6%, is currently below the GVRD average. Granville Island would like to see transit use for this segment reach 12-18%. They see the Downtown Streetcar as an important high-capacity transit solution and a key piece of transit infrastructure needed for their visitors, patrons, and employees, as well as Emily Carr students, faculty and staff.

To achieve their sustainable transportation objectives, Canada Mortgage & Housing Corporation (CMHC) Granville Island recommends that more detailed design be conducted for the section of the streetcar line connecting Granville Island to the Canada Line station at the Olympic Village Station. This would provide an opportunity to pursue a pre-Olympic streetcar showcase project between Granville Island and the Olympic Village Station by 2009.

To assist in advancing the feasibility of the Downtown Streetcar project, the Granville Island office of CMHC intends to seek approval of a $65,000 contribution towards this more detailed design study. Staff expects to confirm CHMC's funding contribution in the next few months.

In conclusion, there are many compelling reasons to begin more detailed design for the Downtown Streetcar system for the Phase 0 section between Granville Island and Science World, including the maintenance facility. The necessary detailed design cost is estimated to be $365,000 of which Granville Island is expected to contribute $65,000. Funding is available from the 2005 Engineering Capital Budget for the Downtown Streetcar [Recommendation D (ii)].

Upon completion of the Downtown Streetcar project update public process and detailed design, staff will report back to Council on the final recommended design and possible funding and implementation options for the section from Granville Island to Science World, including a maintenance facility [Recommendation D (iii)].

Integrate the Streetcar with the Regional Transit System [Recommendation D (iv)]

As more detailed design is being completed on the Phase 0 streetcar system, staff will continue to work with TransLink on how to integrate the Downtown Streetcar with the regional transit system and transportation plans [Recommendation D (iv)].

Future Streetcar Extensions

Council originally requested staff, as part of approving the Downtown Streetcar project update, to report back on a terms of reference for exploring the streetcar potential of the Arbutus Corridor. At that time, the City was waiting for the decision of the Supreme Court of Canada in CPR's challenge to the validity of the Arbutus Corridor Official Development Plan (ODP). Earlier this year the Supreme Court of Canada upheld the City's right under the Vancouver Charter to enact the Arbutus Corridor ODP by-law, which designates the Arbutus Corridor as a public thoroughfare for the purposes of transportation, including streetcars, and of greenways.

It will be important over time to conduct conceptual design, cost, and ridership studies of the streetcar potential for the Arbutus Corridor as well as other streetcar extensions such as Stanley Park, Pacific Boulevard, False Creek Flats, and Vanier Park. Staff will pursue

opportunistic strategies to complete these studies to better understand and accommodate these potential extensions in a cost effective manner. However, the immediate priority for advancing the Downtown Streetcar should be to focus efforts on more detailed design of the Phase 0 streetcar system.

FINANCIAL IMPLICATIONS

The public process costs are expected to be $11,000 and will be funded within the Planning Department's 2006 operating budget. The cost of more detailed design for Phase 0 is estimated to be $365,000. It is proposed that this is funded as follows:

- o $300,000 allocated in the 2005 Engineering Capital Budget for the Downtown Streetcar
- o $65,000 from Granville Island (still to be confirmed by CHMC)

These combined funds provide enough budget to complete more detailed design along the most critical elements of the Phase 0 section relating to Granville Island and the immediate construction timing of both Southeast False Creek and the Olympic Village station. To finalize a detailed design for the entire Phase 0 section, additional funding may be required.

ENVIRONMENTAL IMPLICATIONS

The City recently won an FCM 2006 Sustainability Community Award for sustainable transportation strategies for SEFC. The Downtown Streetcar is a key infrastructure improvement to provide SEFC residents with quality transit service that will help reduce transportation related GHG emissions and vehicle-kms by 25% to 50% as compared to other urban neighbourhoods.

It is important to deliver the streetcar infrastructure to SEFC as soon as possible after 2010 to support SEFC as a transit-oriented development and reduce automobile trips. With the streetcar implemented, it's forecasted that at least 60% of all daily trips by SEFC residents will be made without a vehicle.

CONCLUSION

The Downtown Streetcar studies have provided updated ridership, revenue, and cost estimates and have confirmed the viability of a streetcar system in its approved corridors. A broader public process will provide input on all of the project update studies recently completed. Staff recommend further work on more detailed design for the Downtown Streetcar section between Granville Island and Science World, including a maintenance facility. Also, a recommended design and a funding and implementation strategy for Granville Island to Science World will be pursued and reported back to Council to capitalize on cost-sharing or construction timing opportunities that may exist.

* * * * *

APPENDIX A


Transportation
Strategic Planning
CITY OF VANCOUVER
Downtown Streetcar
Stanley Park
Burrard Inlet
Vancouver Convention & Exhibition Centre
Coal Harbour
SeaBus
N
Denman St
Georgia St
West End
Waterfront Transit Hub
Gastown
Downtown Eastside
Central Business District
Davie St
Jervis St
Thurlow St
Burrard St
Pacific St
English Bay
Granville St
Richards St
Nelson St
Smithe St
Powell St
Cordova St
Hastings St
Chinatown
Keefer St
Prior St
Main St
Vanier Park
Yaletown
Science World
False Creek Flats
Cornwall Av
Granville Island
False Creek
Cambie St
2nd Av
Columbia St
Quebec St
Main St
4th Av
Central Broadway
Broadway
Arbutus St
Burrard St
Granville St
Oak St
Hospital District
12th Av
Downtown Streetcar
Phase I
Stanley Park extension
Pacific Blvd. extension
Potential extensions
Streetcar Stations

DOWNTOWN STREETCAR

The City of Vancouver is proposing a Downtown Streetcar which will provide an attractive and exciting transit experience, linking major destinations such as Waterfront Centre, Gastown, Chinatown, Science World, and Granville Island. It will also provide connections to other transit modes including the Canada Line, SeaBus, SkyTrain, West Coast Express, and bus services.

NEW SERVICE CONCEPT:

Local streetcar service between Granville Island and Downtown locations.

ROUTE:

- Dedicated rail right-of-way between Granville Island, False Creek South, Southeast False Creek, Science World, and City Gate
- Streetcar operating in mixed traffic on Quebec Street, Columbia Street, Cordova Street, and Water Street.
- Replaces #3 Main local bus service between Chinatown and Downtown
- Replaces #50 Waterfront/False Creek South local bus

KEY DESTINATIONS:

Granville Island, False Creek, Science World, Chinatown, Gastown, Storyeum, and Waterfront Station.
Future extensions: Stanley Park, GM Place & BC Place, Yaletown, and Convention Centre.

