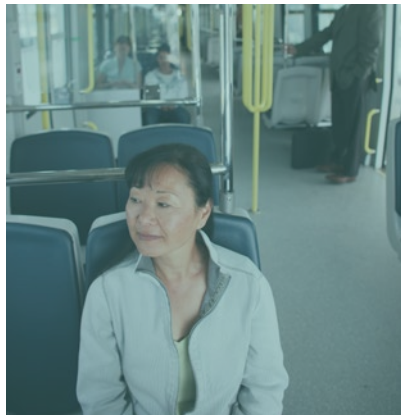


Regional Transportation Investments

a Vision for Metro Vancouver

APPENDICES



**MAYORS'
COUNCIL**
On Regional Transportation

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Actions to Invest

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INTRODUCTION

DOCUMENT OVERVIEW

The following document provides an overview of investment programs and projects under consideration within the Mayors' Council Subcommittee's *Regional Transportation Investments: a Vision for Metro Vancouver* effort. The summary for each program and project includes a project overview, description of objectives and need, specific project/program scope, summary of operating and capital costs, and a summary of the project/program outcomes and evaluation results.

OVERVIEW OF INVESTMENT FRAMEWORK

The *Regional Transportation Investments: a Vision for Metro Vancouver* examines options and provides a proposed program of funding for regional transportation at two levels:

- **Maintain Service and System (MSS)** is a set of investments targeted at addressing the most basic needs for regional transportation to aim to keep up with growth in population and employment. This level of investment does not help the region to meet its transportation goals. Maintain Service and System is targeted at achieving the following:
 - Bus: Add sufficient service to keep overcrowding from getting worse in peak periods
 - Existing Rail: Increase service, within the capacity of existing maintenance and storage facilities
 - Roads (MRN): Add funding to meet current standards
 - Cycling: Restore funding to historical levels to implement regional cycling investments (cost-shared with municipalities)
- **Expansion** programs provide additional funding for transportation infrastructure and services to help move the region closer toward transportation goals.

MSS is the starting point for investment, a set of first priorities within the overall expansion program, recognizing that the highest priority for investment is maintaining the current system. The projects and programs described in this document describe the investments in each mode category for both MSS and Expansion combined. The specific investments that comprise MSS are described in the "*Overview of Maintain Service and System*" section of this document.

EVALUATION METHODOLOGY

Each project or investment was evaluated based on how well it advances regional goals. This framework for evaluating projects was used to facilitate decision-making, and the criteria and methodology for evaluating projects was designed in collaboration between TransLink and municipal staff.

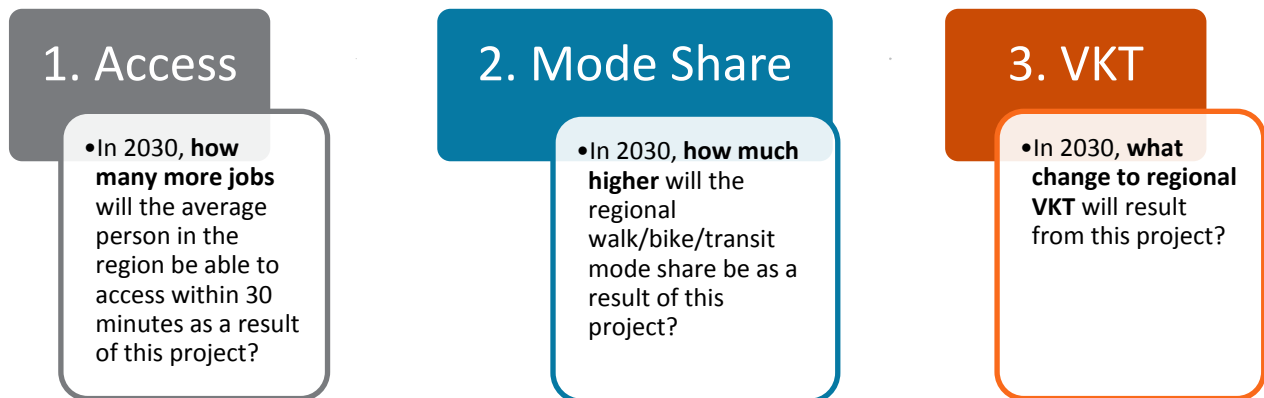
ASSESSMENT OF CANDIDATE PROJECTS

The Regional Growth Strategy and the Regional Transportation Strategy articulate regional goals around a sustainable economy, healthy people and communities and a clean environment. From a transportation perspective, achieving these goals depends largely on ensuring good regional access to jobs, reduced driving distances and more walking, cycling, and transit trips. While these three metrics don't capture everything that this region might care about (e.g. placemaking, security), they substantially drive progress towards most regional goals.

Appendix A: Actions to Invest

For example, reducing Vehicle Kilometres Traveled (VKT) results in less congestion, increased travel reliability, safer streets with fewer traffic fatalities, less fossil fuel use, less air pollution, and lower GHG emissions. Increasing walking, cycling, and transit mode share helps reduce VKT (and so achieve the benefits above) as well as improve physical activity and public health, improve placemaking and reduce crime. Increasing regional accessibility to jobs and markets for people and goods is one of the fundamental tasks of the transportation system and critical to supporting a sustainable economy.

To simplify the evaluation and to avoid any weighting of the criteria (that would require value judgments best made by decision-makers rather than technical staff), each of the projects was assessed against these three key metrics:



The performance metrics shown in the following project descriptions indicate the Access, Mode Share and VKT changes that are expected (in 2030) as a result of that project. The scores were assessed using benchmark forecasting for a representative sampling of the projects along with existing studies and other supporting data. A detailed explanation of the criteria and methodology used to evaluate projects, along with the outcomes of investment scenarios, is presented in Appendix C.

COST-EFFECTIVENESS SCORE

The cost-effectiveness score is calculated by dividing each metric by the total annual average cost of the project to government (net of fare revenues). The resulting figures were then indexed on a 0-100 scale to facilitate easy comparisons (with 0 representing the least cost-effective and 100 representing the most cost-effective project on the list).

MAINTAIN SERVICE AND SYSTEM

OVERVIEW

The Metro Vancouver region is expected to add more than a million people over the next thirty years. *Maintain Service and System (MSS)* is a package of investments aimed at addressing the most basic needs for enhancements to the regional transportation network to keep up with growth in population and employment and to maintain the region's existing transportation network.

Specific MSS investments are targeted at addressing the following needs:

- **Bus:** Add sufficient service to keep overcrowding from getting worse than current conditions in peak periods.
- **Existing Rail:** Increase service, within the capacity of existing maintenance and storage facilities.
- **Roads (MRN):** Add funding to meet current standards for the region's Major Road Network.
- **Cycling:** Restore funding to historical levels to implement highest-priority regional cycling investments (cost-shared with municipalities).

MSS provides a basic level of investment, which is built upon further with Expansion funding. The combined investment of both layers of funding is described in this Appendix.

Notably, MSS does not help the region move substantially toward meeting regional targets for reduced Vehicle Kilometres Traveled (VKT) and walk/bike/transit mode share.

MAINTAIN SERVICE AND SYSTEM INVESTMENTS BY MODE

BUS SERVICE

Sufficient capacity in the current bus system exists to accommodate expected population and employment growth on many corridors and in many communities. Persistent overcrowding and pass-ups are currently limited to a select number of corridors and times of day. Transit service investments would **increase bus service by 6%** over the ten-year plan period, a total increase of about 310,000 annual service hours. A 6% increase in bus service hours by Year 10 would provide sufficient resources to maintain bus service quality, as measured by percentage/number of trips operating at overcrowded conditions during the peak periods, at current levels, except on some very high demand corridors such as Broadway in Vancouver, where overcrowding would nevertheless worsen.

Investments would focus, as a first priority, on enhancing service on corridors where persistent overcrowding already occurs and where and when ridership demand is expected to increase the most. In general, network design and structure would remain largely the same as today. Example bus service investments would include:

- Some expansion of All-Day Frequent bus services to new corridors (5,000 annual service hours by 2024)
- Intensification of All-Day Frequent bus services on existing corridors (161,000 annual service hours by 2024)
- Some expansion and intensification of frequent service in peak periods (Peak Frequent) (131,000 annual service hours by 2024)
- Expansion of Custom Transit (HandyDART) service (38,000 annual service hours by 2024)
- Additional vehicles needed to support expanded service described above (including conventional buses, community shuttles, and Custom Transit vehicles)

Appendix A: Actions to Invest

The MSS bus service scenario assumes an increase in annual bus service hours of 310,000 hours by Year 10. SeaBus service would be increased by 2,400 hours beginning in Year 1, which would provide service at 15-minute frequencies throughout the day using existing fleet. A 6% increase in Custom Transit service is also assumed. Transit investments would *not* include expansion of basic coverage services to new and growing areas.

New vehicles would also be procured to support this transit service expansion, including 72 conventional buses and 16 Community Shuttles.

Costs: MSS – Bus Service Increase (including SeaBus)

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$51.9 million	\$35.5 million

RAIL UPGRADES

In the case of existing rail services, the level of investment needed to fully address population and employment growth (to keep overcrowding constant compared with current levels by Year 10) would require the addition of more rail vehicles than are able to be accommodated by existing storage and maintenance facilities. To keep expenditure increases within Maintain Service and System relatively modest, rail upgrades in MSS would be limited to investment levels which would not trigger the need to build additional rail car storage and maintenance. Persistent overcrowding and pass-up conditions on the rail system during peak times would remain, and would worsen over time. Crowding on trains travelling during non-peak times or directions would increase.

Specific rail upgrades include:

- **Expo Line:** 28 additional vehicles to deliver an 11% service increase on the SkyTrain system. (Note that this amount is *additional* to new vehicles put into service as part of the Evergreen Line project.)
- **Canada Line:** 6% increase in service utilizing spare vehicles
- **West Coast Express:** 2% increase in service utilizing spare vehicles

Costs: MSS – Rail Upgrades

Area	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Expo Line	\$87.4 million	\$10.3 million
Canada Line	\$ --	\$1.7 million
West Coast Express	\$ --	\$0.5 million
Total	\$87.4 million	\$12.5 million

CYCLING

Cycling programs are funded as a cost-share program with municipalities. MSS would add \$4.45 million per year to the current bicycle funding program to achieve \$6.0 million per year in total capital-cost sharing funding. MSS also includes funding to increase resources available for TransLink-owned bicycle assets, specifically parking improvements at TransLink facilities, such as stations; this funding would be an additional \$1.0 million per year (capital) and \$0.3m (operating) above base levels. Costs are shown in the below table with amounts incremental to Base Plan levels.

Costs: MSS – Cycling

Area	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Regional Cost-Sharing	\$44.5 million	\$ --
TransLink-Owned Assets	\$9.5 million	\$0.3 million
Total	\$54.0 million	\$0.3 million

ROADS

MSS would increase funding to Major Road Network in a variety of areas. MSS includes annual capital funding to address seismic safety investment needs on the MRN (e.g. bridges and culverts), and funding to support minor capital upgrades to the MRN network, in partnership with municipalities. TransLink funding to support additional MRN Pavement Rehabilitation and MRN Operations and Maintenance is also included, which would allow for annual increases of 1%, as well as an additional one-time 10% increase, for Pavement Rehabilitation. Costs are shown in the table below with amounts incremental to Base Plan levels.

Costs: MSS – Major Road Network

Area	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
MRN Minor Upgrades	\$100 million	\$ --
MRN Structural Rehab	\$130 million	\$ --
MRN Pavement Rehab	\$26.3 million	\$ --
MRN Operations & Maintenance	\$ --	\$1.6 million
Total	\$256 million	\$1.6 million

STATE OF GOOD REPAIR

MSS would also provide for capital investments to maintain TransLink’s existing asset base, to maintain state of good repair, and to maintain the system’s existing capacity (e.g. fleet replacements).

OTHER INVESTMENT CATEGORIES

No system or service expansion investments in the following categories over and above the 2014 Base Plan are included in MSS:

- Transit Facilities
- Expanded B-Line service
- System Management
- Walking Access to Transit
- Major Investments

Funding for investments in these categories is included in the Expansion funding envelope, described elsewhere in this document.

The 2014 Base Plan includes a \$300 million funding envelope to provide interim rehabilitation investments for the Pattullo Bridge. The envelope would mitigate seismic risk and address the condition of the bridge deck in order to maintain the structural integrity of the Pattullo Bridge (per the 2014 Base Plan). This has been retained in MSS. Some of these costs would be avoided if a long-term solution for the Bridge is identified in the near future.

FIGURE 1 OVERVIEW OF INVESTMENTS IN MAINTAIN SERVICE AND SYSTEM, 2015 THROUGH 2024

<p>6% Increase in Bus Service (including Custom Transit) 72 Conventional Vehicles 16 Community Shuttles 16 Custom Transit vehicles</p>	<p>Expanded Frequent All-Day Network, for example:</p> <ul style="list-style-type: none"> • Nanaimo Street • West 4th Avenue to UBC • SeaBus 		<p>Expanded Frequent Peak network, for example:</p> <ul style="list-style-type: none"> • Coast Meridian Ave./David Ave. (Coq./Port Coq.) • Big Bend/Glenlyon (Burnaby) • 6th Ave. (New West.) • 108th Street/160th Street (Surrey) • Bridgeport Road (Richmond) • Westwood Plateau (Coq.) 	
<p>Increase in Rail Service</p>	<ul style="list-style-type: none"> • Expo Line: additional 28* cars, 11.5% service increase on the SkyTrain system 	<ul style="list-style-type: none"> • Canada Line: 6.4% service increase (utilize spare vehicles) 	<ul style="list-style-type: none"> • West Coast Express: 2.2% service increase (utilize spares) 	
<p>Cycling</p>	<ul style="list-style-type: none"> • Add \$4.45m/year to achieve \$6m/year total capital-cost sharing funding • Add \$1.0m/year (capital) and \$0.3m/year (operating) for bicycle parking investments 			
<p>Roads</p>	<ul style="list-style-type: none"> • Modest funding increases for cost-sharing municipally-owned regional road assets <ul style="list-style-type: none"> ○ MRNB Capital Upgrade program – \$10 million per year ○ MRN Structures rehab – \$13 million per year ○ MRN Operations and Maintenance – 1% network growth per year 			
<p>State of Good Repair</p>	<ul style="list-style-type: none"> • Increased funding to maintain TransLink assets in a state of good repair, to reduce the deferred maintenance backlog over time, and maintain existing system capacity (e.g. fleet replacements) 			

* in addition to new SkyTrain vehicles to be put in service as part of the Evergreen Line project

ROADS

Funding for Roads programming focuses on investing to maintain and expand the region's Major Road Network, which currently includes more than 2,300 lane-kilometers of municipally-owned regionally significant roadways. The MRN carries people, goods and services by foot, bicycle, bus, car and truck. TransLink provides overall coordination, planning and funding for the MRN. The programs described in this section would increase the level of funding available for operations, maintenance, rehabilitation and upgrades to the Major Road Network (MRN) and MRN structures, and expand the amount of roadway that is within the MRN.

The priorities for roads, as set out in the Regional Transportation Strategy – Strategic Framework, are investment and ongoing maintenance to improve safety, increasing local connectivity, and improving goods movement, and the following funding programs would contribute to projects that are in line with these overarching policy goals. No major capital projects have been identified in this investment area; however as a consideration for the 11-30 year horizon, the RTS Strategic Framework identified the need for a long-term solution to address goods movement along the north shore of the Fraser River.

PROGRAM COSTS (INCREMENTAL TO BASE PLAN)

	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Capital for Minor MRN Upgrades [\$20 million capital per annum for 10 years]	\$200 million	\$ --
Operation, Maintenance, and Rehabilitation (OMR) on MRN [one time 10% increase and annual 1% increases]	\$26.3 million	\$4.7 million/year
Capital for Structural Rehabilitation on MRN [\$13 million capital per annum for 10 years]	\$130 million	\$ --

The above figures are inclusive of costs for Roads investments described in the Maintain Service and System investments section, which have 10-year capital cost (2015 \$) of \$256 million and Year 10 operating cost (2015 \$) of \$1.6 million.

PROGRAM EVALUATION

Evaluation of the two Roads programs is combined, as shown below.

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one- hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	616	78	-0.59	+14,543
Cost-Effectiveness Score (0-100)	2.3	0.1	0.0	0.0

Observations

- Investing in the MRN is necessary to improve safety and local access and to support efficient goods movement, but will not move us towards the achievement of our mode share and VKT targets
- Investing in new MRN capacity and/or connections will reduce travel times over the short to medium term, thus increasing the number of accessible jobs; however, without concurrent mobility pricing on the roadway network, this benefit is likely to be reduced over time as induced travel will increase daily VKT and thus increase congestion.

PROGRAM: ALLOWANCE FOR MRN ADDITIONS (OMR)

PROGRAM DESCRIPTION

This program would increase the MRN operating and maintenance (OMR) budget to support and maintain additions of new roads or existing roads to the MRN. The program allows for a one-time expansion of 10%, as well as annual increases of 1%. In order to be added to the MRN, roads must undergo an evaluation process as well as meet the priorities for roads, as set out in the Regional Transportation Strategy – Strategic Framework: improve safety, increase local and regional connectivity, and improve goods movement.

PROGRAM OBJECTIVES

This program’s objectives are to ensure that the MRN can be expanded to support regional needs in terms of facilitating increased access, goods movement, and safety for all modes.

PROGRAM SCOPE

Roads are added to the MRN based on an evaluation process undertaken by TransLink and the municipality/municipalities where the road is located. Under current requirements, to qualify for MRN inclusion, roads must meet strategic priorities, provide access to significant regional destinations, and:

- A minimum of 70% of trips along the segment must be longer than 10 km in the peak hour and peak direction, and total peak hour, peak direction traffic volume is greater than 800 vehicles per hour; OR
- A minimum of 10 through buses in the peak hour and peak direction, or the segment carries a minimum of 800 trucks per day.¹

Expansion investment would include an initial 10% increase in funding for MRN operations, maintenance and rehabilitation to accommodate MRN additions, and a 1% increase per year thereafter.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$26.3 million	\$4.7 million/year

The above figures are inclusive of costs for investments described in the Maintain Service and System investments section, which have 10-year capital cost (2015 \$) of \$26.3 million and Year 10 operating cost (2015 \$) of \$1.6 million.

OUTCOMES AND EVALUATION RESULTS

See section cover page.

¹ Approved by the Board on December 9, 1998 as part of the report titled, “Establishment of the Major Road Network: Recommended Guidelines and Network”.

PROGRAM: CAPITAL FOR MINOR MRN UPGRADES

PROGRAM DESCRIPTION

This program would increase funding to deliver minor capital (under \$10m) upgrades on the MRN. Types of minor capital upgrades considered would include: corridor improvements, intersection improvements, new traffic control signals, and pedestrian and cycling projects. Funding would be committed on a competitive basis according to consistency with the priorities for roads, as set out in the Regional Transportation Strategy – Strategic Framework: improve safety, increase local and regional connectivity, and improve goods movement.



PROGRAM OBJECTIVES

This program would fund projects that improve local access, goods movement and safety for all modes. Projects funded under this program would also be smaller projects that improve the overall functional efficiency of the road network and are intended to postpone the need for larger capital project investments.

PROGRAM SCOPE

This program would continue the current practice of providing a 50% cost share for appropriate MRN upgrade projects under \$10m.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$200 million	\$ --

The above figures are inclusive of costs for investments described in the Maintain Service and System investments section, which have 10-year capital cost (2015 \$) of \$100 million.

OUTCOMES AND EVALUATION RESULTS

See section cover page.

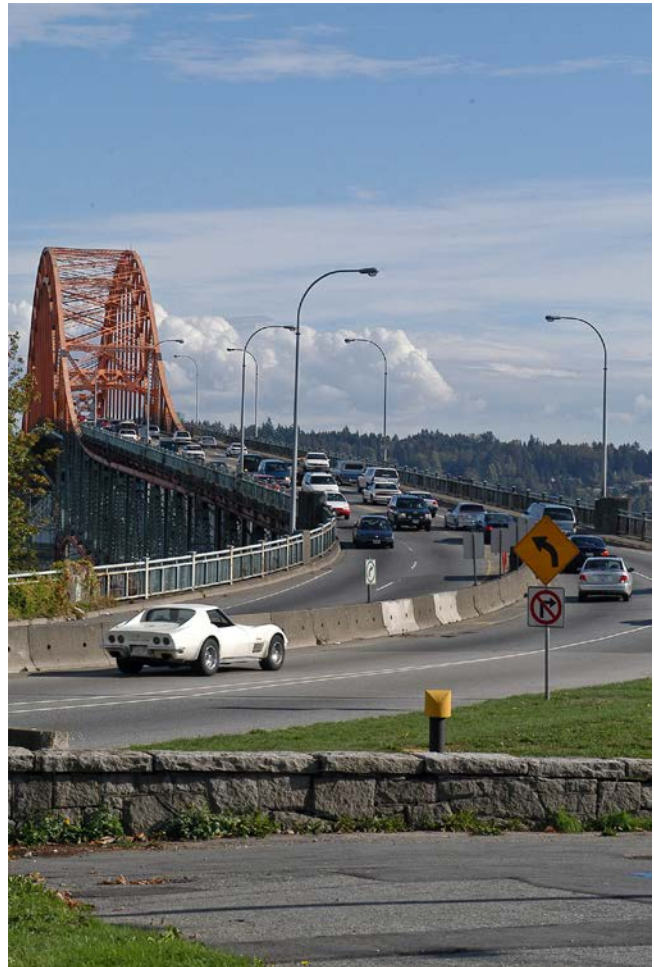
PROJECT: REPLACEMENT OF PATTULLO BRIDGE

PROJECT DESCRIPTION

The Pattullo Bridge is an important element of the region's Major Road Network. Connecting the City of Surrey and City of New Westminster, the bridge carries, on average, over 75,000 vehicles per weekday, almost 10% of which are trucks. The bridge, maintained by TransLink, requires replacement due primarily to age and safety concerns. This project would replace the Pattullo Bridge with a new, four-lane bridge funded primarily by user pricing. The replacement bridge will be designed in a manner so as not to foreclose the consideration of a potential future expansion to six lanes, subject to an all-party agreement and Mayors' Council approval.

PROJECT OBJECTIVES

The Pattullo Bridge provides a critical connection between Surrey and New Westminster, a link that is also important to neighboring municipalities. Yet the 76-year-old structure is in considerably worse condition than was indicated when it was passed from the Province to TransLink in 1999: subsequent investigation revealed that it is at risk in the event of a moderate earthquake or ship collision, the piers are being undermined by river scour and many components have surpassed their useful lives. Accordingly, TransLink has been working with the Province and with the cities of Surrey and New Westminster since 2012 on a potential solution, including the full bridge replacement, which will reduce the need for, and scale of, urgent seismic and deck upgrading on the existing bridge, assuming a funded solution can be advanced in the immediate future.



Other objectives for a replacement facility include addressing other issues with the current crossing:

1. The Pattullo Bridge does not meet current roadway design guidelines, including lane widths and curvature, potentially contributing to collisions.
2. Pattullo Bridge facilities, such as sidewalks and barriers, and connections for pedestrians and cyclists, are inadequate and do not provide sufficient protection from traffic.
3. During rush hours, travel demand on the roads leading to the Pattullo Bridge results in queuing and unreliable travel times for the movement of people, goods and services.
4. Current traffic (including truck) volumes affect the livability of adjacent communities due to air quality, noise and health impacts, as well as due to neighbourhood traffic infiltration.

PROJECT SCOPE

This Vision proposes to replace the Pattullo as soon as possible, with a four-lane bridge, with user pricing to fund the majority of its cost. Pricing can take several forms; see the Advance Mobility Pricing section in the main document for more detail.

Appendix A: Actions to Invest

A new bridge, with modern lane widths, better connections, a centre barrier and high quality cycling and pedestrian facilities, would improve traffic flow, enhance safety and satisfy demand (for drivers and goods movers) for the foreseeable future. A resilient four-lane option would minimize the immediate cost (freeing up resources for other urgent transportation investments). The bridge would be designed such that it would not foreclose the possibility of future expansion to six lanes. This possible expansion may be considered if need arises, for example if demand increases beyond forecasts and/or the surrounding network changes. We recognize that finding a solution for improving goods movement on the north side of the Fraser River continues to be a regional priority; the Pattullo Bridge currently serves approximately one-third of the East West truck traffic in the corridor. Future consideration of expansion would require all-party agreement and Mayors' Council approval. The Provincial government has pledged a contribution towards the replacement of the Pattullo Bridge and to seek Federal support on behalf of the region. As a priced facility, this Vision contemplates a modest contribution to the costs of a new facility, as well as participation in funding of the costly work to keep the existing structure in a state of good repair until a new bridge is completed. This full bridge replacement will significantly reduce the need for much of the costly rehabilitation work underway on the existing bridge. To ensure that public dollars are not wasted, TransLink will move to implement a new bridge funded by user pricing at the earliest possible date.

Most of our residents feel that the current tolling reality in the region is not fair. It is essential that the Province of BC addresses this by bringing in a consistent approach to tolling across the region that is fair and efficient. The Province of BC has indicated openness to revisiting its tolling policy. We are asking them to complete this work immediately as it will be an essential step in developing a rational and fair system for paying for infrastructure and managing the network. This work is particularly important as we work together on implementing region-wide distance-based mobility pricing which would reduce or restructure the toll rates on regional facilities and support demand management on the Pattullo Bridge and other parts of the regional road network.