CONNECTIONS:

- SkyTrain Expo and Millennium Lines
- Future False Creek South Canada Line station (2nd Avenue)
- Seabus & West Coast Express, Downtown bus routes

FEATURES:

- Faster, more reliable, and more comfortable due to:
  - Dedicated sections of street for streetcars only
  - Quieter, more interior space and larger open windows than buses
  - Holds traffic light green when the streetcar arrives at an intersection
- Expands service coverage to Southeast False Creek and Science World
- Provides new service to Granville Island from Canada Line & Skytrain rapid transit lines
- Enhanced Waterfront transit hub with modern electric streetcars and station
- New customized streetcar stations with arrival time of next streetcar
- Connects several Downtown Vancouver tourist & recreational destinations

SERVICE TIMES AND FREQUENCY: (weekdays and weekends)

Start Time:	6 AM
AM/PM Peak Frequency:	8 min
Midday & Evening Frequency:	10 min
End Time:	1 AM

PEAK PERIOD TRAVEL TIME:

Estimated travel time of 17 minutes from Granville Island to Waterfront Station

VEHICLE TYPE:

Modern low–floor fully accessible electric streetcar

Downtown Streetcar Vision and Proposal

Modern cities require a wide range of transit services reflecting complex land use. Experiences in other cities have shown that streetcars provide a high level of service and can be extremely popular with residents, commuters and tourists alike. Streetcar systems in some European cities are the dominant transit service. Examples in North America include streetcars in cities such as New Orleans, Portland, San Francisco and Toronto.

The Downtown Streetcar initiative is a key element of the City's continuing transition to providing more sustainable transportation modes. The intent is that seamless connections to existing transit such as SkyTrain, SeaBus, West Coast Express, and trolley bus services will be provided with integrated fares, thereby enhancing the overall regional transit network.

A key question that is often asked is "Who is the Downtown Streetcar for?". The best answer is that it's for everyone and anyone who makes trips within the Downtown core. The primary purpose of the Downtown Streetcar is to increase one's sustainable mobility choices, regardless of their purpose of trip. This means that commuter, educational, recreational, and tourist trips are all part of the target market.

While most transit services primarily serve commuters, work and school outings only represent 30% to 35% of all daily trips taken by all transportation modes in an average day. As such many more trips could be captured by transit if the type of transit appealed to a broader base of people. By attracting a more diverse variety of users and trip purposes throughout the day, seven days a week, the fleet utilization and cost efficiency of the Downtown Streetcar is optimized.

For example, current transit usage on Saturdays and Sundays is respectively only two thirds and one half of a typical weekday. On a weekday, commuters would ride the streetcar during the AM and PM peak periods while recreational and tourists would benefit from the service during their 'peak' periods – midday, early afternoon, and evenings. When tourist and recreational demand would be at its highest during the summer months, weekend transit use on the streetcar could be as busy, if not busier, than weekdays.

Land Use, Transportation, and Sustainability Context

The Downtown Streetcar project is very consistent with numerous regional and City land use and transportation policies and objectives. In particular, the infrastructure investment in streetscape and accessibility will be a welcome addition to the revitalization efforts currently underway in the Downtown Eastside and Chinatown. The preferred alignment will provide streetscape improvements to Columbia, Water, and Cordova Streets as well as stations located at the Keefer Triangle/Sun Yet Sen Gardens, Hastings and Columbia, Maple Tree Square, Pigeon Park, Storyeum, and Woodwards.

The Downtown Streetcar supports a variety of City plans from goal of the Central Area Plan (1991) to create "an accessible Central Area" to the emphasis of the Transportation Plan (1997) to increase the provision and use of transit. Both the

Downtown Transportation Plan (2002) and the Vancouver Transit Strategy (2002) confirmed support for Downtown Streetcar implementation, including exploring opportunities for future extensions.

Most recently, Council approved the Official Development for Southeast False Creek (2005) including provision for double-track segregated streetcar operation to achieve the sustainable community's transportation target that at least 60% of all daily trips are by non-auto modes. Council also just approved the Community Climate Change Action Plan (2005) to provide Vancouver residents with improved transportation alternatives, including emphasis on transit priority infrastructure improvements when developing proposals for future Capital Plans.

Previous Downtown Streetcar Work

The Vancouver Downtown Streetcar Study (1999) explored a variety of potential destinations, alignment options, and station locations for a streetcar system. This feasibility study also identified a range of capital and operating costs, ridership and revenues, and maintenance facility requirements. The study recommended an incremental phasing of alignments including protecting corridors for future streetcar operation. Council endorsed the general routing of a preliminary streetcar system defined as follows:

- Phase 1: Granville Island to Waterfront Station via 1st Avenue, Quebec, Columbia, and Cordova, serving major downtown destinations, Canada Place, Waterfront Station, Gastown, Chinatown, Science World/SkyTrain, and Granville Island; and the downtown neighbourhoods of the Downtown Eastside, Strathcona, Mount Pleasant, Fairview, False Creek South, and Southeast False Creek
- Phase 2 (Pacific Boulevard Extension): Science World to Roundhouse via Pacific Boulevard, serving GM Place, BC Place, Northeast False Creek, and Yaletown
- Phase 1 Extension (Stanley Park Extension): Waterfront Station to Stanley Park via Cordova, Hastings, and Georgian, serving the Vancouver Convention and Exhibition Centre, the Coal Harbour neighbourhood, and Stanley Park

Minor adjustments to the 1999 streetcar system were approved by Council as part of the Downtown Transportation Plan (2002). These updates included extending the Pacific Boulevard extension along Drake Street to Granville Street and to consider streetcar route extensions into the False Creek Flats, Vanier Park, and along the Arbutus Corridor.

More detailed streetcar operational and design issues were reviewed as part of the Southeast False Creek (SEFC) Transportation Study (2002). The streetcar concept proposed in 1999 assumed the economy of several single-track sections. Depending on the spacing of double track sections it was estimated that a 15-minute headway service could be operated with acceptable delays. The SEFC Transportation Study concluded that predicted ridership would demand 6-10 minute headways from Science World to Granville Island, necessitating double tracking in that section.

APPENDIX B

COPY

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Greater Vancouver
Transportation Authority

May 30, 2005

Ms. Judy Rogers
City Manager
City of Vancouver
453 West 12th Avenue
Vancouver, BC V5Y 1V4

Dear Judy:

Re: Downtown Vancouver Streetcar Project Update

As Council will soon be provided a project update on the Downtown Streetcar, GVTA and city staff discussed on May 25, 2005, the City staff's draft Council report and recommendations. The purpose of the meeting was to ensure that the GVTA's perspective is accurately represented to Council as part of the project update. It was mutually agreed that this letter outlining the GVTA's comments would form an attachment to the City staff report for Council.