Key Assumptions:

- The utilization of user pricing to finance the majority of the bridge has significant impacts on performance expectations for this design, including peak hour reductions in demand on the facility of 15-50%, due to changes in trip choices by residents.
- During project development, further consideration will be given to how to most cost-effectively deliver this solution – such as the design of the approaches, infrastructure sizing, and preservation of corridor property – while not foreclosing future options.
- Current cost estimates include roadway connections similar to today on the North Side with some significant modifications to the connecting roadway infrastructure on the south side of the Bridge. During project development, more detailed consideration will be given by stakeholders to what connections and modifications will best serve stated project objectives.

COSTS²

10-Year Capital Cost (2015 \$)	Year 10 Operating Cost (2015 \$)
\$978 million	(no net new operating costs assumed)

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %)	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	0	0	~0	1,493
Cost-Effectiveness Score (0-100)	0	0	0	0

² The project cost for the Pattullo Bridge replacement project has been refined since preliminary cost estimates were developed including those provided in the Pattullo Bridge Strategic Review Discussion Guide. Cost estimates have been updated to reflect the most recent planning assumptions. The updated estimated cost of a new Pattullo Bridge reflects inclusion of project development costs and costs of interest during construction; presentation of project costs in 2015 dollars; and approximately \$25 million in capital cost for a design approach that would not preclude the future possibility of expanding the bridge to six lanes (at further cost at such a time). Cost estimates will continue to be refined as the project partners better define the design, including scope, construction approach, phasing, connections, right-of-way requirements, and so forth.

TRANSIT: TRANSIT FACILITIES PROGRAMS

OVERVIEW

This program would fund new and expanded stations, exchanges or other transit facilities and improve the performance of existing facilities. Upgrades would focus on enabling facilities to meet increasing passenger demand and facilitate improved transit operations, as well as enhance community integration or address deficiencies in amenities including lighting, weather protection, furniture, and landscaping. Specific scopes would be confirmed through additional planning and coordination with project partners.

Concurrent with these upgrades and new facilities, TransLink may partner with local jurisdictions to prepare area plans and identify opportunities to improve access and make land uses more transit-supportive in the station or exchange vicinity. Some project elements may be funded by other entities.

This category includes the following investment programs and projects:

- Transit Facilities Upgrades / Expansion and New Facilities Program
- Lonsdale Quay Upgrade



PROGRAM: TRANSIT FACILITIES UPGRADES / EXPANSION AND NEW FACILITIES

PROGRAM DESCRIPTION

This program would fund the expansion, upgrade or reconfiguration of transit facilities and design and construction of new bus transit facilities across the region. Program envelopes within this category include:

- Transit Facilities: Projects with priority for completion in first 5 years (6 facilities)
- Transit Facilities: Projects with priority for completion in years 5-10 (6 facilities)



PROGRAM OBJECTIVES

This program would provide funding to upgrade regional bus transit facilities. New and improved facilities support the goal to increase transit mode share, and provide the necessary capacity to meet demand associated with increasing service levels as the system grows. Upgrades would focus on enabling facilities to meet increasing passenger demand and facilitating improved transit operations. Upgrades may also enhance community integration, address deficiencies in amenities, and improve the accessibility of the waiting and connecting environment for users, contributing to growth in mode share.

PROGRAM SCOPE

This program would enable the expansion and/or reconfiguration of existing passenger facilities or construction of new facilities to accommodate increases in customer demand and transit service levels. The program would also allow for improvements to community integration and customer experience through enhanced wayfinding and amenities, including lighting, weather protection, furniture, and landscaping. The specific scopes of individual projects would be confirmed through additional planning and coordination with project partners. Plans would be made within the context of TransLink's Transit Passenger Facility Design Guidelines.

The recent Newton Exchange project provides an example of the type of upgrades this program would support. The project expanded the existing exchange while addressing a number of deficiencies, including passenger comfort, safety and accessibility, operational efficiency and capacity. As an example of a future project, at the new Downtown Langley Exchange, a larger facility will support future transit expansion in the South of Fraser. The new exchange, located adjacent to a mixed-use, transit-oriented development, will include a transit plaza to provide waiting space and amenities for passengers including weather protection, seating, and bicycle storage.

This program has two funding envelopes:

PROJECTS WITH PRIORITY FOR COMPLETION IN FIRST 5 YEARS (6 FACILITIES)

- **Phibbs Exchange** – Reconfigure and expand to address growing demand, improve accessibility, amenity and neighbourhood integration
- **Surrey Central Exchange and off-street bus layover facility** – Reconfigure and expand to facilitate municipal redevelopment plans and address growing demand

Appendix A: Actions to Invest

- **SFU Exchange** – Reconfigure and expand to address growing demand, improve accessibility, amenity and neighbourhood integration
- **Langley Exchange** – Relocate and expand to address growing demand, improve accessibility, amenity and neighbourhood integration
- **Willowbrook Exchange** – New facility to address growing demand, improve accessibility, amenity and neighbourhood integration
- **Coquitlam Central Exchange and park and ride facility** – Reconfigure to allow transit oriented development on the site

PROJECTS WITH PRIORITY FOR COMPLETION IN YEARS 6-10 (6 FACILITIES)

- **Port Coquitlam Station bus exchange** – Upgrade to improve accessibility, and customer amenities
- **Highway 99 at Steveston Highway and Highway 17A** – New Rapid Bus stations coordinated with the Massey Tunnel replacement/Hwy 99 project to provide transfer opportunities to routes serving Richmond, South Surrey, Ladner, Tsawwassen, and Tilbury Industrial Park
- **South Delta Exchange and Park and Ride** – Relocate and expand to respond to changing development, improve accessibility, amenity and neighbourhood integration
- **Steveston** – New off-street bus layover facility to accommodate increased transit service levels and improve operational efficiency
- **Downtown Vancouver** – New bus layover facility or facilities to accommodate increased transit service levels and improve operational efficiency

As needs shift, other facilities upgrades may be identified as priorities and may be implemented in advance of those listed above.

COSTS

Investment	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Facilities: Year 1-5 Priorities (Upgrade 6 Facilities) [\$5.2m/year capital for Years 1-5]	\$52.0 million	\$1.1 million
Facilities: Year 6-10 Priorities (Upgrade 6 Additional Facilities) [\$5.2m/year capital for Years 6-10]	\$52.0 million	\$1.1 million

OUTCOMES AND EVALUATION RESULTS

Transit Facilities Programs (1-5 years)	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 th %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	165	85	5.93	-49,643
Cost-Effectiveness Score (0-100)	8.2	1.9	4.9	8.2

Transit Facilities Programs (6-10 years)	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %)	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	148	76	4.99	-44,338
Cost-Effectiveness Score (0-100)	7.3	1.7	4.2	7.3

Observations:

- This program is designed to both increase capacity and operational efficiency of bus exchanges and to make the transit system more attractive by improving passenger comfort and amenities at these facilities. These improvements can encourage increased transit use, which can help reduce VKT and road congestion, thereby improving travel speeds and accessibility for both transit and auto users.
- Investing in new and ongoing maintenance and upgrades of transit facilities will improve the safety and security of staff and customers.
- Transit facilities are key connection points for many customers. Ensuring they will be able to handle future demand growth is essential for ensuring that the transit system remains an effective and attractive travel option for customers.
- Relatively more cost-effective at reducing VKT compared to other projects since trip distances by transit are high for riders using these transit facilities.
- The performance of the projects in years 6-10 is slightly lower than the projects in years 1-5 primarily because there are fewer projects and the number of customers they impact is lower.

PROJECT: LONSDALE QUAY UPGRADE

PROJECT DESCRIPTION

This project would upgrade the Lonsdale Quay floating SeaBus terminal and adjacent bus exchange.

PROJECT OBJECTIVES

Upgrades are proposed to the floating SeaBus terminal and adjacent bus exchange to improve passenger and operational safety, upgrade the passenger experience, and improve transit vehicle circulation. This project was proposed in the 2012 Moving Forward plan to address passenger and operational safety concerns and improve facility attractiveness. The project was identified as a priority in subsequent Base Plans with implementation on hold pending availability of funding. The project would support the goal to increase transit mode share by improving transit operations and increasing facility attractiveness for users.

PROJECT SCOPE

Schematic design to detail the station upgrades was completed in 2013. The project would include interior refurbishment of the floating SeaBus terminal, replacement or upgrade of the existing canopy above the walkway between the SeaBus terminal and bus exchange, replacement of ceiling panels above the bus passenger island, improved illumination, expanded seating options and new site furnishings, relocated security kiosk, painting, and enhanced wayfinding. Opportunities to accommodate additional retail and bike storage at the facility would be explored.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$10.4 million	\$0.2 million

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one- hundredths of a percent (1/100 ^s %)	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	45	23	2.29	-13,579
Cost-Effectiveness Score (0-100)	6.8	1.6	5.8	6.8

Observations:

- This project is designed to both increase capacity and operational efficiency of Lonsdale Exchange and to make the transit system more attractive by improving passenger comfort and amenities at this facility. These improvements can encourage increased transit use, which can help reduce VKT and road congestion, thereby improving travel speeds and accessibility for both transit and auto users.
- Investing in maintenance and upgrades of Lonsdale Quay will ensure that the facility will remain safe and secure for staff and customers.

Appendix A: Actions to Invest

- Lonsdale Quay will remain a key connection point for many customers travelling between downtown Vancouver, North Vancouver and beyond. Ensuring it will be able to handle future demand growth is essential for ensuring that the transit system remains an effective and attractive travel option for customers.
- The cost-effectiveness scores are slightly lower than other transit facilities likely due to the higher costs for Lonsdale (due to floating SeaBus terminal) compared to the other transit facility investments
- Relatively high cost-effectiveness for VKT since trip distances by Lonsdale Quay users are generally higher than other transit services and has a high number of projected additional boardings

TRANSIT: UPGRADES TO EXISTING RAIL

Metro Vancouver's rail rapid transit network moved over 120 million people in 2013 (34% of system-wide boardings). The following programs would fund upgrades and expansions in fleet, facilities and stations to increase capacity on existing rail lines in order to accommodate future growth, address projected future overcrowding, and facilitate increased transit mode share. Each rail upgrade program includes a phased plan of enhancements over the 10-year plan period and, in some cases, assumes upgrades in subsequent years.

PROGRAM COSTING

	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Expo Line Upgrades (Years 1-10)	\$588 million	\$36.5 million
Millennium Line Upgrades (Years 1-10)	\$177 million	\$17.0 million
Canada Line Upgrades (Years 1-10)	\$52 million	\$16.2 million
West Coast Express Upgrades	\$36 million	\$5.0 million

Note: The above figures are inclusive of costs for investments described in the Maintain Service and System investments section, which have 10-year capital cost (2015 \$) of \$87 million and Year 10 operating cost (2015 \$) of \$12.5 million.

PROGRAM: EXPO LINE UPGRADES

PROGRAM DESCRIPTION

This program would upgrade the capacity of the Expo Line through procurement of additional fleet vehicles, expansion of fleet storage, operations and maintenance facilities, and upgrades to station houses and platforms. The program would work toward implementation of the recommendations of the Expo Line Upgrade Strategy (2010). The Expo Line is part of the Frequent Transit Network.

PROGRAM OBJECTIVES

Upgrades to Expo Line are needed to increase capacity of the line to meet projected demand and to support the goal of doubling the capacity of the line by 2020, as articulated in the Provincial Transit Plan (2008). Without investment, delays and overcrowding will increase in the future as ridership growth exceeds capacity, particularly at the peak load point between Commercial-Broadway and Main Street–Science World Stations.

The objectives of this program are to:

- Enable a greater regional share of trips to be made by transit by meeting current and future ridership demand on the Expo Line.
- Ensure all subsystems are upgraded to support the increase in system capacity and an expanded fleet.
- Improve station infrastructure to make them more accessible and ensure unimpeded and safe passenger flows.

PROGRAM SCOPE

The Expo Line is the backbone of Metro Vancouver’s rail rapid transit network, connecting Surrey, New Westminister, Burnaby and Vancouver. Expo Line ridership is forecast to reach 23,000 to 26,000 people per hour per direction (pphpd) at the peak point by 2040. Current peak capacity on the Expo Line is estimated at 15,400 pphpd. Through this program, the system would be upgraded to provide a peak capacity of 25,700 pphpd by 2041 through the exclusive operation of 5-car Mark II/III trains, which provide the largest passenger capacity per train.

In recent years, TransLink has made station upgrades on the Expo Line to improve capacity, accessibility, customer amenities, and to install fare gates. Funding is already secured to upgrade Main Street-Science World, Scott Road, New Westminister, Commercial-Broadway, Metrotown, Joyce-Collingwood and Surrey Central Stations. This program would enable similar improvements at additional stations, for example Burrard, Edmonds, Waterfront, and others. Upgrades may include expanded or reconfigured platforms, and reconfigured passenger circulation, including entries and exits.

Specific scopes of individual station upgrade projects would be confirmed through additional planning and coordination with project partners. Plans would be developed within the context of TransLink’s Transit Passenger Facility Design Guidelines. Waterfront Station, for example, could undergo a range of potential upgrades, including structural and seismic upgrades, reconfiguration of platforms, additional entry/exit points and vertical circulation elements, integration with a refurbished SeaBus terminal, and a potential off-street bus layover facility. Improvements may be achieved through minor station upgrades or more broadly as part of a redevelopment of major hubs in partnership with the City of Vancouver and local landowners.

The program, phased over the 10-year plan period, would include:

- Procurement of additional Mark III fleet, increasing Expo Line capacity to roughly 21,700 pphpd by 2024.
- Increasing operation of five-car Mark II/III trains (compared with current trains which operate in a 2-car or 4-car configuration).

Appendix A: Actions to Invest

- Capacity upgrades to the SkyTrain Operations and Maintenance Centre (OMC) to accommodate the additional and longer trains.
- Propulsion Power System upgrade (stage 3).
- An expanded program of station upgrades, including extension of station platforms to accommodate longer trains, and enhancement of stations to accommodate greater passenger volumes, including improved circulation, additional faregates, escalators, and emergency exits.

Upgrades would be phased between 2015 and 2024 as follows:

Phase	Timeframe	Program description
1	2015 – 2019	<ul style="list-style-type: none"> • Fleet: 60 additional cars in service by 2019 (inclusive of 28 cars as part of Maintain Service and System). • Facilities: expansion of Operations and Maintenance Centre and Heavy Maintenance Centre, and upgrades to Propulsion Power System in 2017-2018 to accommodate the new fleet. • Stations: upgrades to improve passenger access and circulation at five stations, and minor capacity / platform upgrades at 15 stations.
2	2020 – 2022	<ul style="list-style-type: none"> • Fleet: 18 additional cars in service in 2020. • Stations: access, safety/security, and circulation upgrades at additional stations.
3	2023 – 2024	<ul style="list-style-type: none"> • Fleet: 21 additional cars in service in 2024.

These investments include the procurement of 28 Mark II cars in 2017 assumed as part of Maintain Service and System needed to provide sufficient capacity on the Expo Line to meet near-term demand.

Beyond the 10-year horizon of the implementation plan, further investment will be needed to address growing capacity and access needs on the Expo Line. Investments would include 27 additional fleet cars procured between 2025 and 2029. These upgrades are not included in costing shown in the table below.

Additionally, options to alleviate capacity needs on the Expo Line may be explored; for example, extensions of the Millennium Line have the potential to reduce demand on the Expo Line. If it is decided to not extend the Millennium Line westward on the Broadway corridor, extending the Millennium Line to downtown Vancouver could be considered to reduce demand on the peak link.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$588 million	\$36.5 million

Note: The above figures are inclusive of costs for investments described in the Maintain Service and System investments section, which have 10-year capital cost (2015 \$) of \$87 million (2015 \$) and Year 10 operating cost of \$10.3 million (2015 \$).

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	1,006	2,673	32.31	-85,603
Cost-Effectiveness Score (0-100)	2.4	2.8	1.3	0.7

Observations:

- Without upgrades to the Expo Line, overcrowding on this portion of the network would prevent the full benefits of system expansion from being realized. The Expo Line is nearing 30 years of age and requires investment to remain a safe, accessible and attractive transportation choice.
- While this project has high costs, it is an important investment to ensure that there is sufficient capacity to meet future demand. If conditions on the service deteriorate, it will deter many people from using transit and will have a compounding effect on the achievement of transportation goals and targets.
- Investing in the Expo Line has particular significance because of the role it plays in the Regional Growth Strategy; an efficient transportation system is a key element of encouraging density and development around stations and along the Expo Line.
- *Due to limitations in the regional transportation model, the above figures should be interpreted with caution. It is likely that the actual benefit of this upgrade project is greater than shown here.*

PROGRAM: MILLENNIUM LINE UPGRADES

PROGRAM DESCRIPTION

This program would upgrade the capacity of the Millennium Line through procurement of additional fleet vehicles, expansion of fleet storage facilities and upgrades to stations. The Millennium Line is part of the Frequent Transit Network.



PROGRAM OBJECTIVES

The objective of the program is to ensure the successful long-term integration of the Evergreen Line with the current SkyTrain network when it opens in 2016, and provision of sufficient capacity to meet demand. This program would address capacity issues, support future ridership growth and shift more trips to transit by alleviating overcrowding as demand increases over time.

PROGRAM SCOPE

In 2016, the Evergreen Line will commence operation as an extension of the current Millennium Line, connecting Coquitlam and Port Moody to Vancouver and the SkyTrain network. Funding for the required 28 new SkyTrain cars has already been committed (within the 2014 Base Plan) as part of the Evergreen Line expansion of the SkyTrain network and would go into service on opening day; however, more fleet will be needed to meet all of the growth in demand anticipated along the Millennium Line during the plan period.

This program would provide funding for infrastructure upgrades on the Millennium Line (including the Evergreen Line extension) needed to meet demand over the 10-year plan period, including:

- Procurement of additional Mark III fleet, increasing Millennium/Evergreen Line capacity to roughly 8,000 pphpd.
- Increasing line capacity by operating the 4-car Mark II/III configuration (compared with opening-day trains which will operate in a 2-car configuration).
- Capacity upgrades to the Coquitlam Vehicle Storage Facility to accommodate additional and longer trains.
- Station upgrades to accommodate greater passenger volumes, including improved circulation, additional faregates, escalators, and emergency exits.

Upgrades would be phased between 2015 and 2024 as follows:

Phase #	Timeframe	Scope
1	2015 – 2022	<ul style="list-style-type: none"> • Facilities: first phase of capacity expansions at the Coquitlam Vehicle Storage Facility to accommodate the new fleet. • Stations: minor platform upgrades at all 13 Millennium Line stations.
2	2023 – 2024	<ul style="list-style-type: none"> • Fleet: 46 additional cars. • Facilities: second phase of capacity expansions at Coquitlam Vehicle Storage Facility to accommodate the new fleet.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$177 million	\$17.0 million

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	1,074	2,856	36.11	-91,463
Cost-Effectiveness Score (0-100)	6.8	8.1	3.9	1.9

Observations:

- Without upgrades to the Evergreen/Millennium Line, overcrowding on this portion of the network would prevent the full benefits of system expansion from being realized.
- While this project has high costs, it is an important investment to ensure that there is sufficient capacity to meet future demand. If conditions on the service deteriorate, it will deter many people from using transit and will have a compounding effect on the achievement of our goals and targets.
- Investing in the Millennium/Evergreen Line has particular significance because of the role it plays in the Regional Growth Strategy; an efficient transportation system is a key element of encouraging density and development around stations and along the Millennium/Evergreen Line.

PROGRAM: CANADA LINE UPGRADES

PROGRAM DESCRIPTION

This program would upgrade the capacity of the Canada Line through procurement of additional fleet vehicles, expansion of fleet storage facilities and upgrades to stations. The Canada Line is part of the Frequent Transit Network.



PROGRAM OBJECTIVES

Currently, passenger volumes exceed available vehicle capacity at the peak point between Oakridge and King Edward Stations during the AM peak period (7:30-8:30AM), resulting in crowding and pass-ups. By 2045, ridership demand is expected to grow by 73-85% from current levels. Meeting the increased demand requires additional fleet and upgrades to infrastructure, including stations and the fleet storage facility. The objectives of this program are to:

- Meet future travel demand and maintain Canada Line as an attractive travel option for customers.
- Support transit-oriented developments and maintain the effectiveness of the regional transit network.

PROGRAM SCOPE

Ridership demand on the Canada Line has grown steadily since the line commenced service in 2009. TransLink is currently undertaking a review of the Canada Line to assess ridership demand in the 30-year horizon and the corresponding need for service and infrastructure. Forecasts suggest that significant ridership growth is expected in the next 30 years, and additional infrastructure and fleet will be needed to accommodate the increase in demand.

This program would allocate funding for the Canada Line service and infrastructure upgrades needed in the next ten years to begin to meet demand in the medium to long-term, including:

- Procurement and operation of additional fleet.
- Capacity upgrades to the Canada Line Operations and Maintenance Centre to accommodate additional vehicles.
- Extension of station platforms from 40m to 50m to permit operation of 3-car trains when warranted by demand, and enhancement of stations to accommodate greater passenger volumes, including improved circulation, additional faregates, escalators, and emergency exits.

Upgrades anticipated to take place between 2015 and 2024 would include:

- **Service:** The Canada Line can currently carry 6,100 passengers per hour per day (pphpd), and service investments would increase capacity by up to 2,000 pphpd during the peak periods. (Of this amount, MSS service increases would increase capacity by about 700 pphpd.)
- **Fleet:** 12 additional cars in service in 2019. (An additional 8 cars would be procured in 2024 for revenue service beginning in 2025.)

Appendix A: Actions to Invest

- **Facilities:** capacity expansion at the Canada Line Operations and Maintenance Centre to accommodate new fleet.
- **Stations:** passenger access and circulation upgrades at 3 stations, major platform capacity upgrades at 12 stations to finish or extend platforms from 40 to 50 m, and emergency exiting capacity upgrades at 4 stations.

Additionally, beyond the 10-year horizon, it is anticipated that between 2025 and 2030 the program would extend to fund acquisition of eight additional cars. Program extension beyond the 10-year horizon is not included in costing.

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)*
\$52M	\$16.2M

*Annual operating cost reflects annual cost following deployment of vehicles procured in 2024.

Note: The above figures are inclusive of costs for investments described in the Maintain Service and System investments section, which have no capital costs and annual operating cost of \$1.7 million (2015 \$).

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	623	1,655	18.38	-53,009
Cost-Effectiveness Score (0-100)	8.5	10.1	4.2	2.4

Observations:

- Without upgrade to the Canada Line, overcrowding on this portion of the network would prevent the full benefits of system expansion from being realized. There are portions of the service that already exceed capacity, and demand is only expected to grow.
- While this project has substantial costs, it is an important investment to ensure that there is sufficient capacity to meet future demand. If service conditions deteriorate, it will deter many people from using transit and will have a compounding effect on the achievement of our goals and targets.
- Investing in the Canada Line has particular significance because of the role it plays in the Regional Growth Strategy; an efficient transportation system is a key element of encouraging density and development around stations and along the Canada Line.

PROGRAM: WEST COAST EXPRESS UPGRADES

PROGRAM DESCRIPTION

Population in the WCE service area is estimated to grow by 62% by 2041. Ridership demand for WCE service is forecast to grow even with the introduction of the Evergreen Line in 2016. WCE service levels have changed very little in almost 20 years and peak hour trains are over-capacity during AM peak hour and near capacity during PM peak hour. Current West Coast Express service levels are not adequate to meet the future level of anticipated demand, and the busiest trains have reached the maximum length (10 cars) that can be accommodated by existing platforms and hauled by the current locomotives. This program would upgrade the capacity of the West Coast Express (WCE) service through the addition of passenger cars and a locomotive to meet growing demand over the plan period.



PROGRAM OBJECTIVES

The primary objective of this program is to address capacity constraints on West Coast Express.

PROGRAM SCOPE

As part of Maintain Service and System, one additional rail car (from TransLink’s existing set of vehicle assets) would be added to one existing AM inbound trip and one existing PM outbound trip. Additionally, this program would introduce an additional train to meet near-term demand during the peak hour and support future expansion through additional procurement of passenger cars. The introduction of the new train will lead to temporarily shorter trains, but these will need to be lengthened in the medium term to meet demand. Upgrades to West Coast Express have also been identified to meet future demand; these upgrade needs will be reviewed once the Evergreen Line opens in 2016 and there is a better understanding of the relationship between demand on these two services.

The scope of the program from 2015 to 2024 is as follows:

Phase #	Timeframe	Description
1	2015 – 2018	Fleet: 5 additional cars and 1 new locomotive. MSS would add one additional rail car (from TransLink’s existing set of vehicle assets) to one existing AM inbound trip and one existing PM outbound trip.
2	2019 – 2024	Fleet: 5 additional cars.

Additional WCE station upgrades and community integration improvements are anticipated beyond 2024 and have not been included in the costs below.

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$36M	\$5.0M

Note: The above figures are inclusive of costs for investments described in the Maintain Service and System investments section, which have no capital cost and annual operating cost of \$0.5 million (2015 \$).

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	115	306	0.63	-9,783
Cost-Effectiveness Score (0-100)	2.8	3.3	0.3	0.8

Observations:

- The West Coast Express provides a regular commuter service and is a key link between Port Moody and Vancouver. It is already over-capacity during the morning peak hour, and demand is expected to continue to grow.
- Low density around the West Coast Express corridor, limited service and a high cost per unit of service have an impact on the performance of the upgrades.

TRANSIT: B-LINE OR BETTER INVESTMENTS

OVERVIEW

The following projects involve investments in new or extended fast, frequent, and direct B-Line or Better bus routes. A funding program is also included to support investments in transit priority measures on B-Line corridors to improve speed and reliability.