Consideration for the Downtown Streetcar project comes at a time when the GVTA is making significant investments in the Vancouver transit system, including the Richmond-Airport-Vancouver (RAV) rapid transit line, a new fleet of electric trolley coaches, expansion of bus service across the City including the downtown core, and a new operating depot to replace the Oakridge facility. The investments to be delivered over the next five years will significantly transform the City's transit system. In addition, we will continue to pursue planning and preliminary design for a rapid transit extension beyond Broadway and Commercial to the Central Broadway Business District and ultimately through to UBC.

At this time it is not clear what the role of GVTA would be in the Downtown Streetcar project, although it is being designed as an urban transit service. While our Area Transit Planning staff have been involved in the Downtown Streetcar project in an advisory capacity, the focus has been largely on technical issues. City staff note that because of the integrated nature of the Streetcar service, that it is appropriate that GVTA be involved in both the operations and construction of the system if approved.

.../2

While the GVTA supports the recommendations to conduct a 'best bus" study, as well as preserving transit right's of way for the Downtown Streetcar (e.g. Southeast False Creek), our concern is around the priority given to the Downtown Streetcar project, as well as the sources of funding and the impact on GVTA services. From a priority perspective, the expenditure of $100 to $230 million on the Downtown Streetcar would appear to be a lower priority for regional transportation funds, given the needs elsewhere in the City, for example along the Broadway corridor. While a source of funding for the project is not specifically mentioned, there is reference to the City pursuing senior government funding for the Downtown Streetcar, which could result in GVTA and the City competing for funds for other transportation projects in the City of Vancouver and the region. Insofar as the impact on GVTA services is concerned, it is acknowledged by staff that the Downtown Streetcar will replace some bus and trolley services currently being provided by GVTA.

I would also draw your attention to the *Greater Vancouver Transportation Authority Act*, which contains provisions dealing with independent transit services. Under the Act, independent transit services are defined as bus or rail transportation services that are provided in the transportation region (GVRD area) by a person or municipality other than the GVTA or its subsidiaries or contractors. The Act states that no person or municipality may establish or operate or approve the establishment or operation of independent transit services in the region unless it does so with the approval of the GVTA. The GVTA may give an approval if the independent transit services will not reduce the effectiveness or financial viability of the regional system. The authority is prohibited from providing financial support for any independent transit services.

We appreciate the amount of work that has gone into the Downtown Streetcar project to date and the opportunity to be involved in some of the technical discussions. Given the significance of the project and its potential funding and operatonal impact on the GVTA, we appreciate this opportunity to share our comments with Council. We would be pleased to continue to work with city staff in an advisory capacity as necessary.

Yours truly,

Pat Jacobsen
Chief Executive Officer

APPENDIX C

3 San Francisco F-line

3.1 *Introduction*

3.1.1 San Francisco has an extensive public transit system including LRT, streetcar and metro systems. San Francisco has two historic tram operations: the cable car system and the F-line streetcar. This section concentrates on the F-line.

3.1.2 A unique feature of the F-line is that it is one of the only systems operated using historical, refurbished, streetcar vehicles. The historic streetcar vehicles give the F-line a very strong tourist appeal connecting important tourist areas within San Francisco.

3.1.3 The F-line was built in four separate stages eventually connecting the downtown area with Fisherman's Wharf. The line was finally completed in March 2000. It is uses 24 rehabilitated streetcars. 17 of the cars are Art-Deco Presidents Conference Committee (PCC) cars and the remaining 7 cars are imported Peter Witt-style streetcars from Milan. The F-line is just over 8-km long and runs from the Castro district downtown to the historic Fisherman's Wharf area (see figure 3.1). The route is not fully segregated and is shared with other road traffic in Market Street. There are 32 stops, approximately every one block and most are accessible by means of ramps or passenger lifts for wheelchair access. The system is operated using overhead contact wire.

3.1.4 All of the streetcar vehicles have refurbished after being purchased from a variety of different sources, although they were built to similar designs. The vehicles were then repainted in a variety of different colour schemes to reflect the various US cities that once owned and operated streetcars (see figures 3.2 and 3.3).

3.1.5 The system has been a success in terms of ridership which has steadily increased year on year. The F-line now carries on average 20,000 passengers per day with a much higher ridership in the summer months, underlining its tourist appeal. The system is now carrying twice the forecast ridership with overcrowding becoming a problem at certain times of the day. Muni (San Francisco Municipal Railway) has recently purchased a further 11 more PCC cars to increase capacity. These additional vehicles will be introduced in 2005.

Figure 3.1: F-Line system map

Figure 3.2: PCC 'Streamliner' design

Figure 3.3: Peter Witt Design

Table 3.4 San Francisco F-Line Characteristics	
System type e.g. LRT/transit/streetcar	Conventional tramway
Average age of vehicles (historic versus modern)	Restored streetcars PCC design and Peter Witt design
Number and type of cars e.g. low floor/articulated/historical	24 St Louis Car PCC ex-Philadelphia (1948); 3 St Louis Car PCC double-ended (1948, rebuilt 1994); 17 are in service painted in PCC colours of Muni. Further PCC cars have been purchased to increase capacity. Also 7 Peter Witt design cars in service
Vehicle dimensions (width, height, length)	Standard PCC design or Peter Witt Design
Capacity of cars (seated and standing)	Standard PCC design or Peter Witt Design
Accessibility (disabled accessibility) e.g. platforms and boarding	Stations are accessible by ramps or lifts. Note PCC fleet has been modified to achieve ADA compliance.
Length (segregated and at-grade)	5 miles/8km joint running in market street and segregate running from Market Street to Fisherman's Wharf.
Type of signalling/traffic management	Drive on sight.
Number of stations	32 stops
Type of platform at station – if any	Low level platforms
Frequency/headway	6-10 min
Hours of operation	05:00/00:30
Technical characteristics of maintenance facility (total area, floor size, # of bays)	Information not publicly available
Organisation and Institutional Setting	Public Ownership and Operation. San Francisco Municipal Railway (MUNI)
Integration with other Transit Systems	Basic fare allows travel on any MUNI vehicle (the "Metro" streetcars, historic streetcars and buses) except for MUNI's cable cars.