These projects would implement B-Line service, which is a limited-stop type of bus service that operates every 15 minutes or better, all-day, seven days a week. B-Line corridors are part of the Frequent Transit Network. Factors that contributed to the selection of the specific set of B-Lines prioritized for investment within the first ten years includes contribution to performance outcomes (including estimation of ridership), and whether the project linked regional Urban Centres. Specific routings, stop locations, and initial service levels (e.g. peak frequency and span of service) for each route would be confirmed through performance-based evaluation and detailed service design. These investments would amount to over 193km of new B-Line service across the region and would require 452,000 net new annual service hours.

In addition, as described further in Appendix B, select B-Line corridors would receive investment in transit priority measures to further improve speed and reliability. Transit priority enhancements could be applied to new B-Lines or existing B-Lines, including the portion of Vancouver’s Broadway corridor between Arbutus and UBC, which will not have rapid transit in the first phase. Transit priority measures could include: signal priority, queue jumpers or bus lanes. In some cases B-Lines may be improved to Bus Rapid Transit (BRT) levels through the introduction of a fully separated right of way along all or a portion of the route. Specific transit priority enhancements would be determined through further study and collaboration with the local municipality. See the System Management section for further detail.

	Investment Levels
Net New Annual Service Hours by 2024	452,000 hours
New B-Lines introduced by 2024	11 B-Lines
KM of B-Line introduced by 2024	193 Km
Additional Vehicles on the Road in 2024	159 buses

List of B-Lines for Implementation in 10 Year Timeframe

	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)	Timing Assumption
Extend 96 B-Line to White Rock Centre via King George Boulevard and 152 nd Street	\$3.7M	\$1.9M	Years 6-10
New B-Line - Surrey Centre to Langley via Fraser Highway	\$11.9M	\$6.1M	Years 0-5
New B-Line - Downtown Vancouver to SFU Burnaby via Hastings Street	\$4.4M	\$2.1M	Years 0-5
New B-Line - Downtown Vancouver to SE Marine Drive via Victoria Drive / Commercial Drive	\$7.5M	\$3.9M	Years 6-10
New B-Line - Dunderave to Phibbs Exchange via Marine Drive / 3 rd Street	\$9.4M	\$4.6M	Years 0-5
New B-Line - Metrotown to Capilano University via Willingdon Avenue	\$11.2M	\$5.8M	Years 6-10
New B-Line - Scott Road Station to Newton Exchange via Scott Road and 72 nd Avenue	\$8.7M	\$4.4M	Years 0-5
New B-Line - Richmond-Brighouse Station to Metrotown via Knight Street, Bridgeport Road and Garden City	\$3.1M	\$1.7M	Years 0-5
New B-Line - Joyce-Collingwood to UBC via 41 st Avenue	\$10.0M	\$5.1M	Years 0-5
New B-Line - Lynn Valley Centre to Downtown Vancouver via 29 th Street, Lonsdale Ave and Marine Drive	\$12.5M	\$6.3M	Years 6-10
New B-Line - Coquitlam Centre to Maple Ridge via Lougheed Highway and Dewdney Trunk Road*	\$8.1M	\$4.1M	Years 6-10
New B-Line - Coquitlam Centre to Langley via Lougheed Highway and 200 th Street*	\$10.6M	\$5.6M	Years 6-10
Total	\$93M	\$47M	

**Initial implementation of only one of these two options is assumed. In the primary document Regional Transportation Investments: a Vision for Metro Vancouver, the costs for these two routes are reflected in total costs by averaging.*

Note: where B-Line service would replace some or all existing service, costs reflect net increases in capital and operating expenditure.

In addition to the routes shown above, an additional set of routes was considered but has been deferred for potential future consideration/implementation. This includes:

- New B-Line – Metrotown to New Westminster via Kingsway, Edmonds Street and 6th Street
- New B-Line – Marine Drive Station to 22nd Street Station via SW/SE Marine Drive
- New B-Line – Downtown Vancouver to SE Marine Drive via Fraser Street
- New B-Line – Coquitlam Centre to Surrey via Lougheed Highway and Highway 1

PROJECT: EXTEND 96 B-LINE TO WHITE ROCK CENTRE VIA KING GEORGE BOULEVARD AND 152ND STREET

PROJECT DESCRIPTION

This project would extend the existing 96 B-Line from Newton Exchange to White Rock Centre via King George Boulevard and 152 Street.

PROJECT OBJECTIVES

This project would complete the full King George Boulevard B-Line project as proposed in the 2012 Moving Forward plan. The project is intended to serve growing demand and build ridership in the corridor as a precursor to potential rapid transit. B-Line service on King George Boulevard was identified in the 2007 South of Fraser Area Transit Plan and in the 2008 Provincial Transit Plan as a precursor to potential rapid transit. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

An extended 96 B-line would provide limited-stop bus service from White Rock Centre to Newton, Surrey and Guildford via King George Boulevard and 152 Street. The service would continue to connect with Expo Line at Surrey Central and King George stations. The route would represent an additional 15km of B-Line or Better bus service and an investment of approximately 18,000 net annual service hours.

Key Assumptions:

- Existing underlying peak-only express bus service (394) would be discontinued.
- Upon introduction of rapid transit on this corridor, the B-Line would be discontinued.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$3.7M	\$1.9M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 th %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	117	544	1.53	-8,131
Cost-Effectiveness Score (0-100)	11.3	23.4	2.5	2.6

Observations:

The performance of this B-Line is affected by the following factors:

- It has only one employment centre anchor on the route
- There is low population density and pedestrian facilities along the route; investing in this B-Line extension, however, is intended to build demand along the corridor by attracting development and investment.
- This B-Line extension would provide a key high-capacity link between White Rock, Surrey and beyond.
- Although this B-Line would likely serve longer distance trips, the VKT reduction potential is overall relatively low.

PROJECT: NEW B-LINE - SURREY CENTRE TO LANGLEY VIA FRASER HIGHWAY

PROJECT DESCRIPTION

This project would introduce a new B-Line on Fraser Highway between Surrey Central and Langley Centre.

PROJECT OBJECTIVES

The project is intended to serve growing demand and build ridership in the corridor as a precursor to potential rapid transit. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT). B-Line service on Fraser Highway was identified in the 2007 South of Fraser Area Transit Plan and in the 2008 Provincial Transit Plan as a precursor to potential rapid transit.

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service along Fraser Highway between Langley Centre, Clayton, Fleetwood, and Surrey Central including connections with Expo Line at Surrey Central and King George stations. This route would represent an additional 20km of B-Line or Better bus service and an investment of approximately 59,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus service (502) would be retained with appropriate frequency adjustments.
- Upon introduction of rapid transit on this corridor, the B-Line would be discontinued.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$11.9M	\$6.1M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	459	1,928	12.04	-44,007
Cost-Effectiveness Score (0-100)	14.2	26.7	6.3	4.5

Observations:

The performance of this B-Line is affected by the following factors:

- It has two strong employment anchors at each end of the route
- It would significantly improve travel speed on the corridor
- It would significantly reduce overcrowding on transit service in the corridor
- It has the potential to entice many longer-distance auto trips onto transit, thus reducing VKT
- It is on the higher cost end of the proposed B-Lines, but high performance results in medium-high cost-effectiveness scores

PROJECT: NEW B-LINE - DOWNTOWN VANCOUVER TO SFU BURNABY VIA HASTINGS STREET

PROJECT DESCRIPTION

This project would introduce a new B-Line along the full length of Hastings Street between Downtown Vancouver and SFU Burnaby.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network. B-Line service on this corridor was identified in the 2005 Vancouver/UBC Area Transit Plan as an upgrade to existing local/express service of the 135. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service between SFU and Downtown Vancouver via Hastings Street. The service would connect with SeaBus, as well as the Expo, Millennium and Canada Lines at Waterfront Station. This route would represent an additional 22km of B-Line or Better bus service and an investment of approximately 20,000 net annual service hours.

Key Assumptions:

- Existing underlying express bus service (135) would be discontinued, while local service on Hastings would be maintained with appropriate frequency adjustments.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$4.4M	\$2.1M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵ %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	159	619	4.85	-18,519
Cost-Effectiveness Score (0-100)	14.5	25.1	7.4	5.6

Observations:

The performance of this B-Line is affected by the following factors:

- It has at least two strong employment centre anchors on the route that both have high parking costs, which could entice drivers onto transit
- There is high population density along the route and built environment supports pedestrian activity and transit ridership

Appendix A: Actions to Invest

- It would significantly reduce overcrowding on transit service in the corridor, making transit more attractive to existing and potential customers
- Would likely not result in significant travel time savings since there is already an existing service this is already largely limited stop, nor would it likely result in a significant number of additional people taking transit instead of driving
- There are expected to be significant cost savings associated with replacing the existing frequent transit service on the corridor, thus the overall cost of implementation of the B-Line would be relatively low, making the cost-effectiveness scores higher than average.

PROJECT: NEW B-LINE - DOWNTOWN VANCOUVER TO SE MARINE DRIVE VIA VICTORIA DRIVE / COMMERCIAL DRIVE

PROJECT DESCRIPTION

This project would introduce a new B-Line along the full length of Victoria Drive and Commercial Drive and into Downtown Vancouver via Hastings Street.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network on an existing high-demand corridor. B-Line service on this corridor was envisioned in the City of Vancouver's 2012 Transportation 2040 plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service between SE Marine Drive and Downtown Vancouver via Victoria Drive, Commercial Drive and Hastings Street. The service would connect with Expo and Millennium Lines at Commercial-Broadway Station and SeaBus, Expo, Millennium and Canada Lines at Waterfront Station. This route would represent an additional 14km of B-Line or Better bus service and an investment of approximately 38,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus service (20) would be retained with appropriate frequency adjustments.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$7.5M	\$3.9M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	268	1,158	5.75	-24,574
Cost-Effectiveness Score (0-100)	13.1	25.3	4.7	4.0

Observations:

The performance of this B-Line is affected by the following factors:

- It has only one major employment centre anchor
- It will have only minimal travel time improvements on an existing frequent transit corridor
- Access to the service is supported by high population density and a pedestrian-friendly built environment along the route, making transit travel more attractive
- It serves a destination with high parking costs, thus providing an attractive alternative for auto users
- It will likely serve shorter length urban trips, thus will have minimal impact on reducing VKT

PROJECT: NEW B-LINE - DUNDARAVE TO PHIBBS EXCHANGE VIA MARINE DRIVE / 3RD STREET

PROJECT DESCRIPTION

This project would introduce a new B-Line between Dundarave in West Vancouver and Phibbs Exchange in the District of North Vancouver via Lower Lonsdale along Marine Drive and 3rd Street.

PROJECT OBJECTIVES

The project is intended to serve growing demand and improve transit connections to major destinations along this important east-west corridor on the north shore. B-Line service on this corridor was identified in the long-term vision of the 2012 North Shore Area Transit Plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service along Marine Drive and 3 Street between Dundarave, Park Royal, Lower Lonsdale, and Phibbs Exchange. The service would connect with SeaBus at Lonsdale Quay. This route would represent an additional 14km of B-Line or Better bus service and an investment of approximately 45,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus service (239) would be retained with appropriate frequency reductions.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$9.4M	\$4.6M

OUTCOMES AND EVALUATION RESULTS

NEW B-LINE: MARINE DR/3 ST (NORTH SHORE)	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	346	1,387	9.45	-37,369
Cost-Effectiveness Score (0-100)	13.8	24.7	6.3	5.0

Observations:

The performance of this B-Line is affected by the following factors:

- It has one major employment centre anchor and substantial employment and retail along the corridor
- It would provide some travel time improvements over the existing frequent transit service, but more importantly would significantly reduce overcrowding on transit service in the corridor, which would make transit travel more attractive
- It has high population density along the route
- While the built environment along some parts of the route is not very pedestrian friendly, making it more difficult to get to and from transit, it also passes through some highly pedestrian friendly areas.
- Potential VKT reduction as a result of the potential B-Line is reasonably high.

PROJECT: NEW B-LINE - METROTOWN TO CAPILANO UNIVERSITY VIA WILLINGDON AVENUE

PROJECT DESCRIPTION

This project would introduce a new B-Line between Metrotown and Capilano University via Willingdon Avenue, Hastings Street, and the Ironworkers Memorial Bridge.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network. B-Line service on this corridor was identified in the long-term vision of the 2012 North Shore Area Transit Plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service between Metrotown and Capilano University along Willingdon Avenue, Hastings Street and the Ironworkers Memorial Bridge via BCIT, Brentwood Town Centre, Burnaby Heights, and Phibbs Exchange. The service would connect with Expo Line at Metrotown Station and Millennium Line and Evergreen Line at Brentwood Station. This route would represent an additional 17km of B-Line or Better bus service and an investment of approximately 56,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus service (130) would be retained with appropriate frequency adjustments.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$11.2M	\$5.8M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	403	1,711	9.45	-37,467
Cost-Effectiveness Score (0-100)	12.8	24.4	5.1	4.0

Observations:

The performance of this B-Line is affected by the following factors:

- There is a major employment centre anchor on one end, a major educational institution on the other end and another along the way.
- The travel time savings are expected to be minimal over existing frequent transit service
- Except for at Metrotown, there is low to medium population density along the corridor.
- The built environment is generally less pedestrian friendly, making it more difficult to get to and from transit
- Potential VKT reduction as a result of the potential B-Line is reasonably high

PROJECT: NEW B-LINE - SCOTT ROAD STATION TO NEWTON EXCHANGE VIA SCOTT ROAD AND 72ND AVENUE

PROJECT DESCRIPTION

This project would introduce a new B-Line between Scott Road Station and Newton Exchange via Scott Road and 72 Avenue in Surrey.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network on an existing high-demand corridor. Frequent bus service on this corridor was identified in the 2007 South of Fraser Area Transit Plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service along Scott Road and 72 Avenue between Scott Road Station, Scottsdale Exchange, and Newton Exchange including connections with Expo Line at Scott Road Station and potential rapid transit on King George Boulevard at Newton Exchange. This route would represent an additional 13km of B-Line or Better bus service and an investment of approximately 43,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus service (319) would be retained with appropriate frequency adjustments.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$8.7M	\$4.4M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 th %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	320	1,319	9.39	-32,293
Cost-Effectiveness Score (0-100)	13.2	24.4	6.5	4.5

Observations:

The performance of this B-Line is affected by the following factors:

- Has one employment centre anchor
- It would significantly reduce overcrowding on transit service in the corridor
- Will have minimal travel time savings over existing FTN service
- Has low population density and minimal pedestrian facilities along the corridor

PROJECT: NEW B-LINE - RICHMOND-BRIGHOUSE STATION TO METROTOWN VIA KNIGHT STREET, BRIDGEPORT ROAD AND GARDEN CITY

PROJECT DESCRIPTION

This project would introduce a new B-Line between Metrotown and Richmond-Brighouse via 49th Avenue, Knight Street, Bridgeport Road and Garden City Road.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network and connect Regional City Centres.

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service along 49 Avenue, Knight Street, Bridgeport Road and Garden City Road between Metrotown and Richmond-Brighouse. The service would connect with the Expo Line at Metrotown Station, and with the Canada Line at Bridgeport and Richmond-Brighouse Stations. This route would represent an additional 17km of B-Line or Better bus service and an investment of approximately 16,000 net annual service hours.

Key Assumptions:

- Existing underlying limited stop bus service (430) would be discontinued as it duplicates other local services.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$3.1M	\$1.7M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	137	515	4.55	-16,645
Cost-Effectiveness Score (0-100)	15.7	26.4	8.8	6.4

Observations:

The performance of this B-Line is affected by the following factors:

- The route has two employment centres as anchors
- A B-Line service would provide some travel time savings over the existing FTN service
- There is significant existing and expected population density along the corridor, but the current built environment is not very pedestrian friendly

PROJECT: NEW B-LINE - JOYCE-COLLINGWOOD TO UBC VIA 41ST AVENUE

PROJECT DESCRIPTION

This project would introduce a new B-Line between Joyce-Collingwood and UBC via 41 Avenue and SW Marine Drive.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network. B-Line service on this corridor was identified in the 2005 Vancouver/UBC Area Transit Plan as an upgrade to existing peak-only, limited-stop service of the 43, and was envisioned in the City of Vancouver's Transportation 2040 plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service along 41 Avenue and SW Marine Drive connecting Joyce-Collingwood, Oakridge, Dunbar, and UBC. The service would connect with the Expo Line at Joyce-Collingwood Station and with the Canada Line at Oakridge-41st Avenue Station. This route would represent an additional 19km of B-Line or Better bus service and an investment of approximately 49,000 net annual service hours.

Key Assumptions:

- Existing underlying peak-only limited-stop bus service (43) would be discontinued.
- Existing underlying local bus service (41) would be retained with appropriate frequency adjustments.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$10.0M	\$5.1M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	351	1,496	8.02	-33,432
Cost-Effectiveness Score (0-100)	13.2	25.2	5.1	4.2

Observations:

The performance of this B-Line is affected by the following factors:

- It has one employment centre anchor
- It would not provide significant travel time savings over existing FTN services
- There is high population density and good pedestrian facilities along the corridor
- It serves a destination with high parking costs
- It is not expected to entice many additional auto users to transit, thus having a minimal impact on VKT

PROJECT: NEW B-LINE - LYNN VALLEY CENTRE TO DOWNTOWN VANCOUVER VIA 29TH STREET, LONSDALE AVE AND MARINE DRIVE

PROJECT DESCRIPTION

This project would introduce a new B-Line between Lynn Valley Centre, Lonsdale Quay and Downtown Vancouver via 29 Street, Lonsdale Ave, Marine Drive and the Lions Gate Bridge.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network. B-Line service on this corridor was identified in the long-term vision of the 2012 North Shore Area Transit Plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service between Lynn Valley Centre and Downtown Vancouver via 29 Street, Lonsdale Avenue, Marine Drive and the Lions Gate Bridge. The service would connect with SeaBus at Lonsdale Quay, with Expo and Millennium Lines at Burrard, Granville, and Stadium Stations, and with the Canada Line at Vancouver City Centre. This route would represent an additional 16km of B-Line or Better bus service and an investment of approximately 61,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus service (229) would be retained with appropriate frequency adjustments.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$12.5M	\$6.3M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	408	1,848	6.59	-32,070
Cost-Effectiveness Score (1-100)	12.0	24.4	3.3	3.1

Observations:

The performance of this B-Line is affected by the following factors:

- There is one major employment centre as an anchor
- It is not expected to significantly reduce travel times
- There is high population density, but only moderate pedestrian facilities along the corridor
- This would provide an alternative to longer auto trips, but there is low incentive for auto users to switch to transit

PROJECT: NEW B-LINE – COQUITLAM CENTRE TO MAPLE RIDGE VIA LOUGHEED HIGHWAY AND DEWDNEY TRUNK ROAD

PROJECT DESCRIPTION

This project would introduce a new B-Line between Coquitlam Station, Port Coquitlam, Pitt Meadows and Maple Ridge City Centre / Haney Place via Lougheed Highway and Dewdney Trunk Road.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network, connecting Regional City Centres. B-Line service along a portion of this corridor is an emerging concept of the 2014 North-East Sector Area Transit Plan, and was identified in the 2008 Provincial Transit Plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service connecting Coquitlam Centre, Port Coquitlam Centre, Pitt Meadows, and Maple Ridge, via Lougheed Highway and Dewdney Trunk Road, including connections with Millennium/Evergreen Line at Coquitlam Centre Station and West Coast Express at Port Coquitlam, Pitt Meadows, and Maple Meadows Stations. This route would represent an additional 20km of B-Line or Better bus service and an investment of approximately 40,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus services (701) would be retained with appropriate frequency adjustments.
- Project would not be introduced if new B-Line Coquitlam-Langley via Lougheed/200 Street is introduced.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$8.1M	\$4.1M

Note: It is assumed that only one of this and the following B-Line option ("New B-Line – Coquitlam Centre to Langley via Lougheed Highway and 200th Street") would be implemented.

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	261	1,208	3.40	-18,068
Cost-Effectiveness Score (0-100)	11.3	23.5	2.5	2.6

Observations:

The performance of this B-Line is affected by the following factors:

- There is one employment centre anchor

Appendix A: Actions to Invest

- It would not have significant travel time impacts over existing FTN service
- There is low population density and minimal pedestrian facilities along the route
- It does provide an alternative to a tolled auto trip, but is not expected to entice many additional auto users onto transit

PROJECT: NEW B-LINE – COQUITLAM CENTRE TO LANGLEY VIA LOUGHEED HIGHWAY AND 200TH STREET

PROJECT DESCRIPTION

This project would introduce a new B-Line between Coquitlam Station, Port Coquitlam, Pitt Meadows and Langley Centre via Lougheed Highway, the Golden Ears Bridge and 200 Street in Langley.

PROJECT OBJECTIVES

The project is intended to serve growing demand and contribute to a grid of fast, frequent and reliable B-Line services that complement the rapid transit network, connecting Regional City Centres. B-Line service along a portion of this corridor is an emerging concept in the long-term vision of the 2014 North-East Sector Area Transit Plan and was identified as part of the 2020 RapidBus network of the 2008 Provincial Transit Plan. The project would attract more riders to transit, which would support regional mode share goals and reduce Vehicle Kilometres Traveled (VKT).

PROJECT SCOPE

A new B-Line would be introduced to provide limited-stop bus service connecting Coquitlam Centre, Port Coquitlam Centre, Pitt Meadows, Walnut Grove, Willowbrook and Langley Centre via Lougheed Highway and 200 Street. The service would connect with Millennium/Evergreen Line at Coquitlam Centre Station and with potential rapid transit on Fraser Highway at Langley Centre. This route would represent an additional 32km of B-Line or Better bus service and an investment of approximately 54,000 net annual service hours.

Key Assumptions:

- Existing underlying local bus services (595 and 701) would be retained with appropriate frequency adjustments.
- Project would not be introduced if new B-Line Coquitlam Station - Maple Ridge City Centre is introduced.

COSTS

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$10.6M	\$5.6 M

Note: It is assumed that only one of this and the previous B-Line option ("New B-Line – Coquitlam Centre to Langley via Lougheed Highway and 200th Street") would be implemented.

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	364	1,637	5.89	-27,987
Cost-Effectiveness Score (0-100)	11.8	23.7	3.2	3.0

Observations:

The performance of this B-Line is affected by the following factors:

- Has one employment centre anchor

Appendix A: Actions to Invest

- Would not have a significant impact on travel time over existing FTN service
- There is low population density and minimal pedestrian facilities along the route
- It does provide an alternative to a tolled auto trip but, given the land use context, is not expected to shift substantial additional auto users onto transit

TRANSIT: INVESTMENTS IN TRANSIT SERVICE

OVERVIEW

The following programs would fund investments in the regional bus network, including improvements to Frequent All-Day, Frequent Peak, and Basic Coverage services as well as targeted investments in the SeaBus, NightBus network and custom transit service (HandyDART).

“Frequent” services operate sufficiently frequently that customers do not need to refer to a schedule, while “Basic Coverage” service provides service coverage at lower frequencies to provide basic access to transit service. For the purposes of this plan, bus services have been categorized into three mutually supportive networks:

Frequent All-Day Service – Where service runs at least every 15 minutes in both directions throughout the day and into the evening, every day of the week.

Frequent Peak Service – Where service runs at least every 15 minutes during highest-demand time periods and directions.

Basic Coverage Service – Where a basic level of service is provided in areas where demand is sufficient to warrant some level of service, but cannot support operation at higher frequencies, even during peak periods.



Frequency improvements would be focused where sufficient demand exists already and/or where there is a reasonable level of certainty that demand is predicted to grow in the future based on committed plans and growth projections. Investments would be prioritized along the highest demand corridors to help improve service levels and reduce overcrowding.

Overview of Bus and SeaBus Service Investments

	Level of Investment
New Annual Service Hours* by 2024	1.45 million service hours
Percentage increase in bus service by 2024 compared to today	25%
New KM of Frequent All-Day Service (FTN) corridors by 2024	125 km
New KM of Frequent Peak Service corridors by 2024	300 km
New Areas served by Basic Coverage Service by 2024	9 new areas

Note: The above figures include bus and SeaBus service hours, and are incremental to Base. Figures are inclusive of ‘Maintain Service and System’ service investments, including an increase in annual bus service hours of 310,000 hours by Year 10 and an increase in SeaBus service of 2,400 hours beginning in Year 1. MSS also includes new vehicles to provide this service, including 72 conventional buses and 16 Community Shuttles.

COSTS

	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Investments		
All-Day Frequent Network	\$84.9M	\$43.6M
SeaBus	\$31.2M	\$4.7M
Peak Frequent Network	\$44.7M	\$23.6M
Coverage Network	\$7.2M	\$4.4M
NightBus Network	\$ -	\$2.1M
HandyDART Service	\$19.9M	\$14.7M
Additional Bus Depot	\$150M	\$15.9M
Total	\$338M	\$109M

Note: The above figures are inclusive of funding for investments described in the Maintain Service and System investments section, which have 10-year capital cost (2015 \$) of \$52 million and Year 10 operating cost of \$35.5 million.

PROGRAM: IMPROVE AND EXPAND FREQUENT ALL-DAY SERVICE

PROGRAM DESCRIPTION

Frequent All-Day service refers to corridors where transit service runs at least every 15 minutes in both directions throughout the day and into the evening, every day of the week. These corridors are part of the Frequent Transit Network. This program would support investments in (1) higher all-day frequencies on existing Frequent All-Day corridors, and (2) expansion of the Frequent All-Day network into new areas along select corridors.



PROGRAM OBJECTIVES

An improved and expanded Frequent All-Day network would help meet expected transit demand and reduce overcrowding, attract new transit riders, and serve growing markets. This program would increase service levels along already high-demand corridors, building system ridership and reducing overcrowding. This would help achieve regional mode share targets for transit and support municipal and regional land use efforts to focus growth and development along frequent transit corridors.

PROGRAM SCOPE

Frequent All-Day service refers to corridors where service runs every 15 minutes or better until 9 pm every day, starting at 6 am on weekdays, 7 am on Saturdays and 8 am on Sundays. This program has two core components: (1) intensify existing Frequent All-Day service, and (2) Expand Frequent All-Day service to new corridors. Resources would be allocated based on demonstrated and/or projected demand.

1. Intensify existing Frequent All-Day service to meet expected demand

Under the Vision, 304,000 annual service hours would be allocated over the ten-year plan period to increase service frequencies on existing Frequent All-Day corridors. This program would invest additional resources as indicated in the table below to further intensify existing Frequent All-Day corridors.

Example corridors, to be selected through more detailed planning, include: Broadway (Vancouver), Fraser Highway (Surrey/Langley), Hastings Street (Vancouver/Burnaby), Marine Drive/3 Street (North Shore), King George Boulevard (Surrey/White Rock), Willingdon Avenue (Burnaby), Lougheed Highway (Port Coquitlam/Pitt Meadows/Maple Ridge), 41 Avenue (Vancouver), 49 Avenue (Vancouver), Scott Road (Delta/Surrey), Cambie Road (Richmond), Highway 99 (Delta/White Rock), Lonsdale Avenue (North Vancouver), Main Street (Vancouver), Railway Avenue (Richmond), 6 Street (New Westminster), and others.

2. Expand Frequent All-Day service to new corridors across region

Under the Vision, 118,000 annual service hours would be allocated over the ten-year plan period to expand the Frequent All-Day network along select corridors by increasing service frequencies to meet this service definition. This program would invest additional resources as indicated in the table below to further expand the network of Frequent All-Day service. Corridors would be identified on the basis of observed demand or

Appendix A: Actions to Invest

where there is a reasonable level of certainty that demand is predicted to grow in the future based on committed plans and growth projections.

Example corridors, to be selected through more detailed planning, include: Boundary Road (Vancouver/Burnaby), 8 Avenue (New Westminster), Highway 17/Highway 99 (Delta), Mountain Highway (North Vancouver), 29 Street/Queens Road/Capilano Road (West Vancouver), Pinetree Way/David Avenue/Coast Meridian Road (Coquitlam/Port Coquitlam), No. 1 Road/Garden City Road (Richmond), No. 3 Rd (Richmond), Bridgeport Road/Knight Street (Richmond), Highway 91/91A (Surrey/Delta/ Richmond/New Westminster), 64 Avenue (Surrey/Langley), 88 Avenue (Surrey/Langley), 200 Street (Langley), Golden Ears Way (Langley/Maple Ridge), Rupert Street (Vancouver), 16 Avenue/33 Avenue (Vancouver), and others.

Program element	Level of Investment
1. Intensify existing Frequent All-Day Service	304,000 annual service hours
2. Expand Frequent All-Day Service along new corridors	118,000 annual service hours

* Service hours are incremental to service assumed in the 2014 Base Plan.

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$84.9M	\$43.6M

Note: The above figures are inclusive of costs for investments described in the Maintain Service and System investments section.

OUTCOMES AND EVALUATION RESULTS

Intensify Existing All-Day Frequent Service: Years 1-10	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵ %)	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	2,645	12,258	35.73	-184,549
Cost-Effectiveness Score (0-100)	20.5	42.5	4.7	4.8

Observations:

- All-Day Frequent Services generally operate in areas with higher population and employment density, better pedestrian facilities, and more expensive auto parking charges. As a result, investing in additional service hours in these areas will generate good returns in terms of mode share and VKT.

Expand All-Day Frequent Service: Years 1-10	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵ %)	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	1,529	7,411	16.29	-110,855
Cost-Effectiveness Score (0-100)	21.8	47.4	3.9	5.3

Observations:

- All-Day Frequent Services are generally in areas with higher population and employment density, better pedestrian facilities, and more expensive auto parking charges. As a result, investing in additional service hours in these areas will generate good returns in terms of mode share and VKT.

PROJECT: SEABUS SERVICE IMPROVEMENTS

PROJECT DESCRIPTION

This project would increase peak frequencies on the SeaBus connecting Waterfront Station with Lonsdale Quay to meet Frequent Transit Network guidelines – operating at least every 15 minutes all day – and to increase service to operate every 10 minutes during AM and PM peak periods. SeaBus service would become part of the Frequent Transit Network.



PROJECT OBJECTIVES

More frequent SeaBus service would attract new transit riders and reduce strain on North Shore to Downtown bus routes, particularly during peak hours.

PROJECT SCOPE

The SeaBus currently operates every 15 minutes during peak periods using two in-service vessels, connecting Waterfront Station with Lonsdale Quay. Funding for SeaBus service improvements would provide an additional 5,200 annual service hours, and would increase service to every 10 minutes in both directions from approximately 6:00-9:00am and approximately 3:00-6:00pm Monday to Friday, and every 15 minutes off-peak throughout the year. Within the Maintain Service and System funding envelope, 2,400 annual SeaBus service hours would be allocated to increase SeaBus service to every 15 minutes all day, seven days per week, which meets the requirement for classification as part of the Frequent Transit Network. In addition to the MSS level of investment, this project would also layer in an additional 2,800 annual SeaBus service hours and introduce a third SeaBus vessel into operation during peak periods to provide 10 minute service during weekday peak periods.

Replacement of one existing SeaBus vessel will be required during the plan period to maintain the current fleet size, which will be necessary to operate 10-minute peak service and maintain 15-minute service during other times of the day into the future.

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$31.2M	\$4.7M

Note: The above figures are inclusive of funding for investments described in the Maintain Service and System investments section.

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	206	1,001	2.20	-14,973
Cost-Effectiveness Score (0-100)	8.6	18.6	1.5	2.1

Observations:

- The SeaBus is an important link between North Vancouver and downtown Vancouver. While this project has high costs, it is an important investment to ensure that there is sufficient capacity to meet future demand. If conditions on the service deteriorate, it will deter many people from using transit and will have a compounding effect on the achievement of our goals and targets.

PROGRAM: IMPROVE AND EXPAND FREQUENT PEAK SERVICE

PROGRAM DESCRIPTION

Frequent Peak service refers to corridors where transit service runs at least every 15 minutes during peak-demand time periods or directions, but do not meet the definition of ‘Frequent’ throughout the day. This program would support investments in: (1) higher peak frequencies on existing Frequent Peak corridors, and (2) expansion of the Frequent Peak network along new corridors.

PROGRAM OBJECTIVES

An improved and expanded network of Frequent Peak service would help meet expected demand, attract new transit riders, and serve growing markets. This program would increase service levels during already high-demand time periods, building system ridership and reducing overcrowding. This would help achieve regional mode share targets for transit.

PROGRAM SCOPE

This program has two core components: (1) intensify existing Frequent Peak service, and (2) Expand Frequent Peak service to new corridors. Resources would be allocated based on demonstrated and/or projected demand.

1. Intensify existing Frequent Peak service to meet expected demand

Under the Vision, 117,000 annual service hours would be allocated over the ten-year plan period to increase frequencies on Frequent Peak services during their busiest time periods (e.g. AM and PM peaks) and/or directions. This program would invest additional resources as indicated in the table below to further intensify existing Frequent Peak service. Corridors would be identified on the basis of observed demand or where demand is predicted with a reasonable level of certainty to grow in the future based on committed plans.

Example corridors, to be selected through more detailed planning, include: Austin Avenue (Coquitlam), Mount Seymour Parkway (North Shore), 108 Avenue (Surrey), Crescent Road (White Rock), No. 2 Road (Richmond), Burnaby Lake area/Government Road (Burnaby), 12 Street (New Westminster), South Delta/Arthur Drive (Delta), and others.

2. Expand Frequent Peak service along new corridors across region

Under the Vision, 173,000 annual service hours would be allocated over the ten-year plan period to expand the network of Frequent Peak services along select corridors by increasing service frequencies during their busiest time periods (e.g. AM and PM peaks) and/or directions to every 15 minutes or less. This program would invest additional resources as indicated in the table below to further expand the network of Frequent Peak service. Corridors would be identified on the basis of observed demand or where demand is predicted to grow in the future based on committed plans and a reasonable level of certainty.

Example corridors, to be selected through more detailed planning, include: School House/Brunette (Coquitlam), Capilano Road (North Shore), 112 Street (Surrey), 152 Street (Surrey), 24 Avenue/32 Avenue (Surrey/Langley), Hwy 17 (Delta), and others.

Program element	Level of Investment
1. Intensify existing Frequent Peak Service	117,000 annual service hours
2. Expand Frequent Peak Service along new corridors	173,000 annual service hours

* Service hours are incremental to service assumed in the 2014 Base Plan.

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$44.7M	\$23.3M

Note: The above figures are inclusive of costs for investments described in the Maintain Service and System investments section.

OUTCOMES AND EVALUATION RESULTS

Intensify Existing Frequent-Peak Service to Meet Expected Demand: Years 1-10	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 th %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	1,112	5,390	11.85	-80,622
Cost-Effectiveness Score (0-100)	46.1	100.0	8.3	11.1

Observations:

- Peak Frequent Services are generally in areas with medium population density and longer auto commute trips. As a result, investing in additional service hours in these areas will generate good returns in terms of reducing VKT.

Expand Frequent-Peak Network Across the Region: Years 1-10	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 th %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	444	3,787	13.16	-78,661
Cost-Effectiveness Score (0-100)	20.7	78.8	10.3	12.2

Observations:

- Peak Frequent Services are generally in areas with medium population density and longer auto commute trips. As a result, investing in additional service hours in these areas will generate good returns in terms of reducing VKT.
- Increase peak service in areas currently with low transit service levels generates high ridership per incremental hour, however market saturation is expected to occur with relatively few hours (so these outcomes are not scalable)

PROGRAM: EXPAND BASIC COVERAGE NETWORK

PROGRAM DESCRIPTION

Basic Coverage service refers to bus services providing a basic level of service coverage to areas where demand is sufficient to warrant some level of service, but cannot support operation at higher frequencies, even during peak periods. This program would allocate resources to introduce basic coverage services in new areas.



PROGRAM OBJECTIVES

This program would improve transit access in currently underserved areas, which would provide increased choice for people with few mobility options.

PROGRAM SCOPE

Through this program, funding would be provided to introduce up to an additional 57,000 annual service hours of basic coverage service across the region and up to an additional 15,000 for enhancement of service in existing basic coverage service areas in the region. This may be achieved through extensions or redesigns of existing basic coverage services or introduction of new routes. Examples of expansion areas include:

- Burke Mountain/Partington Creek in Coquitlam
- Four areas in Surrey (Clayton, Morgan Creek and Anniedale)
- Two areas in Langley (Willoughby, and Brookwood)
- Two areas in Maple Ridge (Silver Valley, and Albion/Thornhill)

In some cases these services would be expected to advance to Peak Frequent service when demand warrants.

Program element	Level of Investment
Intensify existing Basic Coverage Service	15,000 annual service hours
Expand Basic Coverage Service in new areas	57,000 annual service hours

* Service hours are incremental to service assumed in the 2014 Base Plan.

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$7.2M	\$4.4M

Note: The above figures are inclusive of funding for investments described in the Maintain Service and System investments section.

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	-33	1,123	6.27	-34,091
Cost-Effectiveness Score (0-100)	0.0	38.2	8.0	8.6

Observations:

- New service in areas currently without transit service generates high ridership per incremental hour, however market saturation expected to occur with relatively few hours (so these outcomes are not scalable).
- Distance from population centres and introduced bus traffic drive low accessibility scores.

PROGRAM: INCREASE FREQUENCY AND SPAN OF SERVICE ON NIGHTBUS NETWORK

PROGRAM DESCRIPTION

The NightBus network provides late-night service on select corridors, primarily in and out of Downtown Vancouver. This program would invest in increased service frequency and extended span of service on high demand NightBus services.

PROGRAM OBJECTIVES

Higher frequency NightBus service operating for a longer span of service would reduce overcrowding and risk of pass-ups on high demand NightBus routes. Extended span of service would provide new mobility options for late evening and early morning travel.

PROGRAM SCOPE

Under this program, funding would be provided to approximately double the amount of service hours available for NightBus service (20,000 new annual service hours). This investment would allow for frequency increases and extended span of service on high demand NightBus routes such as the N9, N17, N19, and N20; there is also the potential that additional new NightBus routes and/or later hours could also be considered. Resources would be allocated on the basis of observed demand and overcrowding.



COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$ -	\$2.1M

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	51	250	1.18	-7,030
Cost-Effectiveness Score (0-100)	11.9	26.1	4.7	5.5

Observations:

- Low productivity time period results in relatively low performance.
- The Nightbus service provides an important connection for shift workers and expansion of service could provide more employment options to some residents.

PROGRAM: INCREASE CUSTOM TRANSIT SERVICE AND RESOURCES

PROGRAM DESCRIPTION

Custom Transit is the region’s door-to-door shared ride service for persons with physical or cognitive disabilities who are unable to use some or all of conventional transit without assistance, and is branded as HandyDART. Service is integrated with the region’s 100% wheelchair accessible conventional transit service. This program would increase the service and resources available for Custom Transit accessible transit services to help keep pace with population growth and an aging population.



PROGRAM OBJECTIVES

Custom transit services provide affordable and accessible travel options for persons with disabilities. An expanded Custom Transit program would support increased availability of transit services for people who need them.

PROGRAM SCOPE

Under the Vision, 190,000 annual service hours would be allocated over the ten-year plan period to expand services offered through the Custom Transit program. This program would allocate up to an additional 190,000 annual service hours to the Custom Transit program, a total increase of approximately 24% over today’s service levels. These funds would support increased service availability, reduced wait times and trip denials, and faster travel times. Given the proportion of Custom Transit trips that are focused on health care and social services, we feel that this type of service should be delivered in a 50/50 cost-sharing partnership with the provincial government. This partnership approach will be pursued as part of this Vision.

Program element	Level of Investment
Increase Custom Transit Service and Resources	190,000 annual service hours
Total increase over today’s service levels	30%

* Service hours are incremental to those assumed under the 2014 Base Plan

COSTS

Total Capital Cost (2015\$)	Annual Operating Cost (2015\$)
\$19.9M	\$14.7M

Note: The above figures are inclusive of funding for investments described in the Maintain Service and System investments section.

OUTCOMES AND EVALUATION RESULTS

Project not evaluated.

PROJECT: BROADWAY CORRIDOR RAPID TRANSIT

PROJECT DESCRIPTION

This Vision calls for rapid transit between Commercial Drive and the University of British Columbia. The first 10 years of the Vision targets implementing the first phase; extending the Millennium Line westward from its current terminus at VCC-Clark to Arbutus, with frequent B-Line bus connections continuing to UBC from Arbutus. This project will also result in greater frequency on the Millennium and Evergreen Line (2016), which will benefit riders from across the region. This corridor would be part of the Frequent Transit Network.

PROJECT OBJECTIVES

Broadway is one of the region's busiest transit corridors and features major population, job and institutional centres. Rapid transit will help to support this regional economic centre, and improve capacity and transportation reliability both along this corridor and on the connecting regional network. It will give all users more choices and will clear road space for more efficient use by automobiles and cyclists.

Extending rapid transit along the corridor would address capacity and reliability needs of the corridor, which would increase transit trips and mode share, and reduce vehicle kilometres travelled (VKT) and emissions. This project aims to efficiently serve growing demand in the corridor, while balancing regional investment priorities.

PROJECT SCOPE

In 2012, TransLink and the Province concluded the UBC Line Rapid Transit Study, in partnership with the City of Vancouver, UBC and Metro Vancouver. This study identified a shortlist of rapid transit options that could meet the long-term needs of the Broadway corridor between Commercial-Broadway station and UBC: SkyTrain to UBC, a combination of SkyTrain and LRT or a fully LRT based solution.

This Vision has determined that the first phase of rapid transit will extend the Millennium line from its current terminus at VCC-Clark west along Broadway to Arbutus, providing a connection with the Canada Line at Broadway-City Hall. Eventually rail based rapid transit is required all the way to UBC from Arbutus. This connection could be completed either through a further extension of SkyTrain or with a Light Rail solution as identified in the UBC Line Study. During the approval process for the first phase, the stakeholders will work together to conclude how and when to complete the next phase of rail to the UBC campus.

This line will bring provincial, regional and local value. The region is committed to constructing and operating the extension as a tunneled alignment along Broadway, contingent upon a Partnership Agreement being established with the City of Vancouver. The City of Vancouver will be responsible for the incremental cost associated with any additional tunneling beyond where technically or functionally required, consistent with operational capacity for other rapid transit systems within TransLink. The calculation of this portion of the Partnership Agreement will require more design development and will also consider the net costs to the project as well as other factors.

The Partnership section of the Vision outlines the basis by which the region and municipalities will formalize these partnerships. This Agreement will outline the reciprocal commitments by TransLink and the City of Vancouver in respect to land use assumptions and actions, investment in connecting municipal infrastructure and direct financial contributions.

This project also depends upon funding partnerships from other governments and the private sector. This funding will also be pursued as a matter of priority to ensure early implementation can occur.

Appendix A: Actions to Invest

Key Assumptions:

- B-Line services (99) on the segment between Commercial Drive and Arbutus would be discontinued upon introduction of rapid transit.
- B-Line service from Arbutus to UBC would be retained until full build-out of rail to UBC. At Arbutus, a facility accommodating about two thirds of the current layover space at Commercial-Broadway would be required. Enhancements to the B-Line services between Arbutus and UBC will also be pursued to ensure efficient transit operations until the rapid transit is implemented to UBC.
- There are options for how rapid transit is completed between Arbutus and UBC in the second phase, as identified in the UBC Line rapid transit study: either by a Light Rail connection or a continuation of SkyTrain. If SkyTrain is eventually extended to UBC, there will be additional costs associated with the first phase, in order to build track west of Arbutus to allow for the UBC extension without impacting operations. This additional cost is estimated at \$100 million and has not been included in cost estimates.

COSTS*

10-Year Capital Cost (2015 \$)	Year 10 Operating Cost (2015 \$)
\$1,980 million	\$23.2 million/year

PROJECT: RAPID TRANSIT IN SURREY

PROJECT DESCRIPTION

This Vision would introduce light rail transit (LRT) on three corridors: 104th Avenue, King George Boulevard and Fraser Highway. These corridors would be part of the Frequent Transit Network.

PROJECT OBJECTIVES

The City of Surrey and surrounding communities are among the fastest growing parts of the region, forecast to attract more than 25% of new residents and jobs over the next 30 years. The objectives of these lines are to shape land use; shape travel demand; increase ridership; and reduce emissions.

PROJECT SCOPE

Identification of this project was informed by the Surrey Rapid Transit Study, which was led by TransLink and the Government of B.C., in partnership with the City of Surrey, the City of Langley and Metro Vancouver. This study identified a shortlist of rapid transit options that could meet the long-term needs of Surrey and surrounding communities; these options included BRT on all three corridors, LRT on all three corridors and two combinations that would have BRT on 104th and King George with LRT or SkyTrain on Fraser Highway.

This Vision would implement one of the short-listed alternatives, introducing LRT on Fraser Highway and on 104 Avenue and King George Boulevard south to Newton with B-line service continuing to White Rock. It provides the greatest extent of rail transit service of the short-listed alternatives and is the most consistent with the City of Surrey’s urban development aspirations. It includes:

- 19 LRT stations and 6 B-Line stations
- A total of 26.8 kilometres of Light Rail Transit corridor length

While detailed design work is needed to determine optimal alignments and station locations and funding approach, the objective is to complete construction on the first two lines — 104th Avenue and King George Boulevard — within the first 7 years of the Vision. Design and construction on the Fraser Highway line will commence within the first 10 years and will be completed within the first 12 years.

The business case depends upon the concurrent implementation of land-use policies, and other supporting actions such as transit priority measures, parking management and walking and cycling investments that optimize the potential for the lines’ success. Achieving these objectives requires partnerships. The Partner section in the Vision document outlines the basis by which the region and municipalities will formalize Partnership Agreements. The Mayors’ Council is committed to work with municipalities to have the Agreements on the land use assumptions and actions, investment in connecting municipal infrastructure and direct financial contributions in place as these projects are approved and rolled out in future 10-Year Investment Plans.

The project scope assumes that B-Line services on the respective corridors would be discontinued as new LRT service commences.

COSTS*

Capital Cost (2015 \$)	Operating Cost (2015 \$)
\$2,440 million (12-year total)	\$22.3 million per year (by Year 12)

CYCLING & WALKING ACCESS TO TRANSIT

As the regional authority responsible for providing a transportation system that moves people and goods in support of regional and provincial objectives, TransLink's mandate is broad and multi-modal and includes walking and cycling. One of the headline targets of the RTS is to make it possible for people to make 50% of all trips by walking, cycling and transit within 30 years. Transit investments are a significant focus of regional dialogue largely because the investments required are so significant; however, walking and cycling – which already accommodate more trips every day than transit – will need to play an even bigger role if we are going to reach our targets in a way that is affordable to the region. Transit will play a critical role in supporting those longer distance trips but transit on its own won't get us to that 50% target – the capacity is simply too expensive to build. Walking and cycling are inexpensive, energy and space efficient, health-promoting, climate friendly, time competitive for short urban trips and – most importantly – have significant untapped potential. About half of all trips in this region under 2km are currently made by auto. If even a fraction of these short auto trips were made by walking and cycling, significant amounts of auto traffic could be shifted from streets and substantial amounts of money could be saved in maintaining roads and building expensive parking structures.

Conditions that support walking and cycling are also critical to help fully leverage investments in transit by enabling transit stops and stations to maximize their catchment area and reach the widest possible market. Improving walking and cycling facilities is more cost-effective than providing feeder bus services – especially in denser urban areas where service needs are highest. And, investment in walking and cycling access has benefits for transit operations: it reduces road congestion in dense, urban areas with large volumes of bus service hours, and increases safety on the roads for bus operators, car drivers, cyclists and pedestrians alike.

Every transit trip starts and ends with a walking trip. Currently, about 1/4 of the streets in Urban Centres and along the Frequent Transit Network (FTN) have no sidewalks, and an additional 1/3 have sidewalks only on one side of the street. In these areas and elsewhere, poor walking conditions and a lack of sidewalks and safe crossings mean that some people who would otherwise choose to take transit – don't.

Likewise, about 40% of Metro Vancouver residents who don't currently cycle would actually like to do so at least some of the time – but don't because of fear and stress associated with riding mixed with high speed motor vehicle traffic.

To unlock this potential, a focused program of investment to ensure safe walking conditions to transit and safe, traffic-protected bikeways is needed, and is called for in the Regional Cycling Strategy³.

As the authorities responsible for most streets and roads in the region, municipalities play the primary role constructing bikeways and walkways. TransLink plays an important catalytic and coordination role in helping to plan and fund facilities and programs across the region, including bicycle parking, local bikeways, development of a Major Bikeway Network, and walking and cycling connections to transit. For cycling investments, the priority will be on cost-sharing traffic-protected facilities in Urban Centres, Frequent Transit Development Areas and other high cycling potential areas.

³ In addition to constructing new cycling routes and facilities, the Regional Cycling Strategy identifies cycling programs, such as cycling education and Safe Routes to Transit, as being fundamental components of encouraging a wide range of people to take up cycling. These multi-modal programs are addressed under the sections for Mobility Management (Appendix B) and Walking (Appendix A).

COSTS

	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Cycling	\$131M	\$1.5M
<i>Regional Cycling Routes (not TransLink-Owned)</i> (\$11.9M/year by year 6)	\$96.7M	\$ --
<i>TransLink-Owned Routes and Parking at TransLink Facilities</i> (\$4.6M/year by year 6)	\$34.4M	\$1.5M
Walking Access to Transit Total (\$5.0M capital year by year 6)	\$35.0M	\$ --

Note: The Cycling investment figures are inclusive of "Maintain Service and System". MSS includes investment incremental to Base Plan in the amounts of \$44.5 million (2015 \$) in total capital for investment in Regional Cycling Routes (not TransLink-owned); and \$9.5 million (2015 \$) in total capital and \$0.3 million (2015 \$) operating per year for TransLink-owned Bicycle Investments, including Bicycle Parking. No funding for Walking Access to Transit is included within "Maintain Service and System" investments.

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵ %))	Daily Vehicle Kilometers Travelled
CYCLING				
Change from 2030 Base Case	2,984	1,540	163	-895,728
Cost-Effectiveness Score (0-100)	34.4	20.9	31.7	34.4
WALKING ACCESS TO TRANSIT				
Change from 2030 Base Case	749	386	73	-224,737
Cost-Effectiveness Score (0-100)	40.8	24.8	67.2	40.8

Observations:

- The typical distance people are willing to walk is under 2km; currently the mode share for trips under 2km is 48% walking and 45% by auto. There is good opportunity to shift some of these short auto trips to walking – especially in Urban Centres.
- The typical distance people are willing to cycle is up to 8km; the current mode share for trips under 8km is 65% auto, 21% walking and only 3% cycling. There is significant opportunity to shift some of these short auto trips to cycling which provide time-competitive way to travel in urban areas for short to medium length trips;
- Increasing the amount of high-quality, traffic-protected bikeways in Urban Centres and other high cycling potential areas, as proposed in this Vision, is the key step to attract a significant number of new users who currently do not feel safe or secure bicycling mixed in with high-speed motor vehicle traffic.

PROGRAM: INVESTMENT IN BIKEWAYS

PROGRAM DESCRIPTION

This program would provide funding and cost-sharing to support complete the region's bikeway network as envisioned in the Regional Cycling Strategy over a time frame of about 20 years. In the first 10 years, this program would add to the existing bikeway network up to:

- 300 km of traffic-protected bikeways on major streets in Urban Centres, such as on-street cycle tracks with physical separation from traffic or off-street paths;
- 2,400 km of designated bikeways, such as marked bike lanes or neighbourhood street bikeways with bicycle-permeable traffic calming.