APPENDIX D

Executive Overview

Introduction

The City of Vancouver has developed preliminary plans for a Downtown Streetcar service to provide public transit to key tourist and recreational destinations, as well as to emerging downtown residential neighbourhoods (i.e., Southeast False Creek). An initial phase of the service would be built to run between Waterfront Station and Granville Island with a Phase 1 extension to Stanley Park and a Phase 2 route from Science World to Granville on Pacific (serving the Yaletown/GM Place/BC Place area), although note that future phases are not dependent on each other. At this time the City has commissioned marketing research to assess the potential interest in the Downtown streetcar concept and to develop some planning level ridership estimates for such a service among tourist and potential resident recreational users. Mustel Group has conducted the market research and TSi Consultants has developed planning level ridership estimates.

Two market research surveys were conducted between July 29 and August 24, 2004. One survey was completed on-site among over 600 tourists visiting six Downtown tourist destinations along the proposed Phase 1 route and the Stanley Park extension destination. The results were weighted by interview location based on annual tourist controls. The second, a random telephone survey, was completed among 1,200 Greater Vancouver residents 16 years of age and over, whereby over 700 qualified as recreational travelers to Downtown Vancouver for non-commuting purposes in the past three months (i.e., for shopping, personal business, entertainment, recreational or social reasons). The resident survey was weighted to match 2001 census on the basis of age within gender and area of residence.

The key findings are summarized in this *Executive Overview* with a more comprehensive, illustrated presentation of the results in the *Detailed* Findings section of this report.

Key Findings

Downtown Tourist Travel Characteristics

- **Length of Vancouver visit:** Majority of tourists visit less than one week
    - Median = 4 days
    - Mean = 6 days

- **Local accommodation:** Over half say they are staying in the Downtown area. But note, there is a greater propensity to encounter tourists staying Downtown at these locations, due to greater proximity of the interviewing sites to their accommodation.

- **Downtown trip party size:** Most tourists travel in groups of two or more (84%).
    - Median = 2 people
    - Mean = 2.9 people

- **Main mode** to today's Downtown destination: A number of different modes are used with no single mode predominating – walking, private or rented vehicle are the top two (28-29% each), followed by transit (20%).

    - Those who traveled by private or rented vehicle tended to use off-street parking just slightly more than street parking (51% and 43%, respectively).

- **Destinations visited/plan to visit:** Tourists were asked if they had visited or planned to visit any of a list of specific Downtown tourist destinations.
    - Among tourists, the top destination is Stanley Park (88%).
    - Second most popular are: Robson-Granville Street shopping area, Gastown and Granville Island (69-71% each).
    - Chinatown (54%) and Waterfront/Canada Place (40-45%) appeal to a considerable proportion of tourists.
    - Yaletown and Science World appear to attract a minority of tourists (23% and 21%, respectively) and BC Place or GM Place are the least likely of these destinations for the tourist segment (12%).

Recreational Resident Characteristics

- **Demographically:** GVRD residents who visit Downtown for recreational purposes in the past three months (not for work/school commuting) are largely similar to the population overall.
    - Just slightly more recreational visitors are residents of the City of Vancouver (37% vs. 30% among residents in total).
    - About one-in-five of these recreational visitors also work or go to school Downtown.

- **Usual mode** to Downtown Vancouver: private vehicle is the most popular mode for shopping, personal business, entertainment or recreational trips Downtown (61%) with most traveling for these purposes in carpools of two or more (46%). Nevertheless, nearly half (46%) say that transit is a usual mode for traveling Downtown.
    - Note that 12% mention both private vehicle and transit as a usual mode for going Downtown (but not necessarily in the same trip).

- In total, 7% use other sustainable modes (mainly walking, but also some cycling). There is minimal mention of rollerblading, skateboarding or wheelchairing.

Appeal of Proposed Downtown Vancouver Streetcar

- **Streetcar concept:** The following concept description was presented to respondents.

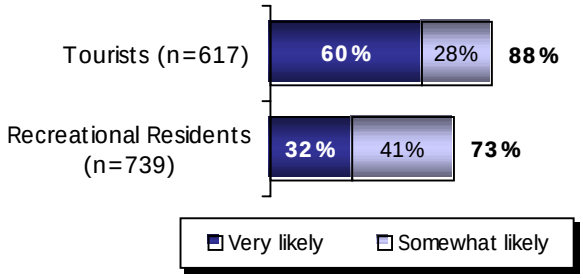
> *Modern, rail-based street cars would run through Downtown Vancouver and around False Creek, as seen on this map … covering major tourist destinations, such as Canada Place, Gastown, Chinatown, Science World and Granville Island.*
>
> *Streetcars would run approximately every 10 minutes in both directions. Streetcar systems like this are quieter than buses, non-polluting, wheelchair and bike-accessible and offer a very smooth ride.*
>
> *Riders of the streetcar would be able to use their fare to transfer onto the rest of the Greater Vancouver transit system of SeaBus, SkyTrain and transit buses.*
>
> *The service would cost in the range of 2 to 3 dollars.*

Updated map (full survey materials appended).

Note that in concept testing consumers tend to overstate their future intentions, particularly a service or product that is completely new (in this case new to Vancouver). As a result, ridership forecasts (later in this report) are based on down-weighted survey results verified against independent estimates developed using other techniques (e.g., preliminary EMME/2 estimates, benchmarking of similar systems currently operating worldwide). This multi-staged approach ensures that the ridership estimates are robust as they do not rely solely on one estimation method.

- **Reported interest in using streetcar:** The following survey findings on the likelihood of use, though not down-weighted, indicate the level of enthusiasm for the streetcar idea. Tourists in particular are very likely to use the new service. Although these results must be treated with caution in terms of user projections, the findings clearly reveal that the streetcar in concept has broad support among those who visit the Downtown – both tourists and recreational residents.

Likelihood of Using Streetcar Service



Q.8) TOURISTS: If this streetcar service was available, how likely would you be to use it to travel to this particular location?

Q.9) RECREATIONAL RESIDENTS: If this streetcar service was available, how likely would you be to use it to travel to the Downtown Vancouver areas we mentioned?

- **Appeal of specific destinations:** Tourists and recreational residents agree on the top two streetcar destinations, but tourists are generally more enthusiastic and committed about using the streetcar. (*These results are not down-weighted*)
    - Stanley Park ranks first:
        - Tourists: 85% "very/somewhat likely"; 64% "very likely"
        - Recreational residents: 69% "very/somewhat likely"; 34% "very likely"
    - Granville Island ranks a close second:
        - Tourists: 81% "very/somewhat likely"; 57% "very likely"
        - Recreational residents: 61% "very/somewhat likely"; 38% "very likely"
    - The next most popular streetcar destinations are:
        - Tourists: Gastown-Waterfront-Chinatown (71-77% total likely with 45-48% "very likely")

        - Recreational residents: the sports arenas: GM Place/BC Place (52% total likely with 23% "very likely") and then Gastown and Waterfront (45-49% total likely; 21-22% "very likely")

- **Barriers to using streetcar:**
    - Tourists: Prefer to walk for exercise and prefer or need rented vehicle
    - Recreational residents: Satisfaction with current transit and preference for using own vehicle

- **Main appealing features of streetcar:**
    - Tourists: Easy, convenient access firstly, but also service frequency, good price, environmentally friendly and general convenience
    - Recreational residents: Service frequency and needed destinations/good access to destinations are top encouragements to use the streetcar, but also the non-polluting/environmentally friendly feature is appealing.

- **Expectation to combine with streetcar with other modes:**
    - Tourists: Most (59%) would combine streetcar use with transit, specifically with buses (42%), SkyTrain (33%) and SeaBus (19%)
    - Recreational residents: The vast majority (87%) of potential streetcar users would connect to another mode- divided between the transit system (largely buses and SkyTrain, 41-42% each) and private vehicles (36%) necessitating parking availability. Note that recreational residents say that private vehicles (largely carpools) and public transit (mainly buses) are the main modes that streetcars would replace. About half (48%) of potential streetcar users say that the streetcar would replace transit.

- **Other marketing issues:** Among recreational residents, heaviest use would be on weekends (88% vs. 53% weekdays) and the preferred payment method is cash (64%).

- **Influence of specific factors on streetcar use:** Tourists and recreational residents agree on the top three factors that would have greatest importance in the decision to use the streetcar.
    - **Service frequency**
    - **Destinations served**
    - **Ability to transfer for free to other transit**
    - As well, the availability of day passes is of high importance to tourists.
    - Also of interest, the style of streetcar is not an issue with little differentiation in greater preferences for the modern or historic style.

Planning Level Ridership Forecast

Downtown Streetcar ridership estimates were calculated for the Phase 1 system (Waterfront to Granville Island), if open today and fully mature (i.e., in operation for 2 to 3 years). Similarly, estimates were prepared for the Phase 1&2 system Stanley Park to Granville Island and Science World to Yaletown.

- If the system were open today and fully mature, Phase 1 (Waterfront to Granville Island) annual boardings for the tourist and recreational markets are estimated at 2.1 to 3.5 million. Adding the preliminary model-based estimate for commuting/education trips produces total annual boards ranging from 3.1 to 4.5 million.

- Phase1&2 (Stanley Park to Granville Island and Yaletown) annual boardings for the tourist and recreational markets are estimated at 3.8 to 5.9 million. Adding the commuting/education model estimate produces total annual boards ranging from 7.2 to 9.3 million.

- Further details of annual ridership estimates are presented in Section III of the *Detailed Findings* by market segment (including tourist and recreational resident plus a model-based commuter/education estimate) and by summer/winter daily boardings.

- The initial "planning-level" ridership estimates should be verified against independent benchmarking of similar systems currently in operation worldwide.

- When the streetcar design and operational characteristics are refined, more accurate ridership forecasts can be considered for the tourist and recreational markets using structured stated-preference surveys.

Conclusions

Clearly the potential recreational markets for the proposed Downtown Streetcar support the service concept integrated with the current transit system. There is a high level of interest expressed in the idea and people recognize the benefits such a service would provide.
In sum,

- Significant interest is indicated among both tourists and recreational residents.
- Tourists are the most enthusiastic, suggesting that the streetcar service has potential to enhance greater tourist growth for Vancouver.
- The Phase 1 routing will serve popular destinations with Stanley Park and Granville Island being the most frequented.
- Service frequency should be approximately 10-minute intervals or less.
- Streetcar fares and pricing should be integrated with the whole public transit system.
- The type of streetcar (modern vs. historic styling) is not a key factor.

At this stage, the planning level ridership estimates appear promising. The following next steps are recommended;

- These planning level ridership estimates need to be assessed in terms of fiscal and operational feasibility.
- The estimates should also be assessed for reasonableness against independent benchmarks of similar types of existing services elsewhere.
- To obtain more accurate design level tourist and ridership estimates, specific stated preference surveys should be conducted.

APPENDIX E


GRANVILLE ISLAND


Terminal Ave
Quebec St


Columbia St
Keefer St


...in
British
Columbia
STORYEUM
5


HOUSTON

APPENDIX F

2004 VANCOUVER BUS ROUTES (RANKED BY DAILY BOARDINGS) & 2021 DOWNTOWN STREETCAR RIDERSHIP FORECASTS

Ranking	Route #	Route Name	Daily Boardings	Revenue Hours	Average Speed	Boards/ Revenue-hr
1	99	B-Line Broadway Station/UBC	30,880	233	23	133
	STREETCAR	PHASE 1 & PACIFIC BOULEVARD EXTENSION & STANLEY PARK EXTENSION	30,000	228	18	132
2	9	Boundary/Broadway Stn/Alma/UBC	25,650	267	17	96
	STREETCAR	PHASE 1 & PACIFIC BOULEVARD EXTENSION	24,000	190	18	126
	STREETCAR	PHASE 1 & STANLEY PARK EXTENSION	23,000	133	18	173
3	41	Joyce Station/Crown/UBC	22,010	205	23	107
4	20	Victoria/Downtown	22,000	249	16	89
5	17	Oak/Downtown/UBC	20,750	237	19	88
6	98	B-Line Richmond Ctr/Burrard Stn	20,160	238	22	85
7	3	Main/Downtown	18,760	214	15	88
	STREETCAR	PHASE 1 (GRANVILLE ISLAND TO WATERFRONT STATION)	16,500	95	18	174
8	22	Knight/Macdonald	16,280	212	19	77
9	16	29th Ave Station/Arbutus	15,400	210	18	73
10	8	Fraser/Downtown	14,200	179	16	79

APPENDIX G

Streetcar and Bus Comparative Review

A Technical Memorandum For The City Of Vancouver's Downtown Streetcar Project Update

July 18, 2006

IBI GROUP

Contents

1 INTRODUCTION

This review compiles a set of quantitative and qualitative indicators that compare streetcars to buses. This review is based on available literature and knowledge base in the transit engineering industry, and has been prepared in context of the City of Vancouver's Downtown Streetcar project update. It compares the general characteristics of streetcars and bus services and also looks at the specific characteristics of the proposed Downtown Streetcar in Vancouver. Four major categories are used in this comparison:

- Financial;
- Operational;
- Traffic Impacts; and
- Social Impacts.

This memo is organised according to the analysis categories, followed by a brief summary of key points.