One of the actions identified in the Regional Cycling Strategy is to define and implement the Major Bikeway Network (MBN) of high quality regionally significant routes that parallel and connect to the rapid transit system and regional gateways. These routes should be traffic-protected to the extent possible. Examples of specific projects that could be designated as part of the MBN are outlined below, including upgrading the BC Parkway and completing the Central Valley Greenway, North Shore Spirit Trail, Evergreen Bikeway, and routes South of Fraser to parallel future rapid transit lines.

PROGRAM SCOPE

This program would augment the existing Bicycle Infrastructure Capital-Cost Sharing (BICCS) program to provide cost-share funding to support an additional 300 km of traffic-protected bikeways and 2,400 of designated bikeways throughout the region, as identified by municipal transportation and cycling plans.

Facilities would generally be constructed on a cost share basis with municipalities, but the cost share amount may vary depending on facility type and regional priority.

- Cost share funding would be ramped up over the first 5 years of the plan to ensure sufficient time to build matching funds into municipal capital plans.
- TransLink-owned assets would be funded at 100%.
- Regional priorities such as traffic-protected bikeways in Urban Centres and key links on the MBN would be cost-shared at up to 75%.
- All other municipal bikeways would be eligible for cost-sharing at 50%.

COSTS AND EVALUATION RESULTS

See section cover page.

EXAMPLES OF POTENTIAL PROJECTS

In addition to focusing on traffic-protected bikeways in Urban Centres, Frequent Transit Development Areas and other areas of high cycling potential, the following are examples of Major Bikeway Network projects which could be cost-share funded under this program:

BC PARKWAY COMPLETION & UPGRADES (PARALLELING EXPO LINE)

The BC Parkway is a 26 km cycle route connecting False Creek in Vancouver to Gateway Station in Surrey, paralleling the Expo Line. It is primarily a traffic-protected paved multi-use path, with some sections of designated on-street routes. About 50% of it is a TransLink asset: a 12 km portion of the route is owned by BC Hydro and managed by TransLink, and the remaining 14 km is owned and managed by the respective municipalities. This project would provide funding for upgrades to the TransLink-managed portion and, as a cost share, to the municipally-owned portions of the BC Parkway to enhance safety, functionality for cyclists and pedestrians, security and user amenities. This project would include extensive street crossing improvements, enhancements to the definition and condition of the separated cycling and pedestrian facilities, and overpasses at major arterial crossings. The identified upgrades would also improve pedestrian and cyclist access to the Expo Line.



CENTRAL VALLEY GREENWAY COMPLETION & UPGRADES (PARALLELING MILLENNIUM LINE)

The Central Valley Greenway (CVG), originally opened in 2009, is a 24 km multi-use regional route that parallels the Millennium Line, running from VCC-Clark Station in Vancouver through Burnaby to New Westminster Quay. It is a mix of unpaved multi-use trails, paved multi-use trails, on-street designated cycling routes with accompanying sidewalks, and on-street traffic-protected routes. Portions of the CVG remain gravel trails and long sections are not traffic-protected. This project would complete the Central Valley Greenway and address deficiencies identified since its opening, by focusing on creating traffic-protection on the portion of the CVG that runs along Winston Street in Burnaby, improving the New Westminster low level route, and providing a bridge over False Creek Flats in Vancouver. Completing the CVG would also improve access to transit for both cyclists and pedestrians.

NORTH SHORE SPIRIT TRAIL COMPLETION (CONNECTING NORTH SHORE URBAN CENTRES)

The North Shore Spirit Trail is a 35 km multi-use trail running from Horseshoe Bay to Deep Cove, connecting the District of West Vancouver, the District of North Vancouver, the City of North Vancouver, and the Squamish Nation. Initially envisioned in 2007, several portions have already been constructed by the local authorities, including significant portions from West Vancouver Civic Centre to the Second Narrows Bridge. The Spirit Trail currently has a mix of path types, including unpaved multi-use paths, paved multi-use paths, and designated on-street routes. This project would contribute funding on a cost share basis to help the local authorities complete the North Shore Spirit Trail. This project would improve connections between communities on the North Shore to each other and to the rest of the region through connections to the SeaBus, Lion's Gate Bridge, and Second Narrows Bridge.

EVERGREEN LINE BIKEWAY (PARALLELING EVERGREEN LINE)

When completed in 2016, the Evergreen Line will extend the SkyTrain for 11 km from Lougheed Station in Burnaby into the region's Northeast Sector to Lafarge Lake and Douglas College in Coquitlam. It will add two new SkyTrain stations in Port Moody and four in Coquitlam. To support multi-modal access to the new line and to improve

Appendix A: Actions to Invest

cycling connectivity in general, TransLink and the municipal partners have identified the alignment of a parallel multi-use path and on street bike facilities: both opening day and future ('ultimate') path alignments have been identified. This project would complete the opening day Evergreen Line bikeway and make progress towards completing a portion of the ultimate alignments.

CANADA LINE BIKEWAY

This project would support increased traffic-protection to the bikeways paralleling the Canada Line.

SOUTH OF FRASER BIKEWAYS (PARALLELING FUTURE RAPID TRANSIT)

This project would support traffic-protected bikeways alongside future rapid transit on 104 Ave, King George Boulevard, and Fraser Highway.

BROADWAY CORRIDOR BIKEWAY (PARALLELING FUTURE RAPID TRANSIT)

This project would support a traffic-protected bikeway alongside future rapid transit on the Broadway corridor.

PROGRAM: INVESTMENTS IN SECURE BICYCLE PARKING

PROGRAM DESCRIPTION

This program would fully fund investments to increase the bicycle parking supply at TransLink facilities region-wide, with a particular emphasis on installing secure, long-term bicycle parking. Secure long-term bicycle parking would take the form of shared parking areas accessible only to registered keycard holders, similar to the facility currently under construction at Main Street-Science World SkyTrain Station.



PROGRAM OBJECTIVES

Investing in secure bike parking at transit facilities would encourage passengers to access transit by bike. TransLink's research shows that the risk of theft is a deterrent to cycling in Metro Vancouver, and this is particularly pronounced when users leave their bikes unattended for many hours in the day, such as commuters leaving their bikes at transit facilities. Providing secure bicycle parking would make best use of transit infrastructure by ensuring convenient and safe access to transit facilities.

PROGRAM SCOPE

This program would build upon TransLink's existing Regional Secure Bicycle Parking Plan to install secure bike parking at rapid transit stations and major bus exchanges. Secure bike parking will be integrated into the Expo Line station upgrades at Main Street-Science World, Joyce-Collingwood, Metrotown, and Commercial-Broadway Stations, and will be installed as standalone structures at King George Station, Carvolth Park Ride lot, and other locations to be determined. These secure bike parking facilities will replace the bike lockers in some areas, and complement them in others. This program would provide funding to assure that secure bike parking is available at a variety of rapid transit stations and exchanges throughout the region.

COSTS AND EVALUATION RESULTS

See section cover page.

PROJECT: WALKING ACCESS TO TRANSIT

PROJECT DESCRIPTION

In partnership with municipalities, TransLink will pursue a program of pedestrian infrastructure and amenity improvements focusing on the areas within walking distance to transit stops and stations.

PROJECT OBJECTIVES

The objective of this program is to create high pedestrian amenity areas with supporting land use that promotes walkability and maximizes transit ridership. The program will help to realize the full potential of transit investments by ensuring that a poor walking environment is not a barrier to transit use, as it currently is across much of the transit network where a lack of sidewalks and safe crossings rule out transit as a viable option for many people. TransLink will work with municipalities to define the area programs and identify infrastructure priorities and station area plans as warranted by adjacent development, planned station retrofits and municipal/community support.



PROJECT SCOPE

This program includes cost-sharing for:

- Minor improvements (under \$500,000) to pedestrian access and amenity in the immediate vicinity of transit stops and stations (e.g. new or widened sidewalks and crossings); and
- Major improvements (over \$500,000) including cost-sharing for more comprehensive land use, station area and corridor plans required to confirm more significant improvements to walkability in the neighbourhoods around transit stops and stations, especially frequent transit. TransLink will work with municipalities to identify where plans and investment are needed as warranted by adjacent development, planned transit investments and facility upgrades and community support.

The program will support improvements to the following areas, prioritizing highest transit ridership (or potential future ridership) locations within each category:

- Within 800m of a rapid transit station or West Coast Express station
- Within 400m of existing or potential future bus stops, especially on the FTN
- Within 400m of MRN corridors
- Within Regional Growth Strategy designated Urban Centres and FTDA's

COSTS AND EVALUATION RESULTS

See section cover page.

APPENDIX B

Actions to Manage

INTRODUCTION

In addition to investing in the transportation system, we can make great progress towards regional goals by managing the system to be more efficient and user-focused.

We can make the multi-modal transportation system work better through technology, like signal priority for transit vehicles, and changes to the way we use infrastructure, such as designating bus-only lanes or queue jumper lanes. We can also make the system work better through mobility pricing, transit customer amenity improvements, rewards and incentives to encourage travel that makes efficient use of the network, trip-making information covering all modes, marketing, support programs, and regulations all aimed at making travel easier for the user and more efficient for the system as a whole. These efficiency gains are achieved by gently nudging users who have some flexibility to spread their travel to less busy times, routes and modes – resulting in better use of existing capacity and resources.

By encouraging travelers to shift travel times, routes, modes, and behaviours, the actual demand for transportation service and infrastructure – especially during the busiest peak periods – becomes much clearer, and TransLink may be able to defer the need for some kinds of new investments. The funds saved on projects that can be deferred can be used to pay for other investments elsewhere in the transportation system or reduce costs to the user.

To optimize the impact of these management initiatives, they need to be combined with a competitive range of travel options so that each user has real choices available to them in terms of mode, route, and time.

This section describes the system management projects and policies that are priorities for near-term implementation in the 10-Year Plan: mobility pricing development, a mobility management program that can integrate payment, information and incentives, implementation of transit priority on key transit corridors, and a goods movement management program.

PROJECT: INTEGRATED MOBILITY PRICING DEVELOPMENT (INCLUDING FIELD STUDY)

PROJECT DESCRIPTION

The Vision identifies integrated mobility pricing as a key action to implement before the end of the 10-year period. Pricing is a powerful tool to more efficiently manage the transportation system by influencing the choices people make: how they travel; how far they travel; the route and the time. A more consistent approach to pricing across the entire transportation system, including transit and roads, is also fairer as people pay more directly for what they actually use. Even if such a pricing regime was revenue neutral and raised no additional



funds, these efficiency and fairness gains are the most important reasons to price transportation. There are opportunities to use the funds raised from pricing to reduce existing fees and taxes (such as the fuel sales tax) and also to return to investments in maintaining and expanding the transportation system.

A basic level of mobility pricing is already in place in Metro Vancouver in the form of transit fares and parking fees. Aside from some limited facility-specific bridge tolls, though, mobility pricing on the road system is not well developed in this region. Fuel tax acts as a form of mobility pricing but has a number of challenges. While it may influence the amount of travel, it has no influence on time or location of travel, and as a revenue source it is challenged by increases in vehicle efficiency.

An effective mobility pricing approach on the transit and road systems will improve fairness and efficiency, while also raising new revenues to help fund the existing transportation system and the investments outlined in the Vision. We still need to do a lot of work to figure out exactly what mobility pricing would look like on the ground in Metro Vancouver. On both the road and transit networks, a more effective approach to pricing could include a distance-based charge that varies based on time of day or level of congestion or crowding.

In order to progress a mobility pricing strategy, it is important to bring together a range of key stakeholders to look at pricing strategies for both transit and roads, including implementation approaches, potential impacts on people and businesses, and ways to mitigate any negative impacts. A Mobility Pricing Field Study will be commissioned in order to bring together the required technical and communications work.

PROJECT OBJECTIVES

The objectives of the Mobility Pricing Field Study could include:

- Determine existing attitudes and acceptability towards transport user charges, and explore the factors that drive the level of acceptance;
- Test behavioral responses to different mobility pricing signals on roads and transit;
- Explore the policy and technical implementation feasibility of applying user charges to different parts of the transportation system; and

- Raise public and stakeholder awareness of applying mobility pricing concepts to the transportation system.

PROJECT SCOPE

A consistent and principled approach to pricing roads and transit is desirable. The Mobility Pricing Field Study will include a review of the current transit fare structure and leverage Compass Card data to understand how the transit system could be better priced for fairness, system efficiency and revenue. Given that issues around pricing the road system are much less understood, the bulk of the project resources will go into testing and evaluating different road pricing approaches. While TransLink has undertaken preliminary scoping of the Mobility Pricing Field Study based on lessons from pilots and research in other jurisdictions, the exact scope of the Study will only be clear once the project team, including partners and stakeholders, has been established.

Key tasks to be undertaken in the Mobility Pricing Field Study could include:

- Planning and undertaking market research and stated preference surveys to inform the study itself;
- Designing a field study and procuring the necessary services and technology;
- Identifying and recruiting study participants;
- Pre test monitoring and surveying;
- Monitoring travel behaviour under certain pricing structures; and
- Post test survey and reporting.

In parallel to the above tasks would be:

- review of policy, legislative, and technical implications and requirements; and
- communications strategy which aims to raise awareness and further explore issues related to mobility pricing with the general public.

COSTS

Costs are to be determined and will be dependent on the scope of the study and the role of partners.

PROJECT: MOBILITY MANAGEMENT: INTEGRATED PAYMENT, INFORMATION & INCENTIVES

PROJECT DESCRIPTION

Urban mobility needs are evolving and new services – such as car-sharing – and new technology – such as smartphone trip planning apps and smartcards - are emerging to fill these needs

This mobility management program offers a new, more integrated, more customer-focused approach to delivering and managing the transportation system. Mobility management harnesses technological advancements and partnerships with other public and private sector transport providers (like taxis and car-sharing) in order to create new and innovative user-focused products and services to travelers in Metro Vancouver. This program will focus on building and maintaining the infrastructure – such as one-stop-shop integrated payment and customer information systems - that allow for a more seamlessly integrated transportation system across all jurisdictions and agencies and modes. The program will also focus on leveraging these integrated systems to develop targeted incentives programs for different types of customers. This program is in line with recent recognition by the Canadian Urban Transit Association (CUTA) that integrated mobility is the key goal to guide Canadian transportation agencies



As a region, we stand to benefit most from this type of program if it is coordinated – although not necessarily delivered - by the public sector. As the regional transportation authority, TransLink is the best candidate for this task. If we, as a region, don't step up, these needs will inevitably be filled by a hodge-podge of private sector providers – making it more confusing for customers and less likely to achieve regional objectives.

Travel Planning & Incentives Program

Personal travel planning is a technique that delivers information, incentives, rewards, and motivation directly to individuals to help them voluntarily make travel choices that are both better for them and for the system as a whole. This technique helps users make connections between their travel needs and available transportation options, ensuring the regional transportation system is used to its full potential, opening up new possibilities for TransLink to build relationships with customers and partners, and potentially to realize new revenue streams.

This particular project would deliver information and incentives through a variety of channels including in-person consultation (at the household, neighbourhood, school or workplace level) and targeted social marketing as per the existing TravelSmart program but with a substantially enhanced reach. The project would also include specific transit advertising to market new and existing services to people and businesses that may not be aware of the options available to them. The investment will build on the current offerings of the TravelSmart program.

Integrated Information & Payment Systems

New transport business models are emerging from companies such as Google, Daimler, and Nokia that could affect the revenue potential and impact TransLink's ability to achieve policy objectives. It is therefore critical that TransLink defines a role in how it enables and manages mobility options. This project would use advances in

technology to provide real-time, dynamic, and targeted travel information across all modes targeted to each individual user – based on their needs and their travel patterns – including interactive smart-phone apps, integrated real-time customer information, and programs and services to accompany and enhance Compass Card functionality and experience. The project will also work towards a single integrated payment platform — based on Compass Card — across all modes of transportation including services not delivered by TransLink such as car-sharing, bicycle-sharing, taxis, ferries, neighbouring transit services, auto and bicycle parking, and road user charges.

Funding for both projects will support:

- A significantly expanded customer information system
- Development of an integrated payment system for elements of the mobility pricing system
- A significantly expanded TravelSmart program including personalized travel consulting at schools, workplaces, and neighbourhoods
- New functional group within TransLink drawn from different disciplines (planning, marketing, IT, business development, etc) to develop new programs, products, and services
- Core technology investments required to enable the development and delivery of above products and services:
 - Content Management Systems (with Membership Accounts Services, Third-Party Content Management and Internal Content Management);
 - Customer Relationship Management (CRM) Systems; and
- Additional functionality for the Compass Card System including integrating payment systems across multiple agencies and businesses

PROJECT OBJECTIVES

Leveraging the significant investments in Compass Card, advances in mobile computing and communications technology, and the existing TravelSmart program and brand, the two projects will substantially enhance TransLink's ability to manage the transportation system at a much finer grained level while simultaneously increasing the quality of the customer experience.

The two projects will help the region to:

- Optimize the benefit from existing and future transportation investments by encouraging users to select a mode for their trip that works best for both them and the transportation network – spreading demand to less busy and less costly times, routes, and modes where possible.
- Improve the customer experience by developing products or services that directly respond to the unique needs of different market segments.

PROJECT SCOPE

Travel Planning & Incentives Program

This project will broaden and enhance the existing TravelSmart program to:

- Personalize transportation information and marketing.
 - Develop nuanced understanding of different travel markets, what they value, and the most effective incentives and disincentives for them based on data collection.

Appendix B: Actions to Manage

- Grow the reach and influence of the existing TravelSmart program including expanded school programs; outreach to businesses; municipal partnerships; and online trip planning.
- Develop technology-based products and tools tailored to different market segments aimed at improving the customer experience and nudging behaviour to support system efficiency. Speculative examples of these tailored products could include:
 - i. “See More” – a smartphone application and Compass Card add-on to encourage convention attendees and other business visitors to participate in more recreational tourism activities and boost transit use (particularly during off-peak periods) through personalized incentives and rewards.
 - ii. “Cycle Track” – an initiative that provides individuals with positive reinforcement and encouragement for cycling. Users would be given RFID tags (linked to their Compass account) that can be attached to their bicycles allowing personalized, real-time information to be sent to the user such as distance travelled, modal integration information such as real-time transit departures and cycle locker availability from nearby stops and stations.
 - iii. “Map Your Move” – a web-based calculator tool for people moving house into or within Metro Vancouver. Building on existing products such as Transit Score and Walk Score, this presents a wide range of information and data including commute times and cost to prospective house buyers. Map Your Move would focus on the integration of lifestyle needs and mobility choices by allowing users to explore their travel options and helping them to plan their transport needs in relation to the locations of their daily activities.

Integrated Information & Payment Systems

This project will use technology, personalized service, and the development of new partnerships to:

- Provide consolidated transportation information, payment and partnerships.
 - Information: Integrate all customer travel information in the region, irrespective of mode or operating agency, into a single portal delivered across multiple channels: online, mobile phone, telephone.
 - Payment: Work towards using Compass Card to integrate all transportation payment processes – across all modes of transportation - including services not delivered by TransLink such as car-sharing, bicycle-sharing, taxis, ferries, neighboring transit services, auto and bicycle parking, road tolls etc.
 - Partnerships: work with existing and new partners to deliver cutting edge programs and platforms to help travelers make smarter choices, ideally incorporating all transportation options, including taxis, ferries, YVR, coaches, van pools and car sharing.

COSTS

The combined costs for the two projects are as follows:

10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
\$28.6 million	\$8.7 million

These are up-front costs to deliver approximately five information-based products or services, in addition to the extension of the existing TravelSmart program. These services will have the potential to generate revenue (e.g. via co-branded offers, advertising and subscription fees) which is not considered above. These programs will also

support increased ridership and fare revenue. These incremental revenues are not calculated into the costs of the program but are instead assumed in the business casing and financials of the investment plan assume increases in these types of management programs. Without these kinds of expanded efforts, ridership revenue is unlikely to meet forecasts.

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ⁵))	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	6,728	3,471	400	-2,019,548
Cost-Effectiveness Score (1-100)	100	23.1	100	100

Observations:

- While investment is a necessary condition, it is not sufficient on its own to make substantial progress on mode-share and VKT reduction targets. Meaningful progress requires implementing demand management measures (especially mobility pricing).
- The demand-management initiative described here (personalized travel planning and incentives) has been shown to achieve reductions in daily Vehicle-Kilometers Travelled (VKT) that are 1-2 orders of magnitude greater than almost every other project put forward in this plan, for relatively little cost. For example, the TravelSmart Urban Transportation Showcase pilot conducted in this region resulted in an average 8% decrease in VKT in the pilot neighbourhoods; this initiative was by far the most cost-effective and hence established the upper end of the cost-effectiveness index for all metrics.

PROJECT: GOODS MOVEMENT MANAGEMENT PROGRAM

PROJECT DESCRIPTION

Regional economic prosperity depends on the efficient movement of goods within the region – an objective which TransLink has a clear mandate to support. However, to date the region has lacked a cohesive goods movement strategy – largely because of the complexities and shared responsibilities of freight-related planning and governance. TransLink is currently working with partners and stakeholders to develop and adopt that long-overdue strategy.



It should be noted that this region also plays an important role in national and international goods movement as a trans-shipment gateway between Canada and Asia-Pacific where goods are loaded and unloaded between ships, planes, trains and trucks. This trans-shipment of goods between the Port and intermodal facilities, accounting for approximately 36% of heavy truck movements in the region, is the responsibility of the Provincial and Federal governments and should occur primarily on Provincial highways to minimize negative impacts on local communities. TransLink and local governments will continue to coordinate under senior government leadership on these issues.

Even within the domain of local serving goods movement, TransLink has limited authority and so, to make progress, increased collaboration with partners is required.

To support goods movement this Vision includes a range of investments and actions described elsewhere in this document, including:

- investments in connectivity and safety improvements for trucks, including addressing rail crossings, Major Road Network (MRN) connections, replacing the Pattullo Bridge, identifying a solution for improving goods movement on the north shore of the Fraser River and introducing Intelligent Transportation System technology to better manage road traffic (described in Roads Investment section);
- actions designed to free up space on the region’s roadways for higher value commercial trips such as investments in walking, cycling and transit (described in Investment section) and introducing comprehensive region-wide mobility pricing (described in Manage section); and

In addition to the actions identified in the above program areas described elsewhere in this document, TransLink also has a role to play as a convener and coordinator of regional goods movement planning. The project described here captures the latter role – an ongoing program of Goods Movement Management focused on building partnerships to streamline and harmonize policy and regulations, data collection and analysis, and planning.

PROJECT OBJECTIVES

This program will help the region to:

- Coordinate projects and actions that help facilitate the efficient movement of region-serving goods in support of regional transportation and economic development objectives;
- Improve service to the goods movement community by providing more and better information to increase safety, reliability, operations and travel decisions;
- Increase awareness of goods movement benefits, needs and challenges in local communities; and
- Encourage collaboration and integration between land use and transportation planning for more efficient goods movement.

PROJECT SCOPE

In addition to the other goods movement supportive investment and management actions already described in other project sheets, this program commits to:

- Streamlining and harmonizing freight-related regulations and policies across the region including truck route designation, truck permitting and enforcement, truck size/weight/noise regulations, and the collection and analysis of goods movement data;
- Managing and utilizing the existing infrastructure and systems that serve the movement of goods, including transportation demand management (TDM), Intelligent Transportation System (ITS), and other operations management initiatives (e.g. encouraging flexible and extended freight delivery times);
- Pursuing and facilitating a data-driven and outcome-based approach to goods movement planning, decision making and project/investment evaluation (e.g. the continued participation in the Applied Freight Research Initiative (AFRI) Program along with the partner agencies, Transport Canada and MoTI).
- Convene a regional forum or task force to bring together representation from the goods movement sector, municipalities, and the region to discuss, coordinate and collaborate on issues of joint concern.

The Program includes:

- A significantly expanded freight data collection and analytics system
- Convening and managing a Regional Goods Movement Forum
- Planning resources to manage the program

PROGRAM: INVESTMENT IN TRANSIT PRIORITY ON TRANSIT CORRIDORS

PROGRAM DESCRIPTION

This program would introduce funding to support transit-supportive signalization, dedicated transit lanes, queue jumpers and other measures to give traffic priority to transit vehicles on transit corridors. In some cases transit corridors may be improved to Bus Rapid Transit (BRT) levels through the introduction of a fully separated right of way along all or a portion of the route. These measures would reduce transit vehicle delays and increase operating speed.



PROGRAM OBJECTIVES

This program would improve the efficiency, speed and reliability of transit services, which would increase their attractiveness and grow the transit mode share. This program could also benefit other road users by shifting more trips to transit, getting buses out of mixed traffic, and reducing roadway conflicts

PROGRAM SCOPE

Funding would be provided to implement transit priority investments along existing or planned B-Line and other transit corridors, in partnership with municipalities. Funds may also be allocated to transit priority interventions on Frequent Transit Network (FTN) and Major Road Network (MRN) corridors in the interest of improving reliability and reducing emissions on these heavily used bus and goods movement corridors.

Corridors and specific transit priority interventions would be identified for funding based on expected operational improvements to reliability and speed of service. TransLink estimates that the proposed program budget would support transit priority improvements on 1-2 transit corridors per year. The full extent (Tier 2) of the program would introduce approximately 60 km of separated bus lanes and over 220 km of other transit priority measures.