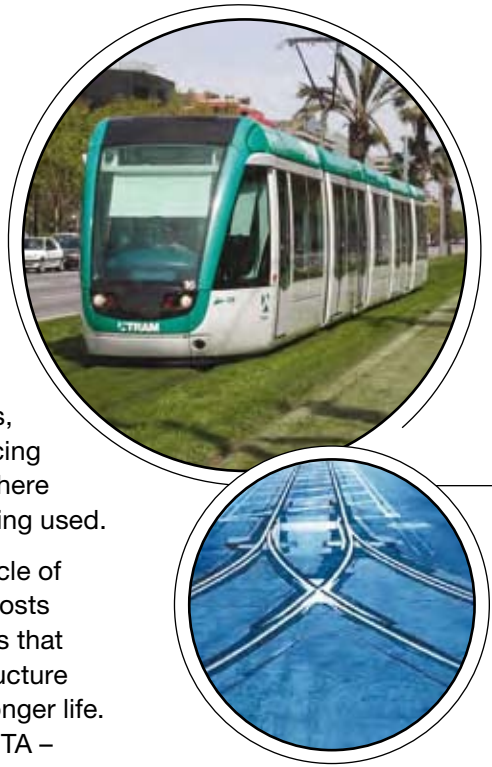
2 FINANCIAL

On the surface, serving an area by bus appears less expensive than rail since buses are less expensive than streetcars, and since buses do not need rail infrastructure. However, the bottom-line financial outlook of streetcar versus bus service has to consider the life-cycle costs, potential benefits of service integration between modes, and incremental ridership and fare revenues that may result. A discussion and analysis of these financial indicators follows.

Capital and Operating Costs

The key cost differentiators between streetcar and bus service include:

- Higher capital costs for streetcar infrastructure, including civil construction, stations, tracks, signals and power distribution along the streetcar alignment. Electric trolley buses would also require overhead power if they were being contemplated, but none of the other elements.
- Higher capital costs for streetcar vehicles. The typical price for a modern streetcar is in the range of $3 to $3.5 million. In comparison, 40-foot transit buses have a capital cost of some $0.4 to $0.5 million, and articulated buses cost in the range of $0.6 to $0.9 million.
- Lower per-passenger operating costs for the streetcar. On busy transit corridors, it is more cost-effective to carry passenger loads on streetcars instead of replacing them with diesel buses. This has proven to be the case in downtown Toronto, where single and articulated streetcars provide surface transit, with very few buses being used.
- The longer service life of streetcars (25 years) compares favourably to the life cycle of a transit bus (17 years). The longer life helps to reduce some of the annualised costs relative to the net present (current year) values. (These are average financial lives that account for the median time an agency either replaces the vehicles and infrastructure or spends an equivalent amount of money refurbishing and restoring them for longer life. The values are guidelines the United States Federal Transit Administration – or FTA – requires agencies to use for project justification studies and funding applications).



Fare Revenues

Another consideration is the higher ridership potential of the streetcar, which leads to greater operating revenues.

There are two contributing factors:

- Rail systems have higher operating speed where separated from other traffic.
- Streetcars and rail systems have a built-in attraction for tourists and occasional “choice” riders. Studies and observations in other cities have demonstrated significant increases in ridership due to a change from bus to rail. This is due to comfort factors such as easy access, large windows, smooth rides, quiet environment, and visible routings. In addition, there is a certain cachet to streetcars, often revealed by rider preference studies, that has to do with the perceived special level of service.

3 OPERATIONAL

This section presents a comparison of operational measures for buses and streetcars, organised by measure.

Speed

- Streetcar – Higher acceleration and braking abilities than bus, therefore better travel time performance. Travel time is enhanced significantly with dedicated right-of-way (R.O.W.). Separation from other traffic is commonplace in European systems and second-generation North American systems. Downtown Streetcar includes sections with dedicated right-of-way, resulting in more attractive travel time performance.
- Bus – Travel time depends on type of service (local, community shuttle, BRT). These types of bus are all present or soon to start in the vicinity of the proposed alignment. None of the planned bus services include dedicated right-of-way; buses would operate in mixed traffic lanes, and experience the same congestion as other traffic streams.

Reliability

- Streetcar – Travel time reliability is higher than bus where streetcar tracks are on exclusive ROW. Reliability is also increased if streetcar tracks are combined with transit signal priority. If in mixed traffic lanes, streetcar experiences similar benefits from transit signal priority as bus.
- Bus – Bus in mixed traffic lanes is less reliable as it has to contend with traffic congestion, being blocked by turning, stopped or parked cars. There are potentially similar benefits from transit signal priority in mixed traffic as a streetcar.

Capacity

- Streetcar – LRT is most commonly considered as "intermediate" capacity, and streetcars are similar but often used as an urban circulator rather than a suburb-to-city service. Per vehicle, a 50-foot (16m) streetcar carries 100% more passengers than a standard low floor bus and 35% more than an articulated low floor bus. For example, the Portland Streetcar has 30 seats, and carries up to 85 standees. This maximum of 115 passengers is over two times that of a low floor bus.
- Bus – considered to be low to intermediate capacity. Per vehicle there are 38 seats, and 17 standees [55 total] on a standard low floor 40-foot (12m) bus, and there are 54 seats, 31 standees [85 total] on an articulated bus (per TransLink peak period 15 minute standards).

Stations and Stops

- Streetcar – Stations stand out and are more clearly identifiable (usually covered stops or shelters next to tracks), and can also be shared with bus services.
- Bus – Stations are typically simpler roadside shelters.

Routing Flexibility

- Streetcar – Routes to stops are limited to places where trades and power supply have been built. Real-time ability to re-route or detour a streetcar is limited; this requires built-in locations for turn-backs on the track network, requiring crossover tracks and potentially traffic intervention.
- Bus – High ability to add stops and change the route. Real-time flexibility exists to deviate from route due to special event or emergency.

Transit Service Permanence

- Streetcar – Investment in tracks and stations represents a longer term commitment to providing service. The flip side to streetcars being 'confined' to their tracks is passengers know the streetcar is on its way.
- Bus – Given its flexibility advantage, bus service can always be reprioritized throughout the region. This could mean changes in frequency but possibly complete deletion of service.

Depot Requirements

- Streetcar – The yard and maintenance facility must be on or near the alignment, and connected by yard lead tracks. Proposed locations in Vancouver are: on Quebec Street under Georgia Viaduct; and under/near the Hemlock ramp onto Granville Bridge.
- Bus – Additional buses would require space in existing or new bus depots. Local buses in Vancouver typically originate from Oakridge – soon moving to Eburne -- or Burnaby Transit Centre.

Equipment Life

- Streetcar – Typically, 25 years for the vehicles and 30 years for the tracks, signals and power system.
- Bus – Typically, 17 years of service before they are replaced.