Program element	Level of Investment
New separated bus lanes introduced by 2024	Approximately 40 lane km
New transit priority measures introduced by 2024	Approximately 155 lane km

COSTS

	10-Year Capital Cost (2015\$)	Year 10 Operating Cost (2015\$)
Investments in Transit Priority	\$193M	\$ -

OUTCOMES AND EVALUATION RESULTS

	Performance Criteria			
	Access (Additional jobs accessible by the average person in the region)	Non-Auto Access (Additional jobs accessible by walk, cycle and transit by the average person in the region)	Mode Share (One one-hundredths of a percent (1/100 ^s %)	Daily Vehicle Kilometers Travelled
Change from 2030 Base Case	561	2,620	6.81	-39,408
Cost-Effectiveness Score (1-100)	5.0	10.4	1.0	1.2

APPENDIX C

Outcomes

DETAILED PLAN OUTCOMES

CONTEXT

As the regional authority for transportation planning and service delivery, TransLink is required to prepare a Regional Transportation Strategy (RTS) that outlines the region's 30-Year Vision for transportation in support of the Regional Growth Strategy and Provincial and regional economic and environmental objectives. The Metro Vancouver Board of Directors and the Mayors' Council received the most recent Regional Transportation Strategy in 2013.

The Regional Transportation Strategy 30-Year Vision includes 5 goals:

1. Provide sustainable transportation choices
2. Support a compact urban area
3. Foster safe, healthy and complete communities
4. Enable a sustainable economy; and
5. Protect the environment

As a region, we can best achieve these goals by designing our communities and transportation system in a way that increases access to jobs while making it possible to reduce driving distances (Vehicle Kilometers Travelled – or VKT) and make more trips by walking, cycling, and transit. To this end, our first headline target is to make it possible for people to make 50% of all trips by walking, cycling, and transit. Our second headline target is to make it possible to reduce the distances that people drive by 33% from 2011 levels.

In order to work towards these targets, each of the projects considered in this process was assessed against its ability to perform in terms of reducing VKT and increasing walking, cycling, and transit mode share. We also considered a third metric - concerned with improving access to jobs and markets – to ensure that we achieve our headline targets in a way that supports a competitive and sustainable economy. Taken together, these three metrics do a good job of capturing the region's transportation goals and aspirations:

Improve Access:

Ensuring good access to jobs and markets for both people and goods is a critical requirement for a sustainable economy.

Reduce Vehicle-Kilometres Travelled:

If we can achieve this improved access while still reducing driving distances – we can reduce congestion, making travel time more predictable and reducing traffic collisions (saving money and lives). We also reduce fossil fuel use, air pollution, and greenhouse gas emissions.

Increase Walking, Cycling, and Transit Mode Share:

Increasing the share of trips that people make by walking, cycling, and transit, in addition to reducing congestion, collisions, and emissions, also increases physical activity, improves public health, and improves what planners call placemaking – the creation of great livable spaces with thriving local businesses and lower crime rates.

The complete package was also assessed against a more complete set of outcome indicators, as shown in the table below. These outcome indicators include: the need to own a car, roadway congestion, transit overcrowding, travel time reliability for people and goods, access to jobs and services for people without a car, public health and safety including air pollution, traffic collisions and physical activity, greenhouse gas emissions and land consumption.

METHODOLOGY

In order to estimate the benefits of the 10 Year Vision, we estimated conditions in 2030 under two scenarios: the Vision scenario, where the investments and policies outlined in this document are in place, and the “No Action” scenario, where transportation pricing structures remain as they are today, no new transportation funding sources are implemented, and minimal investment in transportation is possible. In order to get a clear sense of the impacts that result from this Vision, as distinct from the changes that would have happened even if we had done nothing, we looked at the difference between the 2030 No Action and 2030 Vision scenarios.

We know that some of the investments and actions in this Vision will only come online in Years 10-15 and so their impacts won’t be fully realized by 2030. We also expect that after the first 10 years of this Vision is implemented, continued investment will occur, including completing rapid transit to UBC and continued growth in bus service, that road tolls will increase and that the region will continue to grow and densify according to the Regional Growth Strategy. In order to understand whether the Vision investments and actions set us on a trajectory to achieve our 2045 mode share and VKT goals, we also estimated conditions in 2045, assuming that this 10 Year Vision is implemented and that these additional investments are made in the subsequent decades.

The following table describes the performance indicators estimated for each scenario, and the goals to which they relate.

Appendix C: Outcomes

	<i>Goal</i>	<i>Objective</i>	<i>Metric</i>	<i>Calculation and Rationale</i>
Targets	Provide Sustainable Transportation Choices	Improve regional accessibility	Access	Calculated as per Access to Jobs, below ⁱ . Reflects the ability of Metro Vancouver residents to travel to their desired destinations.
		Reduce the need to own a car	Auto Ownership	Total vehicles estimated to be owned by residents of Metro Vancouver. Reflects the availability and attractiveness of non-auto options, and is an important driver of both VKT and bike/walk/transit mode share.
		Reduce distance travelled	VKT per capita	Total vehicle-kilometres generated by <i>personal travel</i> in the region (i.e. excluding goods movement), divided by the number of residents. VKT reduction helps achieve progress in many of the Economy, People and Environment outcomes below.
		Increase walking, cycling, and transit use	Mode Share (Walk + Bike + Transit)	The proportion of travel made by cycling, walking, or transit. More people using these modes helps achieve progress in many of the Economy, People and Environment outcomes below.
		Support RGS growth targets	Percent of new dwellings in Urban Centres Percent of new jobs in Urban Centres	The proportion of new dwellings/jobs located in designated Urban Centres. Denser development results in both shorter trips and higher rates of cycling, walking and transit use.
Outcome Criteria	Economy	Improve access to jobs	Access to Jobs	The average accessibility across the region, where accessibility is calculated as the sum of all jobs in the region, weighted by the travel time to get to each job. Jobs that take longer to get to count less towards the score than jobs within easy reach ⁱⁱ . Higher accessibility means greater ability for employees and employers to find suitable jobs/labour.
		Ensure efficient goods movement	Congestion (goods)	The proportion of peak-hour truck/passenger VKT that occurs on congested corridors (“congested” is defined as having a volume-over-capacity ratio of 0.8 or greater, above which travel speeds are severely impacted). Congestion results in wasted time, resources and money for travelers and businesses.
			Congestion (passenger)	
		Ensure efficient movement of people	Overcrowding on Transit	The proportion of transit boardings during the peak-hour that occur on overcrowded vehicles. “Overcrowded” here refers to vehicles with passenger volumes in excess TransLink’s <i>Transit Service Guidelines</i> . Traveling on overcrowded vehicles is unpleasant for customers and discourages transit use.
		Ensure reliable goods movement	Reliability (goods)	The proportion of peak-hour truck/passenger VKT that occurs on unreliable corridors (“unreliable” is defined as having a volume-over-capacity ratio of 1.2 or greater, above which travel speeds are severely impacted and travel times are difficult to estimate reliably). Unreliability results in wasted time, resources and money for travelers and businesses, because travelers will budget more time for trips than necessary.
		Ensure reliable movement of people	Reliability (passenger)	
		Increase resilience to fossil fuel shortages and price shocks	Fossil Fuel Consumption per Capita	Total estimated fuel consumed by vehicle travel in Metro Vancouver. Less reliance on fossil fuels means that the region’s economy is less vulnerable to fluctuations in oil prices.
	People	Improve access to communities	Access to Community	Calculated as per Access to Jobs, above, but using a subset of jobs that represent shopping, education, and other services ⁱⁱ . Better access to these opportunities means greater ability for individuals to engage with their communities.

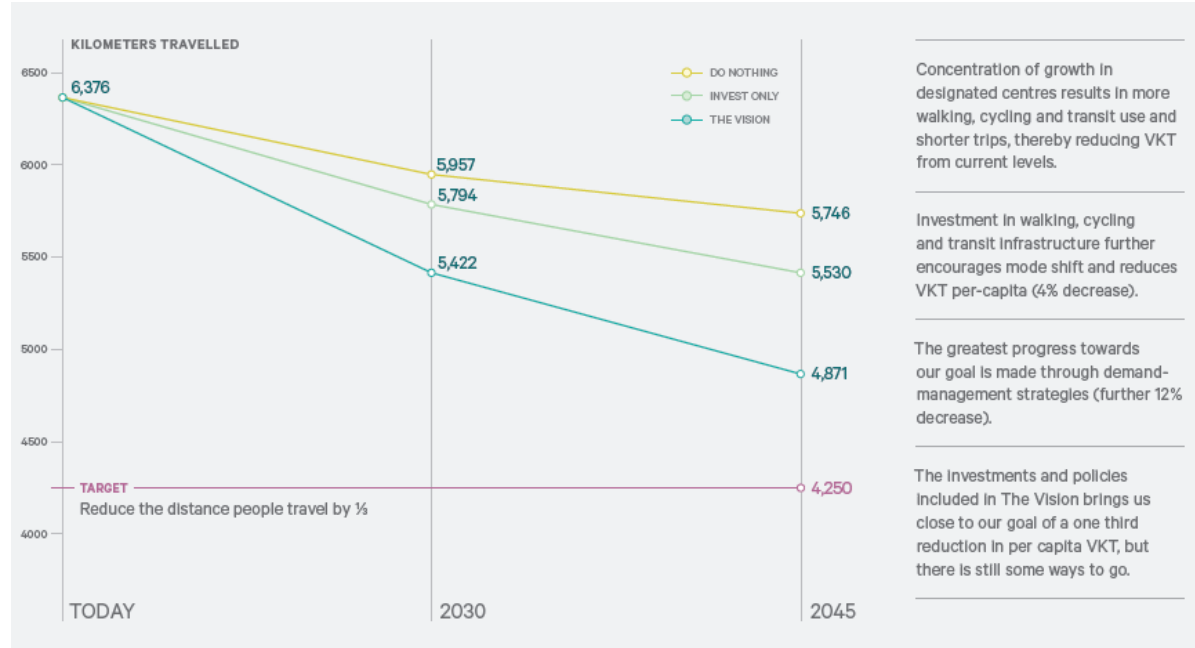
Appendix C: Outcomes

	Improve non-auto access to jobs	Non-auto access to jobs	Calculated as per Access to Jobs, above, but excluding the auto mode ⁱⁱ . Better Non-Auto Access to Jobs means greater ability for residents without access to a car to get to jobs.
	Ensure transport safety	Value of collisions per-capita	The estimated dollar-value of the monetary and non-monetary costs of collisions, divided by the total population. Fewer injuries and lives lost, and fewer dollars spent repairing or replacing damaged property is good for everyone.
	Ensure transport security	Crime	<i>Not measured</i>
	Reduce contribution to respiratory illness	CAC Emissions	Estimated tonnes of criteria air contaminants emitted by vehicles. Reduced exposure to CACs results in lower rates of respiratory disease and associated health care costs.
	Improve cardiovascular health	Walk and Bike Mode Share	Estimated proportion of trips that are made by walking or cycling. Higher rates of active transportation results in improved cardiovascular health and reduced health care costs.
Environment	Reduce contribution to climate change	GHG Emissions	Estimated tonnes of greenhouse gas emissions by vehicles. Fewer GHGs means lesser contribution to global climate change.
	Support a compact urban form within the Urban Containment Boundary	Green-space conversion index	An index representing the conversion of greenspace to developed land (more negative numbers represent higher rates of conversion). Less consumption of greenspace means more land retained as habitat and to support natural ecosystem processes.
	Minimize encroachment on designated conservation, recreation, agricultural, and rural lands.	Remaining capacity for single-detached homes within UCB	The estimated capacity (in number of dwelling units) remaining with the Urban Containment Boundary for the development of single-detached homes. Conservation of this capacity means less likelihood of dispersed development beyond the UCB.

Various approaches were used to estimate these outcomes. One of the key analysis tools is the regional transportation model. This model projects future transportation conditions in the region based on inputs describing the distribution of homes and jobs throughout the region, the roads and transit services available, and the time and dollar costs of using each mode. The model projects the amount of travel that would occur by auto, transit, walking and cycling, and the location of this travel (i.e. from where to where, along which corridor). A variety of other models and toolsⁱⁱⁱ were used to both generate and validate our estimates. Ultimately, it is important to emphasize that these models are simply tools to help us assess the relative impacts of different options. While our models are quite sophisticated they are still ultimately just depictions of reality – our best guesses of what we think might happen. We can never accurately predict the future – there are just too many external variables that we can’t possibly predict in advance.

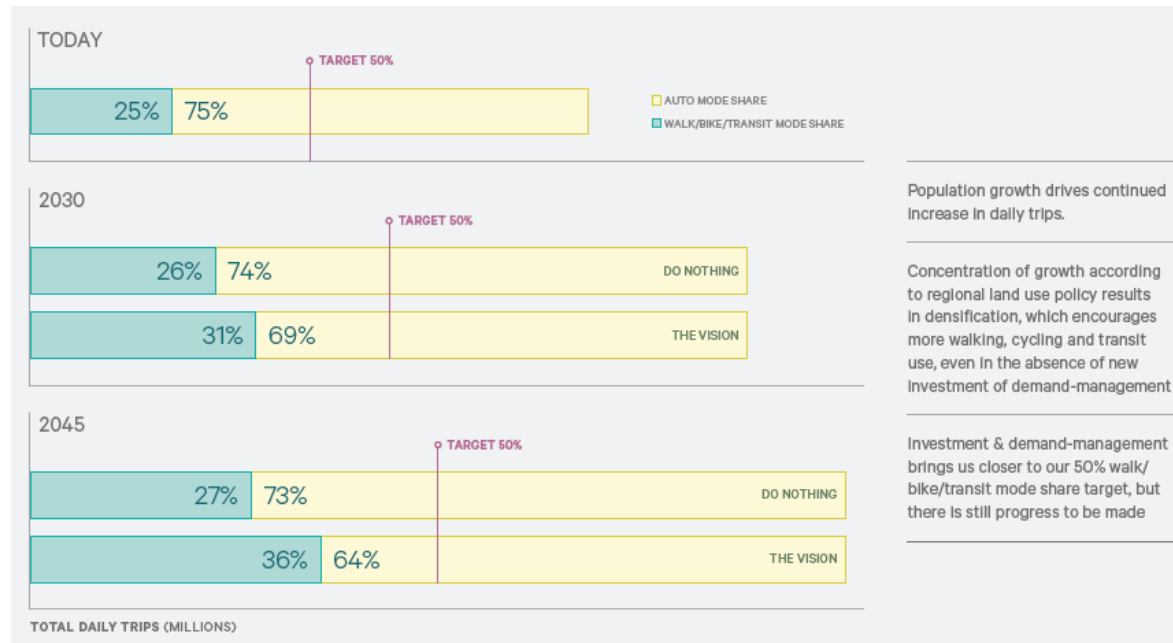
RESULTS – SUMMARY

FIGURE 1 Steady Progress Towards Reducing per Capita Vehicle Kilometres Traveled (VKT)



By 2045, we estimate that the actions in this Vision and continued investment beyond 2030 could reduce the distances that people drive by about a quarter – substantially advancing us towards our target of a one-third reduction. This progress comes partly through the investment in alternatives to driving, but most of that progress is from demand management initiatives – in particular mobility pricing on the road network. Clearly, to make further progress on this target, pricing will need to play a pivotal role. We should note that, although the amount driven per person is going down, we’re still adding more than a million people to the region over the next 30 years. As a result, the total amount of driving will still increase somewhat but not by nearly as much as it would have if we had taken no action.

FIGURE 2 Steady Progress Towards our Walk, Bike and Transit Mode Share Target



By 2045, we estimate that the actions in this Vision and continued investment beyond 2030 will bring the walking, cycling and transit mode share from 25% to over 35% - representing more than 1 million new trips by these modes and about half of the way to our target of 50%.^{iv}

With fewer cars, less driving, and more walking, cycling and transit – this Vision will generate a host of other benefits. With more affordable travel choices, we’ll save money and time. By 2030 these savings will amount to about \$500 per average household per year in out-of-pocket expenses and time savings^v. Some households will save much more than this. For example, those that are able to get rid of that second car because of much improved transportation choices will be able to save upwards of \$10,000 per year.^{vi} With 10% less congestion on the roads and coming close to eliminating the problem of leaving people behind on the curb by buses that are too full to pick up any more passengers – we’ll all have faster and more reliable trips.

These transportation improvements provide strong support for the economy, as people gain new access to tens of thousands of jobs and businesses gain new access to tens of thousands of new workers. We’ll make progress on Provincial and regional climate protection targets – keeping transportation emissions at today’s levels even as we grow by more than a million people. We’ll also see major health improvements – we estimate about 200 lives saved every year due to the health benefits of more walking and cycling and fewer traffic fatalities as a result of less driving. These substantial public health, safety and wellness benefits are not only good for people but will also save the health care system millions of dollars every year.

Thus, this plan constitutes a significant advance toward our collectively held regional goals, resulting in positive outcomes that we can continue to build upon later by completing projects we cannot afford in the first 10 years and, critically, by continuing to manage and price the system for efficiency and fairness, and working closely with our partners to support the creation of compact, transit-oriented communities that support efficient and sustainable travel choices.

RESULTS – DETAILED

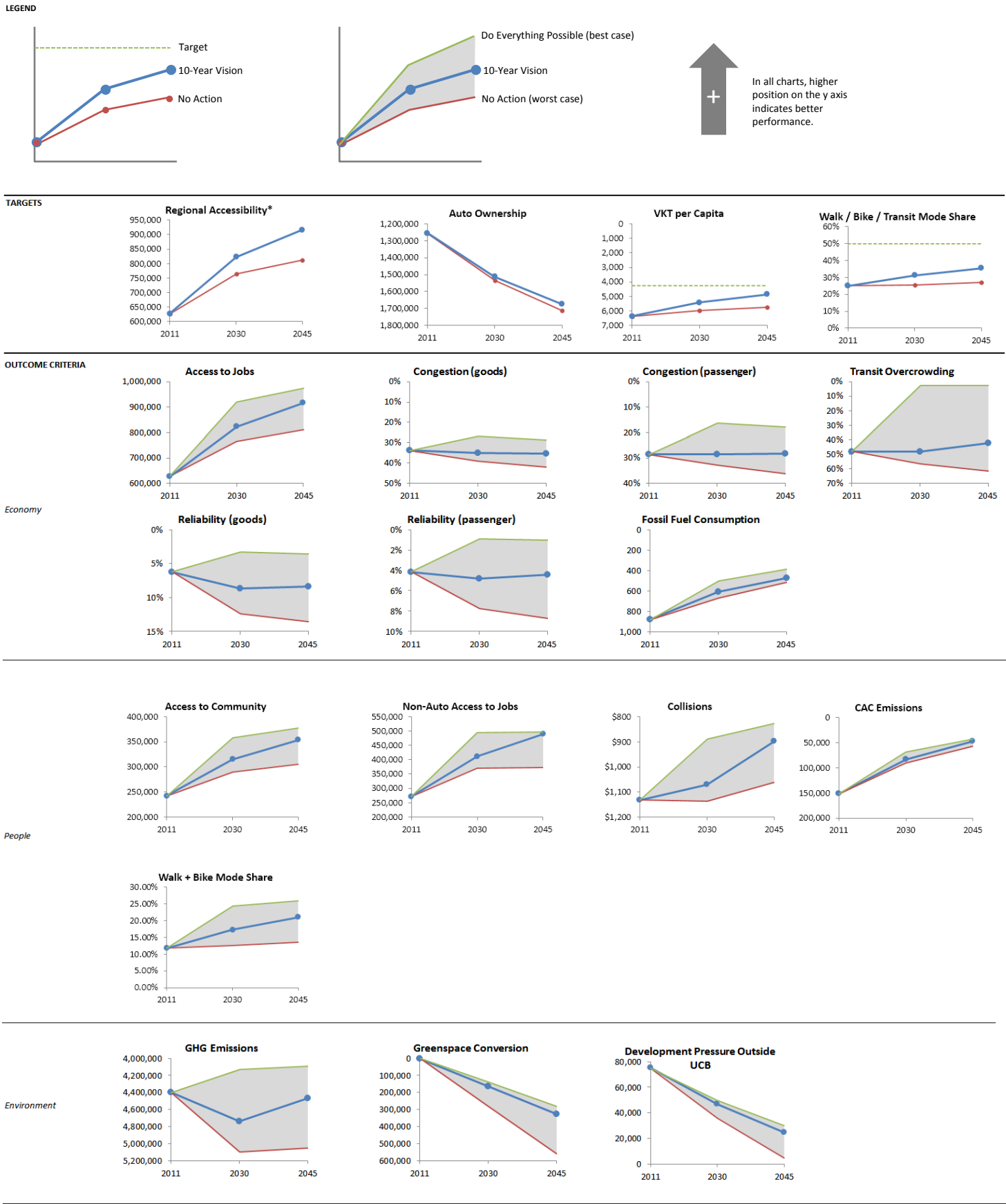
The following table and charts describe performance of the Vision in 2030 and 2045 against each of the targets and outcome criteria. Performance of the No Action scenario is also presented, along with target values and “hypothetical maxima”. Targets exist for two of the transportation metrics (VKT and mode share). The hypothetical maximum for a given criteria represents the performance expected to be achieved if regional investment and policy decisions were made solely to maximize performance on that specific criteria, without regard for cost or other impacts. It is not expected that performance would approach the hypothetical maximum for any of the criteria. In fact, achieving such a condition would be suboptimal, since performance on other criteria, including cost, may be compromised.

The charts on Page C-8 visually illustrate the data presented in table form on Page C-8. In each graph, higher position on the y axis indicates better performance. The green line represents either the target or the hypothetical maximum (the best we could hope to achieve if we put all available resources and actions into maximizing just that one performance indicator) and the red line represents what would likely happen if we took No Action. The blue line shows where we think this Vision will likely get us. In all cases, we see a marked improvement over the No Action scenario.

Appendix C: Outcomes

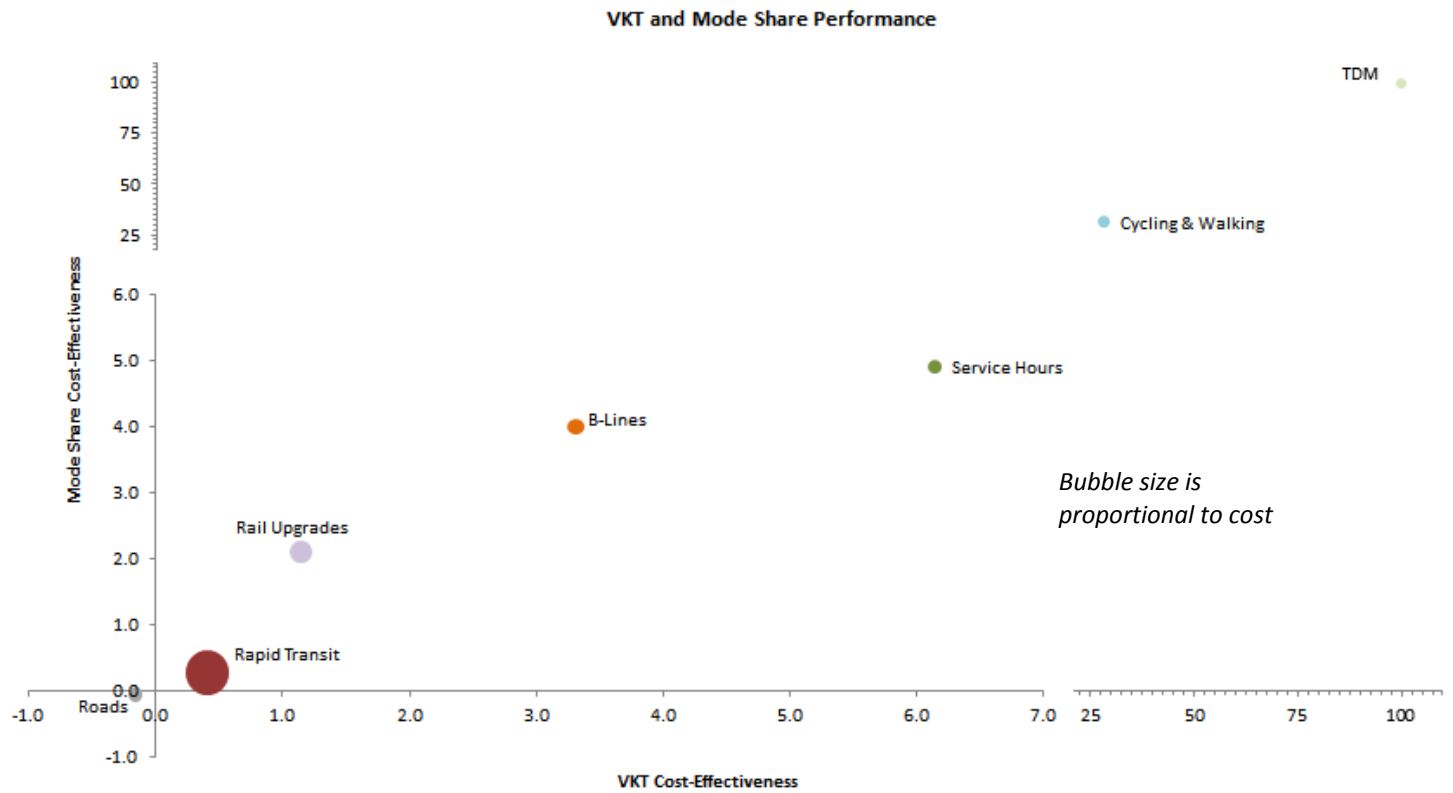
				2011	2030			2045		
					No Action	Vision	Target / Hypothetical Maximum ^{vii}	No Action	Vision	Target / Hypothetical Maximum
Goals	Objective	Metric								
Targets	Provide Sustainable Transportation Choices	Improve regional accessibility	Access	628,000	764,719	822,369		811,000	916,757	
		Reduce the need to own a car	Auto Ownership	1,254,000	1,535,596	1,512,025		1,713,000	1,675,289	
		Reduce distance travelled	VKT per capita	6,376	5,957	5,422	4,251	5,746	4,871	4,251
		Increase walking, cycling, and transit use	Mode Share (Walk + Bike + Transit)	25.1%	25.6%	31.3%	50.0%	26.9%	35.5%	50.0%
		Support RGS growth targets	Percent of dwellings in Urban Centres Percent of jobs in Urban Centres		Implementing the Vision contributes to focusing growth in Urban Centres as designated by the <i>Regional Growth Strategy</i> ^{viii} .					
Outcome Criteria	Economy	Improve access to jobs	Access to Jobs	628,000	764,719	822,369	919,001	811,000	916,757	974,619
		Ensure efficient goods movement	Congestion (goods)	33.8%	39.0%	35.1%	26.8%	41.9%	35.3%	28.8%
		Ensure efficient movement of people	Congestion (passenger)	28.6%	32.8%	28.6%	16.3%	36.1%	28.4%	17.9%
			Overcrowding on Transit	48.0%	56.4%	48.2%	2.5%	61.7%	42.3%	2.7%
		Ensure reliable goods movement	Reliability (goods)	6.2%	12.4%	8.6%	3.3%	13.6%	8.4%	3.6%
		Ensure reliable movement of people	Reliability (passenger)	4.1%	7.8%	4.8%	0.9%	8.7%	4.4%	1.0%
		Increase resilience to fossil fuel shortages and price shocks	Fossil Fuel Consumption (litres) per Capita	882	668	610	501	517	473	388
	People	Improve access to communities	Access to Community	242,000	290,090	314,989	358,190	305,000	353,496	376,600
		Improve non-auto access to jobs	Non-auto access to jobs	271,000	370,960	411,732	495,045	372,000	489,395	496,433
		Ensure transport safety	Collisions	\$1,132	\$1,137	\$1,071	\$888	\$1,060	\$899	\$828
		Ensure transport security	Crime							
		Reduce contribution to respiratory illness	CAC Emissions	151,979	90,778	82,633	67,881	56,121	47,417	41,965
		Improve cardiovascular health	Walk and Bike Mode Share	11.80%	12.64%	17.26%	24.31%	13.52%	21.03%	25.99%
Environment	Reduce contribution to climate change	GHG Emissions	4,399,258	5,100,979	4,736,449	4,127,744	5,053,194	4,468,486	4,089,076	
	Support a compact urban form within the Urban Containment Boundary	Green-space conversion index	0	-281,134	-164,122	-140,567	-562,267	-328,244	-281,134	
	Minimize encroachment on desingnated conservation, recreation, agricultural, and rural lands.	Remaining capacity for single-detached homes within UCB	75,000	35,667	46,844	49,853	4,615	24,615	30,000	

Figure 3 Performance Outcomes of Investment Scenarios



PROJECT-CATEGORY PERFORMANCE

We assessed each project in the Vision for how well it reduces VKT and improves walk/bike/transit mode share. By estimating these impacts for each project, and dividing by project costs, cost-effectiveness for VKT and mode-share of each project was calculated. The following chart summarizes these results by project-category. TDM and Walking & Cycling investments far outperform other investments; they are relatively inexpensive, and have a large impact per dollar. Roads projects have a negative score, meaning that they are likely to increase VKT and decrease walking, cycling and transit. While these two metrics represent our headline targets, they don't capture everything. For example, we fundamentally need a well-connected road network to move people and goods. We need to invest in transit to alleviate over-crowding and improve reliability. Walking, cycling and transit investments also have health and place-making benefits. As a result, this chart represents a partial "snapshot" that captures many of the things we care about, but not everything.