4 TRAFFIC IMPACTS

The following presents a comparison of traffic impacts between buses and streetcars.

Impact to Vehicles

- Streetcar – similar impacts to vehicles as buses, where both are street-running. In the case of this proposed system, the Downtown Streetcar also has off-street segments where there are no impacts to vehicles, except at intersections.
- Bus – similar impacts to vehicles as streetcars, where both are street-running. Greater reliance on street-running than proposed streetcar, and therefore more mixing with traffic.

Impacts to Bicycles

- Streetcar – The streetcar vehicle has a more predictable path because the streetcar follows tracks (it won't make lane changes), but there is also the risk that thinner bicycle wheels might become caught next to tracks if riders are unprepared.
- Bus – Less predictable path than streetcar but has no track infrastructure and drivers have an ability to pass cyclists with a greater shy distance.

Impacts to Pedestrians

- Streetcars – are quieter and produce no exhaust fumes for passing pedestrians. Running ways and stations are often accompanied by broader sidewalks, an improvement to the walking environment.
- Buses – are noisier and diesel buses have exhaust fumes. Can also be accompanied by broader sidewalks.

Signal Priority

- Streetcar – Implementation of transit priority is easier for rail-based vehicles, and detection can be hard wired into the tracks.
- Bus – Transit priority will require method of bus detection, and supporting roadside receivers.

Safety

- Streetcar – Bureau of Transportation Statistics, 1997: LRT has lower fatality rate than automobiles and other forms of public transit. Some rail-vehicle accidents occur because rail cannot swerve to avoid other vehicles making sudden lane changes.
- Bus – Higher rate of accidents than streetcar, according to BTS 1997.

Design Flexibility

- Streetcar – Because of the predictability of operation and the easy ability to restrict other vehicles, streetcar systems have been incorporated in parks, plazas, greenspaces, and boulevards where bus routes would not be acceptable. Tracks can be fully integrated into plaza pavers and even grassed areas.
- Bus – routes can operate within exclusive transit malls, but these are sometimes shared with taxis, motorcycles and delivery vehicles.

5 SOCIAL IMPACTS

The following presents a comparison of social impacts between streetcars and buses.

Street & Neighbourhood Design

- Streetcar – Lateral segregation of different uses, where practical, with curbs and landscaping – as a means of limiting automobile influx into narrow downtown streets. Parking availability may decrease where separate lanes for transit, autos and bicycles are created. However, a smaller percentage of people destined to the area would need parking. In addition, the higher overall cost of constructing a streetcar system on city streets is partially offset by the benefit of rebuilding streets and therefore improving the public realm.
- Bus – No impact on street & neighbourhood design, unless a BRT project with those specific components. BRT service is not part of the plan for this alignment.

Environmental

- Streetcar – Benefits, include congestion relief and air quality improvements. Electric streetcars produce zero-emissions as a mobile source.
- Bus – Can be low or zero-emission, depending on the type of motor. Diesel buses emit fumes and particulate matter.

Noise

- Streetcar – Modern electric vehicles make very little noise, less than diesel engines.
- Bus – Diesel and CNG buses create significantly more noise than either electric trolley buses or streetcars.

Market Attraction

- Streetcar – Streetcar and LRT systems have spun off benefits to nearby retail and commercial establishments. For example:

  a. San Diego Trolley caused a 10% benefit in hotel occupancy near stations (1992 study); 80% of riders at Fashion Valley and Mission Valley riders also shop at the malls; 57% of those said they would not have shopped without the transit service.

  b. In a survey of businesses along Spadina Avenue in Toronto (where an old streetcar line was renovated to replace a bus route), 43% indicated a positive impact, 38% indicated no change, and 19% of the respondents felt business had dropped. Overall, this was an improvement.

  c. The F-Line in San Francisco was extended in 2000 along the Embarcadero and has boosted the number of visits by local office workers, residents and tourists to food shops at Fisherman's Wharf and the Ferry Terminal at the foot of Market Street.

- Bus – Overlaying higher-quality bus services such as Bus Rapid Transit onto a street with local services usually increases ridership and benefits businesses close to stops. This type of service doesn't apply to the proposed streetcar alignment in Downtown Vancouver.

Redevelopment Stimulus

- Streetcar – Investment in rail encourages often revitalisation of urban areas, starting from the time the project becomes committed:

  a. Hudson-Bergen Light Rail – In Jersey City, actual and approved development in 4 years after the LRT started was nearly double the development activity of the previous 27 years; commercial, residential and institutional investment. The City of Bayonne is undergoing a turn-around in property values, building permits, sale prices of residential units, and redevelopment of depressed areas.

  b. Spadina Avenue, Toronto – Following re-introduction of streetcars in 1997, employment growth exceeded the city average, and sections with slumping employment underwent a recovery after the new streetcar started service.

  c. Portland Streetcar (which runs perpendicular to city's main LRT system) is credited with sparking more than $1 billion of brown field redevelopment. Systematic studies of development in Portland showed that new development within one block of the alignment was at higher densities than new developments elsewhere in downtown Portland after 1997. (The streetcar alignment was chosen in 1997 and the service opened in 2001.) In addition, the share of new downtown development within one block of the alignment rose from 19% to 55%. Expressed as a rate, square footages within one block increased nearly 6% compared with an overall rate of 2% in the entire downtown. Two of the key issues were increased accessibility and lower parking requirements, making bigger developments feasible.

- Bus – Conventional bus services are not known for triggering redevelopment, although they can provide access to developing areas that were previously unserved. Because bus services can easily be removed, they do not encourage developers to the same extent as rail with its fixed infrastructure.

Property Values

- Streetcar – Values near new stations tend to increase. For example, in Portland, property values near key light rail stations increased 134 to 491 percent, compared to 67% countywide in 1980-1991 time frame. In Dallas, near the DART system, median residential property values increased 32% versus 20% in a control group, and office property values increased 25% versus 12%.
- Bus – Not usually noted as a stimulus for existing property values, other than its value in offsetting some parking requirements (which streetcars also do) and increasing the potential use of land.