NOTES

ⁱ This metric is intended to represent the ability of Metro Vancouver residents to travel to destinations throughout the region. Ideally, this metric would account for access to all types of destinations, including shopping, recreation, employment, and social opportunities. This is a relatively new metric, and such a comprehensive measure is not currently available. Instead, “Access to Jobs” is used as a proxy measure. It is expected that this measure correlates well to true Regional Accessibility.

ⁱⁱ In the evaluation of the No Action and Vision scenarios, all access measures (Access to Jobs, Access to Communities and Non-Auto Access to Jobs) was calculated using the *best* mode available (i.e. that which provides the best accessibility) from a given origin. In almost all cases, this mode was auto. This approach varies from the project-specific evaluations, where Access to Jobs and Access to Communities were estimated using a mode-share weighted average accessibility. Effectively, the approach used for scenarios estimates *potential* accessibility whereas the approach used for projects estimates *realized* accessibility.

ⁱⁱⁱ Certain adjustments to model outputs were necessary in order to improve estimates of cycling and walking mode share, and to account for capacity constraints on the transit system. A variety of approaches were employed to estimate cycling and walking mode share. These included a review of comparable regions in North America and Europe, a review of studies related to traveler response to infrastructure investments, regression analysis relating cycling mode share to various neighbourhood characteristics, and analysis of regional trip diary data. Using this variety of approaches allowed for comparison and corroboration of results. The other necessary adjustment was to account for transit capacity constraints. This was done by comparing the number of passengers traveling by transit along various corridors with the frequency and size of transit vehicles on those same corridors. Where transit travel exceeded capacity, trips were manually reallocated to non-transit modes.

Outputs from these projection methods, including VKT, mode share, and corridor-level travel volumes, were translated into the outcomes described in the above table. Some metrics are direct outputs of the calculations described above, such as VKT and mode share. Others are straightforward to estimate, such as GHG emissions and fossil fuel consumption. These depend on projections of the fuel efficiency of cars and trucks in the region. Other metrics require more complex calculations, such as the congestion, reliability and accessibility metrics.

^{iv} TransLink’s regional transportation model estimates current walk/bike/transit mode share at 25%. This is slightly less than the 27% mode share estimated by TransLink’s 2011 Trip Diary. The model is calibrated to Trip Diary results, so in theory these values should be very similar, however calibration is inherently imperfect. Here, model results rather than Trip Diary results are used to represent today’s conditions in order to allow for a fair comparison to modeled future conditions.

^v Monetary savings are estimated at \$186 per household, and time savings are estimated at \$332 per household, using \$14.31 as the value of one hour (adapted from BC Ministry of Transportation and Infrastructure: <http://www.th.gov.bc.ca/publications/planning/Guidelines/Business%20Case%20Guidelines/DefaultValues-BenefitCostAnalysis.pdf>).

^{vi} As estimated by the CAA Cost of Driving Report (2014).

^{vii} The hypothetical maximum for a given criteria represents the performance expected to be achieved if decisions were made solely to maximize performance on that specific criteria, without regard for cost or other impacts. It is not expected that performance would approach the hypothetical maximum for any of the criteria. In fact, achieving such a condition would be suboptimal, since performance on other criteria, including cost, may be compromised.

^{viii} The geographic scale of available data is too coarse to estimate specific proportions of growth that occur in designated centres. However, assessment of the transportation investments and policies indicate that under the Vision a greater proportion of growth will occur in designated centres than under the “No Action” scenario.

APPENDIX D

Letter to Mayors' Council from the Honourable Todd Stone, Minister of Transportation & Infrastructure

February 6, 2014



February 6, 2014

His Worship
Mayor Richard Walton, Chair
Mayors' Council on Regional Transportation
287 Nelson's Court, Suite 400
New Westminster BC V3L 0E7

Reference: 224264

Dear Mayor Walton:

Re: TransLink Governance and Referendum

Allow me to congratulate you on your recent re-election as Chair of the Mayors' Council on Regional Transportation.

The provincial government and the Mayors' Council have a common goal: to ensure that traffic congestion is reduced to improve everyone's commute in support of a strong economy and great quality of life for the region. As we move forward to attain this goal, the questions before us are 'what is the plan or vision to achieve that', 'who pays' and 'how much'.

Today, within its transportation service region, TransLink supports the operations of its regional transit system through taxes and fees like property tax, gas tax, and transit fares. To support expanded transit and road networks for the region, some have publicly advocated for new revenue sources, in addition to those taxes and fees Metro Vancouver taxpayers already pay.

The position of the provincial government is clear: if Metro Vancouver taxpayers are being asked to pay new taxes or fees, on top of those that local governments and TransLink currently collect, then taxpayers will have their say through a public referendum.

Transportation Referendum

The provincial government has stated that to minimize cost, maximize voter participation and provide the best opportunity for broad public discussion on transportation expansion and how it is funded, holding the referendum concurrent with the 2014 local government elections in Metro Vancouver makes the most sense.

.../2

Some members of the Mayors' Council have stated, however, that not enough time remains before November to adequately deliver a referendum – to develop a fully costed plan, to finalize the question and to ensure the region's taxpayers have time to fully consider what they will be asked to vote on.

Therefore, the provincial government is willing to extend the referendum window to no later than June 30, 2015. To ensure sufficient time is available for in-depth public discussion, this extension depends on the Mayors' Council articulating and presenting a regional vision, with specific priorities and costs.

If a vision is not ready by June 30, 2014, the next date the provincial government is willing to consider a referendum is in conjunction with the subsequent local government election. This later date would require the Mayors' Council to use existing funding sources if it wishes to expand transit in the interim period.

If the referendum is held in November 2014 or prior to June 30, 2015, the provincial government will compensate local governments for any related administration costs.

With respect to the referendum question, the provincial government is determined that if voters are asked to pay new taxes and fees for expanded transportation, then the vision they are paying to support and the benefits they will receive must be clearly articulated and understood.

I believe the Mayors' Council, which comprises the senior elected officials of the region, is best placed to develop and articulate a clear regional transportation vision, ensuring it balances the region's priorities, is affordable and supports the movement of people and goods.

Mayors have suggested the foundation for this vision exists within TransLink's long-range plan. I agree this plan is a start – but as noted, a clear, detailed, fully costed vision, with specific priorities and project phasing, is needed. This will frame the referendum question for the Mayors' Council and fully inform the public on the decision that is theirs to make.

Two further points with respect to new funding sources: first, if new funding sources are identified and proposed, they must be generated within the region, and not subsidized by taxpayers in the rest of the province. In addition, the provincial government will not permit new funding to be collected from the provincial transportation system situated in the region.

Second, the government recognizes that the timing and viability of major projects is dependent on senior government funding. The provincial government is prepared to commit funding one-third of major capital projects, provided funding is restricted to major new rapid transit capital and the replacement of the Pattullo Bridge, and that it fits within the provincial capital plan. Furthermore, we will work with local governments and advocate for matching contributions from the Government of Canada.

TransLink Governance

To support the Mayors' Council and TransLink in their development of a clear transportation vision, the provincial government will put forward legislation that significantly increases the ability of the Mayors' Council to establish TransLink's long-term strategies and to approve its plans and projects. The Mayors' Council will be granted approval powers over TransLink's 30-year strategy, as well as over a fully-funded rolling 10-year investment plan.

I accept the Mayors' Council's frustration with the current planning and review process involving base and supplemental plans. The provincial government proposes that the 10-year plan replace those plans, and be updated only when necessary – but not less than every three years. TransLink's board will be expected to prepare budgets, oversee operations and implement plans consistent with Mayors' Council approved strategies and plans.

To reinforce an enhanced policy role for the Mayors' Council, we also propose to consolidate the TransLink Commissioner's responsibilities into the Mayors' Council, including approval of fare adjustments, oversight of customer satisfaction and complaint processes and oversight of the sale of major assets.

Consistent with this expanded governance role, the Mayors' Council would, for example, also have a voice in establishing the remuneration of TransLink's board and executive. Recognizing that these new responsibilities and accountabilities will place greater demands on the Mayors' Council, we will ensure that the Mayors' Council has appropriate resources to support this expanded role.

With these added resources to support its efforts, and to strengthen the relationship between the Mayors' Council and the TransLink board, it is my hope that the Chair and Vice Chair of the Mayor's Council will assume the two positions currently available to the Mayor's Council on the TransLink board and thus fully participate in the board's deliberations moving forward.

It is our intention to introduce legislation in the next session of the Legislature to facilitate these TransLink governance improvements. We will also introduce legislation to facilitate the referendum process and clarify government's commitment to reimbursing local governments for the associated costs.

In conclusion, the Mayors' Council has asked for governance changes to strengthen its role in establishing TransLink's long-term strategy and plans. This letter outlines my government's commitment to acting on that request. In turn, I challenge the Mayors' Council to define a regional transportation vision with priorities and costs, to work with government as the Council considers funding sources and finalizes a referendum question, and to publicly advocate for the success of a referendum that will support the region's objectives for decades to come.

I look forward to discussing these commitments with the Mayor's Council at our next meeting on February 14, 2014.

Sincerely,

A handwritten signature in black ink, appearing to read 'Todd G. Stone', written in a cursive style.

Todd G. Stone
Minister

Copy to: Premier Christy Clark

APPENDIX E

Detailed Financial Tables for Vision Plan Investments

EXPANSION: Incremental Capital 2015-2024 (\$millions)

Unconstrained Partnership Funding

	Ten Year CAPEX	Partnership Contribution*	Net Capex
MRN-Roads & Bikes	528	-	528
TL Cycling & Walking	79	-	79
B Line Vehicles	88	(79)	9
B Line Infrastructure	209	(125)	84
sub-total B Line	297	(205)	92
Bus-Vehicles	197	(170)	26
Bus Infrastructure & Facilities	242	(143)	99
sub-total Bus	439	(314)	125
Existing Rail-Vehicles	534	(342)	191
Existing Rail Infrastructure & Facilities	478	(224)	254
sub-total Existing Rail	1,012	(566)	446
Rapid Transit-Millennium to Arbutus	2,279	(1,757)	522
Rapid Transit - Surrey LRT	1,915	(1,104)	811
sub-total New Rail	4,194	(2,862)	1,333
Patullo Bridge	892	-	892
Other	30	-	30
Total Capex	7,472	(3,946)	3,526

* Partnership contribution includes contributions from Gas Tax, Build Canada Fund programs and municipal contributions.

EXPANSION: Incremental Operating Impacts 2015-2024 (\$millions)

Transit Revenue increase	497
Real Estate Program	9
Increase in cumulative funded surplus	(143)
Remove the Gain on Sale of Oakridge	(150)
Operating Expenditure Increase	(1,583)
Debt Service Increase	(660)
Shortfall	(2,030)
Toll on Patullo Bridge	81
Provincial Subsidy on Patullo	89
New Revenue Source Requirement	(1,860)

Numbers may not add due to rounding.

FUNDED STATEMENT OF OPERATIONS - EXPANSION											
SCBCTA											
\$millions	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Transit Revenues	\$ 518.2	543.8	566.1	596.1	627.0	660.0	692.1	718.0	746.0	772.0	800.0
Toll Revenues	\$ 39.6	41.1	42.6	44.1	45.5	46.9	48.4	50.0	51.0	84.0	103.0
User Fees	\$ 557.8	584.9	608.7	640.2	672.6	707.0	740.4	767.0	798.0	856.0	903.0
Motor Fuel Tax	\$ 337.8	335.7	334.7	333.7	332.7	331.8	330.9	330.0	329.0	329.0	328.0
Property Tax	\$ 304.9	314.1	323.5	333.2	343.2	353.5	364.1	375.0	386.0	398.0	410.0
Parking Rights Tax	\$ 56.0	56.9	57.7	58.6	59.5	60.3	61.3	62.0	63.0	64.0	65.0
Other Taxes	\$ 37.7	38.0	38.4	38.7	39.1	39.4	39.7	40.0	40.0	41.0	41.0
New Revenue	\$ -	-	112.2	114.4	116.7	119.1	121.4	310.0	316.0	322.0	329.0
Taxation Revenues	\$ 736.4	744.7	866.5	878.7	891.2	904.1	917.5	1,117.0	1,135.0	1,153.0	1,172.0
Real Estate Revenues	\$ -	0.8	1.0	1.0	1.3	1.3	1.5	2.0	2.0	2.0	2.0
Partnership Funding	\$ 19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.0	19.0	73.0	55.0
Interest Revenue	\$ 2.6	2.9	5.1	7.2	7.3	6.3	4.7	7.0	12.0	15.0	15.0
Gain on Disposal	\$ -	-	-	-	-	-	-	-	-	-	-
Total Revenues	\$ 1,316.1	1,352.5	1,500.6	1,546.4	1,591.6	1,637.9	1,683.4	1,913.0	1,966.0	2,099.0	2,148.0
Roads, Bridges and Bicycles	\$ 46.9	47.3	48.6	50.2	51.7	53.3	54.9	56.0	58.0	60.0	61.0
Transit Operations	\$ 896.4	921.0	966.5	1,006.2	1,055.8	1,117.0	1,162.7	1,199.0	1,245.0	1,293.0	1,364.0
TransLink Corporate & Police	\$ 118.6	113.5	117.6	121.8	126.1	133.3	135.7	141.0	143.0	147.0	150.0
Operating Expenditures	\$ 1,061.9	1,081.9	1,132.7	1,178.1	1,233.6	1,303.7	1,353.3	1,396.0	1,446.0	1,499.0	1,574.0
Surplus Before Interest and Depreciation	\$ 254.2	270.6	367.9	368.3	358.0	334.2	330.1	517.0	520.0	600.0	574.0
Interest Expense	\$ 111.2	120.3	143.0	169.9	178.6	185.0	178.5	163.0	204.0	314.0	382.0
Capital Repayments	\$ 168.6	176.2	186.5	189.8	192.9	202.8	216.3	227.0	241.0	254.0	263.0
Surplus/(Deficit) before Other Items	\$ (25.7)	(25.9)	38.4	8.5	(13.5)	(53.5)	(64.8)	126.0	75.0	32.0	(72.0)
Provision for Contingency Fund Adjustment	\$ (14.8)	-	-	-	-	-	-	-	-	-	-
Provision for Contingency Efficiencies	\$ -	-	-	10.0	10.1	10.2	10.3	10.0	11.0	11.0	11.0
Funded Surplus/(Deficit)	\$ (40.5)	(25.9)	38.4	18.5	(3.4)	(43.3)	(54.5)	137.0	86.0	43.0	(61.0)
Opening Cumulative Funded Surplus	\$ 342.7	302.2	276.3	314.7	333.3	329.9	286.6	232.0	369.0	454.0	497.0
Cumulative Funded Surplus	\$ 302	\$ 276	\$ 315	\$ 333	\$ 330	\$ 287	\$ 232	\$ 369	\$ 454	\$ 497	\$ 436
Cumulative Surplus % of Expenditures before other items	23%	20%	22%	22%	21%	17%	13%	21%	24%	24%	20%

Capital Cash Flow Projects Approved and Proposed

EXPANSION

2015-2024

\$ Thousands				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total	
				1	2	3	4	5	6	7	8	9	10		
CAPITAL															
Projects Approved or Underway				320,733	35,395	-	-	-	-	-	-	-	-	-	356,128
Bus															
Bus	Equipment			2,395	1,835	2,590	1,942	1,590	1,082	887	-	-	773	13,094	
	Facilities			6,780	3,695	3,815	1,894	1,932	1,971	2,010	2,440	2,489	2,295	29,321	
	Infrastructure	Depot		-	-	-	-	-	25,339	25,845	61,512	62,742	-	175,439	
		Exchanges/Bus loops		7,527	14,445	51,281	37,618	39,416	25,508	26,018	26,525	32,314	32,456	293,107	
		TOH		7,371	4,357	5,491	3,139	7,177	4,505	6,318	8,787	2,988	-	50,132	
		Other		-	925	5,456	35,883	56,032	66,162	71,850	61,451	59,991	49,569	407,319	
	Vehicles	Conventional	Replace	64,117	90,303	92,902	62,112	13,053	-	-	-	87,645	50,358	460,489	
			Expansion	-	-	40,114	37,019	44,384	29,055	20,676	23,902	2,151	11,702	209,004	
		Community Shuttle	Replace	4,841	2,617	3,282	6,867	9,020	15,046	11,151	1,464	-	8,330	62,618	
			Expansion	-	-	3,566	3,637	3,710	2,973	2,205	1,968	1,434	1,463	20,956	
		Custom	Replace	9,432	6,512	5,389	8,219	6,686	12,664	11,372	8,334	7,811	6,222	82,640	
			Expansion	-	-	4,011	4,092	4,173	2,838	2,068	1,476	1,291	1,317	21,265	
		Seabus	Expansion	-	-	-	-	-	33,785	-	-	-	-	33,785	
		Non-Revenue		1,147	1,686	1,076	2,291	2,026	2,286	1,861	1,205	-	1,640	15,219	
Subtotal Bus				103,609	126,374	218,972	204,713	189,198	223,213	182,262	199,064	260,855	166,125	1,874,387	
Rail															
Rail	Equipment			11,761	15,213	9,546	1,948	2,749	1,520	724	2,590	-	1,629	47,679	
	Facilities			710	1,250	1,250	-	-	-	-	-	-	-	3,210	
	Infrastructure	Stations & surroundings	CL	-	1,248	-	5,412	-	-	-	15,466	15,536	21,942	59,604	
			E&M	1,092	10,109	67,067	92,904	30,993	34,269	41,441	29,592	23,433	-	330,899	
			SOGR	-	-	-	-	-	-	-	-	-	1,688	1,688	
			Other	19,218	11,230	1,180	1,629	1,303	1,695	1,355	2,204	1,410	-	41,224	
		Other	Expansion	-	-	-	145,769	487,384	664,951	853,072	806,112	791,909	445,015	4,194,213	
		SOGR		-	-	10,200	10,404	10,612	10,824	11,041	11,262	11,487	11,717	87,546	
		Other		3,662	5,335	2,000	5,935	3,122	11,581	8,615	4,687	8,300	29,342	82,579	
		Wayside Power Propulsion		-	690	-	2,366	3,620	-	-	819	-	970	8,466	
	Vehicles	Non-Revenue		725	175	92	140	202	438	315	245	-	258	2,590	
		SkyTrain	Expansion	-	-	89,141	-	105,992	60,813	-	161,689	-	76,797	494,432	
		Bi-level		-	-	-	22,190	-	-	17,230	-	-	-	39,420	
Subtotal Rail				37,168	45,250	180,477	288,697	645,976	786,091	933,793	1,034,665	852,076	589,358	5,393,550	
Corporate															
Corporate	Technology	Applications		9,210	11,229	8,793	11,655	21,739	8,703	8,281	11,126	10,983	16,784	118,502	
	Technology	Infrastructure		3,922	2,367	2,295	2,081	2,122	2,165	2,208	2,252	2,297	2,343	24,053	
	Technology	Other		726	1,021	-	-	-	-	-	-	-	-	1,747	
	Other			-	-	5,100	5,202	5,306	5,412	5,520	5,631	5,743	-	37,915	
	Vehicles	Non-Revenue		220	195	92	213	-	-	248	-	-	-	969	
Subtotal Corporate				14,078	14,812	16,280	19,151	29,167	16,280	16,258	19,009	19,023	19,127	183,185	
TL Roads & Bridges															
TL Roads & Bridges	Infrastructure	Bridges	Knight Street	1	-	-	-	-	-	-	-	-	-	1	
		Bridges	Pattullo	85,654	25,256	139,556	78,888	158,519	256,611	261,743	84,111	87,036	-	1,177,372	
		Bike and Walking Program		1,500	3,600	5,179	7,090	9,109	11,318	11,544	11,861	11,955	12,233	85,388	
Subtotal Roads & Bridges				87,156	28,856	144,735	85,978	167,627	267,928	273,287	95,972	98,991	12,233	1,262,761	
Capital Gross Cost				562,743	250,686	560,464	598,538	1,031,968	1,293,513	1,405,600	1,348,709	1,230,945	786,843	9,070,010	

Capital Cash Flow Projects Approved and Proposed

EXPANSION

2015-2024

\$ Thousands			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
CAPITAL INFRASTRUCTURE CONTRIBUTIONS													
Projects Approved or Underway			16,765	-	-	-	-	-	-	-	-	-	16,765
Major Road Network- Roads & Bridges													
Major Road Network- R Infrastructure	Roads	MRN Pavement Rehab	20,500	20,954	22,449	23,114	23,797	24,499	25,218	26,074	26,835	27,615	241,056
		MRN Structures Rehab	13,000	13,000	13,796	14,072	14,353	14,640	14,933	15,232	15,536	15,847	144,408
		MRNB	20,000	20,000	21,224	21,649	22,082	22,523	22,974	23,433	23,902	24,380	222,166
	Bike Program	Muni Owned	6,000	7,490	9,530	11,333	13,205	15,147	15,450	15,759	16,074	16,395	126,383
Subtotal Major Road Network - Roads & Bridges			59,500	61,444	66,998	70,168	73,437	76,809	78,575	80,498	82,347	84,237	734,012
Operating Subsidiaries and Contractors Minor Capital			-	-	-	-	-	-	-	-	-	-	-
Capital Infrastructure Contributions Gross Cost			76,265	61,444	66,998	70,168	73,437	76,809	78,575	80,498	82,347	84,237	750,778
Total Capital and Capital Infrastructure Contributions Gross Cost			639,008	312,130	627,462	668,706	1,105,405	1,370,322	1,484,175	1,429,207	1,313,293	871,081	9,820,788
Partnership Funding													
Federal	Build Canada Fund		(35,843)	(16,181)	(23,521)	(76,181)	(191,172)	(228,966)	(273,702)	(295,459)	(250,874)	(166,143)	(1,558,044)
Regional	Federal Gas Tax		(126,822)	(112,024)	(225,227)	(125,061)	(102,752)	(108,621)	(83,383)	(86,946)	(131,506)	(106,497)	(1,208,839)
Provincial			(13,503)	(10,388)	(32,727)	(80,227)	(193,292)	(245,189)	(278,671)	(319,963)	(267,622)	(167,679)	(1,609,261)
Other Regional	(Including Local Government)		-	-	-	(18,771)	(45,739)	(68,973)	(104,013)	(121,817)	(83,577)	-	(442,890)
Other			(502)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	-	(4,502)
Total Partnership Funding			(176,670)	(139,094)	(281,976)	(300,740)	(533,455)	(652,248)	(740,269)	(824,686)	(734,080)	(440,319)	(4,823,536)
Total Net Cost			462,338	173,036	345,487	367,966	571,950	718,073	743,905	604,521	579,213	430,762	4,997,252