Ridership Impacts – A Comparison

Streetcars attract more choice riders because of curiosity and observed passenger preference for rail over bus, for various reasons (presence of stations and tracks gives it a sense of permanence, historic vehicles act as an attraction to tourists, comfort and reliability are perceived to be better). For example:

a. A bus route in The Hague, Netherlands, was replaced by a rail line that attracted 22% more riders, 32% more in the off-peak.

b. The F Market-Wharves streetcar line in San Francisco uses mostly restored vintage streetcars (PCC's and Peter Witts) and attracted more ridership (9,700 per day on just the Market section, in 1998) than the bus line it replaced (5,400). The full line now carries over 20,000. Tourists view the line as a type of tourist attraction in conjunction with the cable cars, and local riders use it more heavily. Sometimes, buses are used to handle heavy peak loads, but people often refuse to ride the bus and wait extra for the streetcar instead.

c. In Toronto, on Spadina Avenue, a bus service was replaced by the return of median-running streetcars in the mid-1990's. The #77 TTC bus carried 31,000 per day; running at a less frequent headway than the bus but carrying more passengers per vehicle, the streetcar moves 38,000.

A mix of passengers uses bus services in Vancouver and tourists do ride the #19 trolleybus to Stanley Park during the summer when it runs more often. The #50 bus that serves Gastown, Granville Street, Granville Island and South False Creek, achieves moderate ridership but is less successful during the morning peak period.

6 HIGHLIGHTS

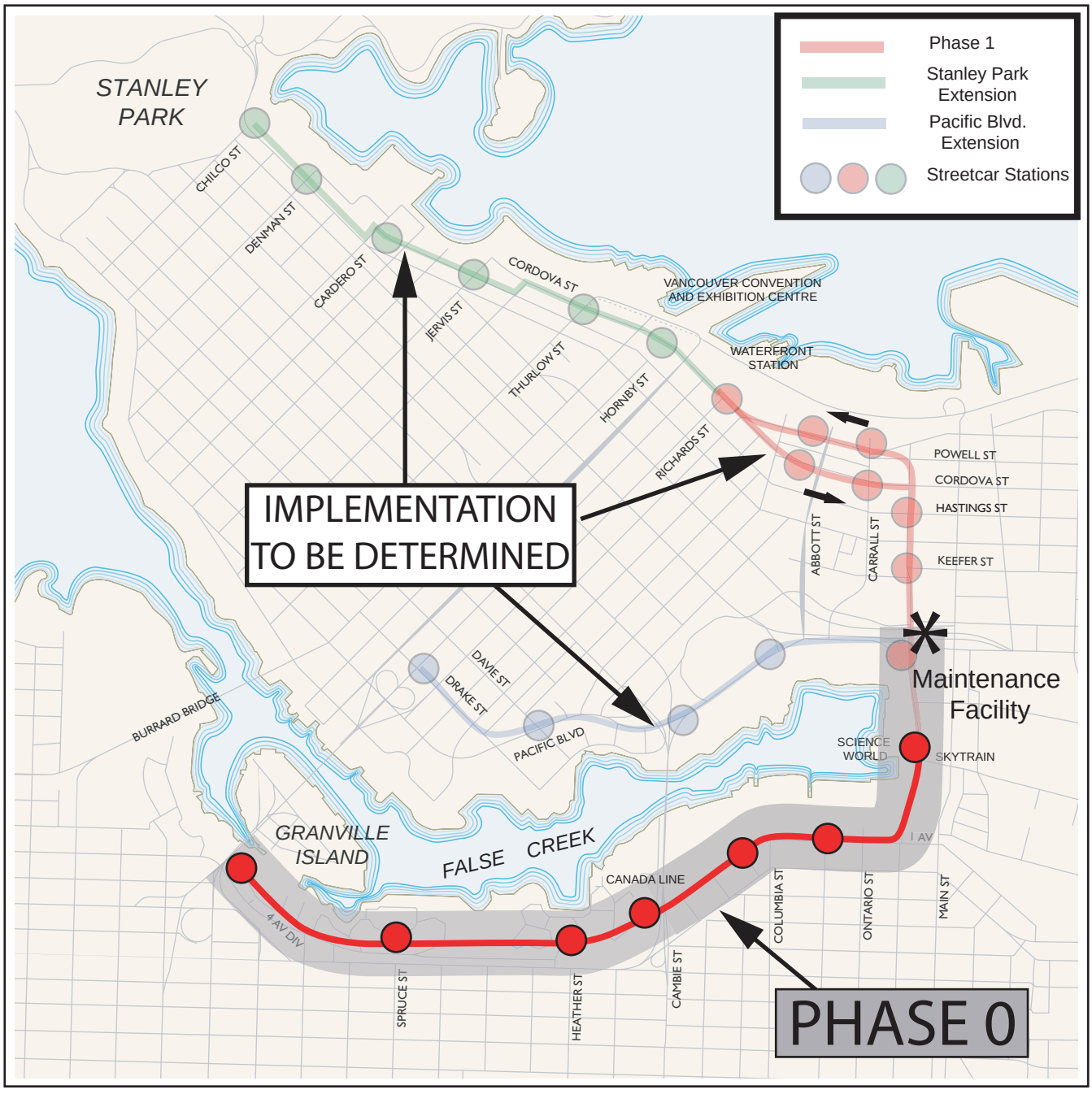
These are the key findings in this comparison of streetcar services with bus alternatives for the proposed Downtown Streetcar:

- ✔ Streetcars have higher initial capital costs for vehicles and rail infrastructure, but most of this cost can be offset through additional passenger fare revenues and operating cost savings from service integration with other transit services.
- ✔ Streetcars have an average 25-year lifespan compared to a diesel or electric trolley bus, which offer only 17 years of service.
- ✔ Benefiting from the initial investment, streetcars can run at higher average speeds, offer greater reliability and capacity, and feature more attractive stations.
- ✔ Installation of a streetcar line has more presence than a bus route and the streetcar service has a distinct appearance and operation. Businesses that build themselves around a streetcar line typically have better economic stability. In particular, restaurants and shops that are able to attract tourists and become readily accessible to commuters in the midday or after working hours tend to prosper.
- ✔ Streetcar corridors act as a redevelopment stimulus, increasing market attraction and property values near stops.
- ✔ Streetcars can enhance urban design and streetscapes and the proposed project includes improvements such as bicycle lanes and pedestrian enhancements along its alignment.
- ✔ Streetcars attract tourism riders in addition to commuters and recreational/shopping trips by area residents. Since streetcars can carry approximately 1.5 times the number of passengers as articulated buses, they are better suited to handle this extra volume.
- ✔ Streetcars run on electricity and are environmentally friendlier than diesel buses, with less vehicle noise and fewer emissions.

In summary, while it is true that simply running a bus service might have lower average capital and operating costs, there are numerous transit operations, personal mobility, urban environment and economic spin-off benefits from a streetcar service that support its implementation in a well-chosen corridor.

APPENDIX H

Downtown Streetcar
Phase 0
Implementation Strategy



Phase 0 - Granville Island to Science World
- Includes Maintenance Facility