Projected Borrowing Compared to Borrowing Limit and Select Financial Ratios - Expansion

<i>\$ Millions</i>	2014B	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F
Opening Gross Direct Borrowing - MFA	1,685	1,548	1,524	1,444	1,312	1,170	1,118	1,115	1,046	964	961
Opening Gross Direct Borrowing - Translink	988	1,277	1,702	1,841	2,150	2,479	3,013	3,659	4,381	4,963	5,495
Opening Gross Direct Borrowing	2,673	2,825	3,226	3,285	3,461	3,648	4,130	4,773	5,426	5,927	6,456
Retirements/Other	(146)	(52)	(114)	(169)	(181)	(90)	(75)	(91)	(105)	(50)	(90)
Borrowing in Yr - Capital	298	453	173	345	368	572	718	744	605	579	431
Closing Gross Direct Borrowing	2,825	3,226	3,285	3,461	3,648	4,130	4,773	5,426	5,927	6,456	6,797
Less: Sinking Fund - MFA	(619)	(685)	(696)	(649)	(583)	(594)	(653)	(649)	(629)	(684)	(677)
Less: Sinking Fund - Translink	(78)	(113)	(157)	(208)	(268)	(341)	(379)	(480)	(601)	(714)	(866)
Less: MFA Debt Reserve Funds	(35)	(36)	(35)	(33)	(30)	(28)	(29)	(27)	(25)	(26)	(24)
Closing Net Direct Borrowing	2,092	2,392	2,397	2,571	2,767	3,166	3,712	4,270	4,672	5,032	5,230
Deferred Concessionaire credits	596	572	549	526	502	479	456	432	409	386	363
Golden Ears Bridge contractor liability	1,051	1,051	1,049	1,046	1,040	1,033	1,024	1,013	1,000	983	965
Closing Net Borrowing	3,739	4,015	3,995	4,142	4,310	4,679	5,192	5,715	6,080	6,402	6,557

Established Borrowing Limit - Gross Direct Debt	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Amount over established limit	-	-	-	-	149	631	1,274	1,927	2,427	2,956	3,297
Net Debt / Operating Revenues <350%	285%	298%	267%	269%	272%	287%	310%	300%	312%	307%	308%
Gross Interest / Operating Revenues <20%	13.7%	14.0%	14.1%	15.5%	15.6%	15.5%	14.6%	12.0%	13.8%	18.2%	20.9%
Net Borrowing per capita <\$2,000*	1,082	1,175	1,143	1,131	1,152	1,219	1,303	1,389	1,483	1,590	1,636

**(excludes GEB contractor liability and Pattullo Bridge Net Direct Debt)*

APPENDIX F

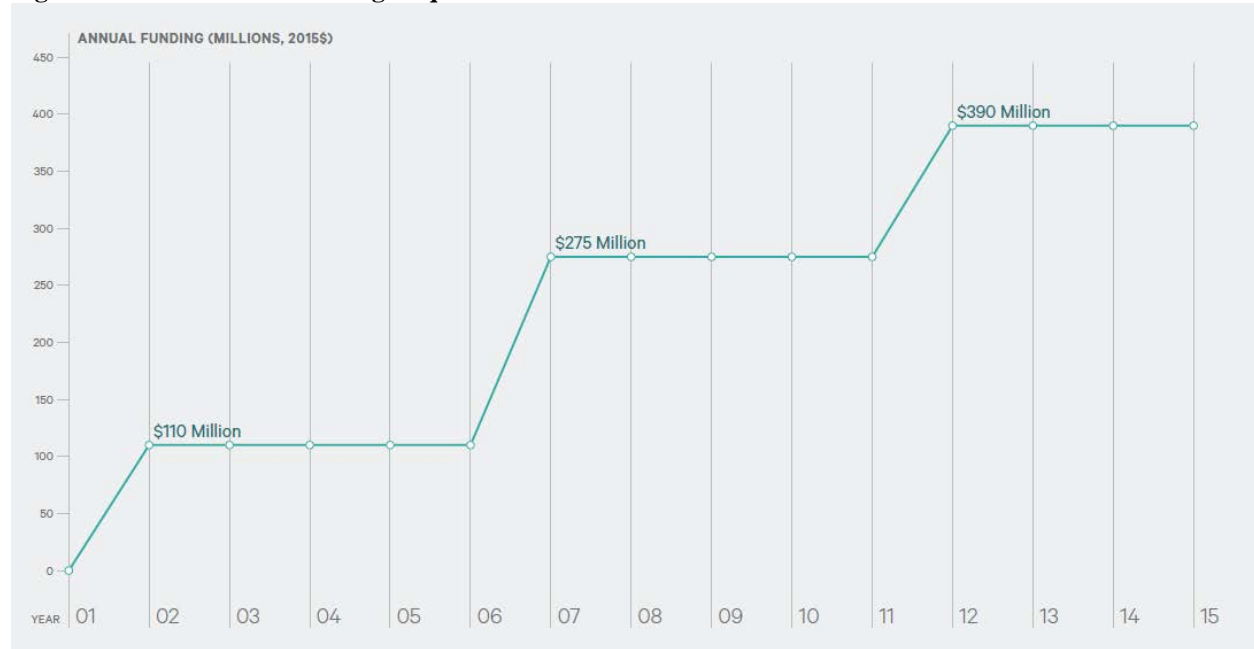
How to Fund

FUNDING FRAMEWORK

CONTEXT

It is often easier to agree on the type of transportation investments that are needed than to agree on the difficult decisions about how to pay for them. As outlined in this document, the Mayors' Council has worked hard to identify an investment package that is both urgently needed and affordable. The incremental funding requirements to fund this Vision are shown in Figure 1.

Figure 1 Incremental Funding Requirements



We have also identified workable funding options to pay for those improvements as described in this framework below. For the past 4 years, beginning in 2010 with the Memorandum of Understanding between the Province and the Mayors' Council on Regional Transportation, we have undertaken extensive technical and partnership work to explore possible funding solutions. In 2012, municipal, regional and Provincial representatives worked (through a Joint Technical Committee) to publish a report: *Evaluation of Revenue Sources to Support Transportation Improvements in Metro Vancouver*, which informed a motion passed by the Mayors' Council in January 2013 that identified the following five sources as appropriate for funding regional transportation:

- **Near-term and medium-term:** vehicle registration fee; carbon tax; regional sales tax; and, land value capture.
- **Long-term:** mobility pricing.

Further information on each of the five funding sources can be found at the end of this Appendix.

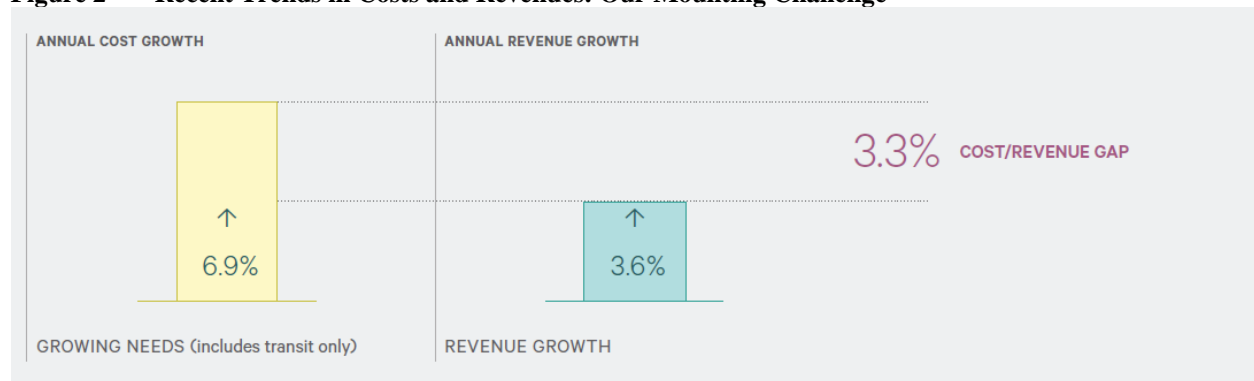
Regional transportation is currently funded by the revenue sources as defined in the *South Coast British Columbia Transportation Authority Act*, as well as senior government contributions for capital projects and vehicle procurement. However, the region faces a number of significant challenges that make it increasingly difficult to continue supporting sustainable transportation choices. In our letter to Hon. Minister Polak, dated January 31,

2013, we outlined our concerns with the sources of revenue currently available for TransLink. Building on this, we would particularly like to stress that:

- Property tax is a core funding source for TransLink but should be capped at current levels (maximum increase of 3% per year) as municipalities primarily rely on property tax to deliver services and maintain infrastructure. Municipalities must keep property tax levels at a rate that is acceptable to the public while continuing to meet their responsibilities.
- Fuel tax is not a sustainable long term revenue source. As a result of people driving less and the increased fuel efficiency of vehicles, fuel tax revenues are declining and are expected to continue this trend. It is also a volatile funding source which makes operating and capital planning more difficult.
- Transit fares are already high and there is not much room to increase them further before having significant negative impacts on ridership.

Combined with the constraints and challenges of existing funding sources, the region is continuing to grow which will increase demands for transportation investments and service. The result is that TransLink's existing revenues are currently growing at only half the trends for meeting the regional transportation needs and costs as shown in Figure 2 below:

Figure 2 Recent Trends in Costs and Revenues: Our Mounting Challenge



PRINCIPLES TO ASSESS A NEW FUNDING APPROACH

The work on finding a funding solution has been guided by principles established by the Mayors' Council and the Government of BC, both of which are included at the end of this Appendix. We have consolidated these principles into the following five to help guide the development and design of the funding portfolio:

1. Perform well against sets of criteria for funding for regional transportation established by both the Mayors' Council and the Province;
2. Be balanced between different sectors of the economy/society;
3. Grow in size over time to keep pace with growth;
4. Be relatively stable and resilient over time; and,
5. Support broader provincial, regional and partner policy objectives.

WORKING TOWARDS A PREFERRED FUNDING APPROACH

Over the past several years, a comprehensive list of potential funding sources has been developed and evaluated in conjunction with the Ministry of Transportation and Infrastructure. The revenue sources stem from a review of existing funding sources, past suggestions for alternative funding sources, a scan of leading practices in other jurisdictions, and consultation with and by the Mayors' Council. In addition, estimates of the revenue potential of the different funding sources have been conducted, as outlined in Table 1.

Table 1 – Rates for Individual Funding Sources¹

Annual Funding Generated	Existing Revenue Tools					New Revenue Tools			
	Property Tax ² (increment per average household, \$ / year)	Hydro Levy (increment above existing \$23 year assessment)	Transit Fares (% increment above 2% annual growth- 1 time increase)	Fuel Tax Increment above \$0.17 /litre (\$/litre)	Parking Sales Tax (Increment above current 2.1%)	Regional Sales Tax (%)	Carbon Tax ³ (\$/tonne)	Vehicle Reg. Fee (\$/year)	Mobility Pricing (Roads) (\$/VKT)
\$25M	\$19	\$28	10%	\$0.02	12%	0.07%	\$3-\$10	\$24	n/a
\$50M	\$37	\$53	20%	\$0.03	21%	0.13%	\$5-\$15	\$40	n/a
\$100M	\$73		40%	\$0.06		0.23%	\$10-\$25	\$74	\$0.01
\$200M	\$146			\$0.14		0.44%	\$15-\$25	\$142	\$0.02
\$250M	\$183			\$0.16		0.51%	\$20-\$25	\$173	\$0.02
\$350M	\$256					0.75%	\$20-\$25	\$260	\$0.03
\$500M	\$365					1.10%			\$0.04
\$600M						1.30%			\$0.05

*Rates for Land value capture mechanisms are not shown as the revenue potential varies significantly by type of land value capture mechanism and how it is applied. None of the land value capture mechanisms are capable of generating \$100 million/year.

The Mayors’ Council has evaluated a number of incremental funding portfolios to determine which approach we think best supports the delivery of the Vision and performs well against the established principles.⁴ The five incremental funding portfolios tested were as follows:

¹ The table includes blank spaces for some funding sources because it was determined that certain rates would either be not technically feasible and/or unlikely to gain broad acceptance.

² The Mayors’ Council does not support use of property tax as an additional source of funding for regional transportation beyond the 3% increase per year allowed in TransLink’s legislation.

³ The range for the carbon tax depends on several uncertain factors: the overall approach, the percentage of total revenue that is allocated to regional transportation, the schedule and increments by which the carbon tax is increased, and (for a Province-wide increment) the percentage of revenue that is returned to the Metro Vancouver region.

⁴ The funding portfolios assumed that only four of the five identified sources could offer enough funding capacity to support a large portion of the Vision. Land value capture is therefore treated as a supplementary source of revenue.

Near Term Potential Portfolios:

Portfolio 1 – 100% from a regional sales tax

Portfolio 2 – 50% from a vehicle registration fee, 40% carbon tax, 10% supplementary sources

Portfolio 3 – 60% from a regional sales tax, 25% vehicle registration fee, 15% supplementary sources

Portfolio 4 – 50% from mobility pricing, 40% carbon tax, 10% supplementary sources

Portfolio 5 – 50% mobility pricing, 40% regional sales tax, 10% supplementary sources

The assessment of the five portfolios concluded that the only single source capable of funding the entire amount is a regional sales tax which has less direct relationship to regional transportation. A mixed portfolio of funding sources is therefore recommended. The remaining portfolios all perform well with respect to the principles described above: in addition to supporting the criteria established by the Mayors' Council and the Province around affordability, fairness, transparency, and relationship to regional transportation, they are well balanced, they grow over time to keep pace with growth, and they are relatively stable and resilient over time. There was a large variation in the impact on the transportation system, with the combination of mobility pricing and carbon tax scoring highest which is one of the reasons the Mayors' Council prefers this option.

THE MAYORS' COUNCIL PREFERRED FUNDING APPROACH

Near Term

The incremental funding need in the short to medium-term is \$110 million/year beginning in 2016, rising to \$275 million/year in 2021. Of the five candidate funding sources identified, only three are able to be implemented in the near- to medium-term and are able to generate revenues in excess of \$100 million/year: a carbon tax, regional sales tax, and vehicle registration fee. Region-wide road usage charges would not be available until later in the plan period, while land value capture can only generate a modest amount of money, and so should be seen as a source of supplemental funding only.

As we have outlined in the Vision, our preferred approach in the near to mid-term is to allocate carbon tax revenues currently collected from the region towards transportation investment. This approach better supports the original policy objective of the BC Carbon Tax to reduce greenhouse gas emissions by 33% by 2020 (over 2007 levels) than the current revenue neutral approach.. It further improves the performance of the Carbon Tax compared to today by using the revenues already collected to support travel behaviour change and reduced travel by single occupancy vehicle. The preferred approach would create a clear linkage between the tax and regional transportation investments which have been shown to reduce emissions by providing more alternatives to the private automobile. The Carbon Tax is relatively easy to administer since the collection mechanisms are already in place. Finally, BC's Carbon Tax is a well-supported policy by the public with at least half of the population in support of it based on recent polling.⁵

The reallocation of the BC Carbon Tax is our preference because it improves the performance of a policy already in place. If the Government of BC rejects this approach we would then discuss alternative reforms to the BC Carbon Tax including increases above the existing rate (currently at \$30/tonne since 2012) with this new increment directed back to a dedicated fund for use by regions across the Province. In Metro Vancouver, we would use these funds for regional transportation investment. If the increase is implemented Province-wide, we assume that the Provincial government would work with the Union of BC Municipalities, regional districts, and individual

⁵ *Focus Canada 2013 – Public Opinion on BC Carbon Tax* (The Environics Institute, 2013)

municipalities to determine how best to allocate additional revenues to fund investments of their choice in their jurisdictions.

We believe that **Land Value Capture mechanisms** should be used to generate revenue for regional transportation in Metro Vancouver and are an important element of both a near-term and long-term funding portfolio. Land Value Capture mechanisms can help offset the costs of major transit infrastructure. As noted, these could be used as a source of funding for local financial contributions as discussed in the Partner section. Some of these mechanisms could also be applied more uniformly across the region. These mechanisms function by capturing a portion of the increased land value derived from improved accessibility to new, high-value transit infrastructure. Although it doesn't have the revenue potential of other sources, it could allow municipalities or TransLink to recapture some of the benefit that accrues to land developers and/or property owners and to use that revenue to support new regional transportation infrastructure. Legislative changes may be needed to apply some of these mechanisms.

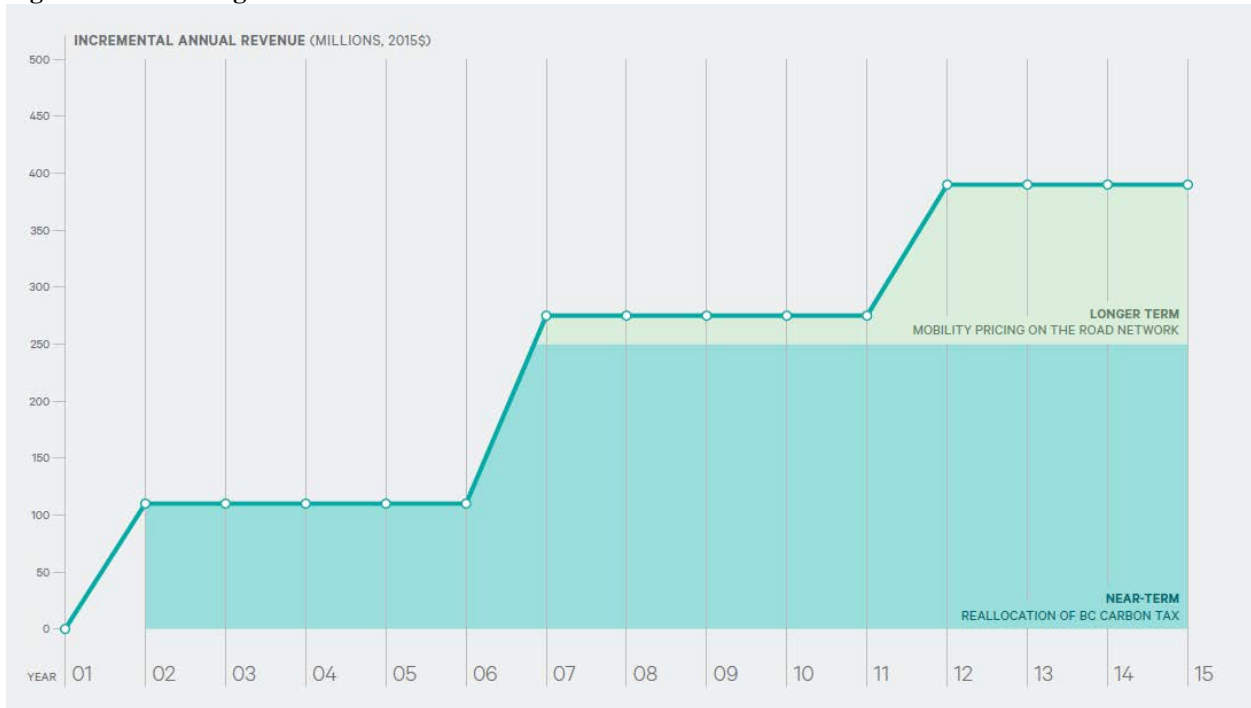
Long-term

The incremental funding need in the medium-term is \$275 million/year beginning in 2021 with that rising to \$390 million/year in 2026. In the long-term, the Mayors' Council has been consistent in identifying system-wide mobility pricing as having the greatest potential to achieve our shared vision for the region. Currently there is only a vague policy connection between what people drive, how far, when they go, and what the cost is. We cannot build our way out of congestion and, as a region, we must instead set pricing levels to improve the efficiency and fairness of the transportation system, while also raising revenue from users across the road and transit networks.

As a funding source, mobility pricing offers the possibility of reducing, eliminating, or optimizing other taxes, in particular existing auto-based prices. For example, recent work in the US is looking at implementing a road usage charge as a replacement for the fuel tax. This is important for aligning policy objectives and also gaining public acceptability. Further information on a proposed tax shift is included at the end of this Appendix. There is no short path toward a mobility pricing system and while we can learn lessons from other regions, a future mobility pricing system must account for this region's unique economic, geographic, and social profile. We therefore support the establishment of a steering group to lead a Mobility Pricing Field Study in order to begin the necessary technical and communications work. This will be an inclusive process involving key stakeholders with an interest in the regional transportation system.

The level of funding required by TransLink by the middle of the next decade (2026) is approximately \$390 million per annum. This level would be reduced by local financial contributions as determined through local partnership agreements, but are still to be negotiated and the amount is not known at this time. Our preferred funding approach would generate, by the end of the Vision period, approximately \$500 million, with approximately \$250 million being generated from the carbon tax reallocation and approximately \$250 million generated from mobility pricing on the road system. This translates into a mobility pricing rate of approximately two cents per km applied to all vehicular travel in the region. This portfolio allows for at least \$110million of the new revenue source to be used to reduce the fuel sales tax by approximately 6 cents per litre (and reduced further depending on the amount of local financial contributions received). This tax shift will help to align policy objectives, in particular the benefits of system management, and overcome the structural deficiencies of the declining fuel tax. This level of tax shift is only illustrative and further work will be required on funding requirements and driver behaviour in order to legislate for tax changes.

Figure 3 Funding Need and Sources



NEXT STEPS

The Funding Framework outlined here responds to the request by the Minister of Transportation and Infrastructure to identify and propose how the Vision could be funded. The Framework draws on considerable technical work undertaken in the last four years in a collaborative manner between the Mayors’ Council, the Province, TransLink, and partners.

While the existing sources of revenue to fund regional transportation are largely at their limits, there are four major new revenue tools that have sufficient capacity to deliver on the investments outlined in this Vision: carbon tax, vehicle registration fee, regional sales tax, and mobility pricing. Each of these major revenue tools, along with smaller supporting revenue tools, such as land value capture, could be combined in various ways to produce a funding portfolio that meets the needs of this region. We have outlined our preference and would like to use this as a starting point for discussions with the Government of BC and the general public in anticipation of the planned referendum.

The Mayors’ Council are confident that this Funding Framework significantly advances the discussion on how new funding sources can support the delivery of this Vision. We look forward to working with the Government of BC and partners to establish a fair, reasonable and efficient funding solution that can meet our common goal of safeguarding our economy, invigorating our quality of life and protecting our health and environment.

MAYORS' COUNCIL GUIDING PRINCIPLES FOR FUNDING REGIONAL TRANSPORTATION

1. System expansion should not occur at the expense of maintaining existing or future system performance and the ongoing state of good repair of infrastructure.
2. Transportation projects will undergo a rigorous alternatives review including full life cycle cost analysis prior to approval.
3. Capital projects expanding or improving the network will be evaluated on impact to the overall network's ability to move goods and people and support land use objectives.
4. Revenue sources should provide pricing signals to link desired user behaviour to overall transportation objectives.
5. Funding should be generated from the goods movement sector to offset costs attributed to the transportation of goods throughout Metro Vancouver, recognizing its role as a gateway to the Province and the nation.
6. Collectively, funding sources should be reliable and predictable, but adjustable against each other as revenue levels change over time.
7. Funding options should be economically efficient in their administration and collection.
8. Transit fare rates should be sensitive to public affordability.
9. Historically, property taxes have been a foundational funding source that reflect the broad benefits of the transportation system but should not increase.
10. As newer more effective revenue sources are introduced, reductions should be considered for funding sources that make the funding mix inconsistent with the principles stated herein.
11. As the Metro Vancouver Region is a key conduit within the provincial and national goods movement strategy, senior levels of government should provide continuing funding to support the transportation needs of the region and the country.
12. Collaboration should exist between TransLink, the Province and Metro Vancouver to ensure alignment with the Regional Growth Strategy and the stated outcomes of regional transportation funding and investment.
13. Funding sources chosen should support sound environmental policy, including legislated reduction of greenhouse gases, and manage demand efficiently.

Approved by resolution of the Mayors' Council on Regional Transportation on May 3rd, 2011.

GOVERNMENT OF BRITISH COLUMBIA PRINCIPLES FOR FUNDING REGIONAL TRANSPORTATION

The Government of British Columbia has specified that new transportation funding mechanisms should take into account the following considerations:

- Affordability for families;
- Avoiding potential negative effects on the provincial economy;
- Having regional sourcing; and
- Ability for TransLink to share in the local benefit arising from transit investment.

Taken from the letter dated January 8, 2013 to the Mayors' Council from Minister Polak.

Overview of Preferred Revenue Tools

Vehicle Registration Fee

An annual fee would be applied to all motor vehicles in Metro Vancouver. This fee recognizes that all vehicles impose a cost on the transportation system and the environment regardless of when, how, and where they are operated. The fee could either be a flat fee or structured as a variable rate depending on either emissions or distance driven.

Flat Fee

The simplest structure is a flat rate, whereby all types and sizes of vehicle are assessed the same fee (or varied by class of vehicle). Examples in Canada include Montreal where residents pay \$75 annually to register their vehicle, with \$45 of this being directed to public transit. Also, the City of Toronto's Personal Vehicle Tax (\$60/yr), which was repealed in January 2011, is another example of a flat fee to fund transportation.

Variable by Emissions

Another option is a rate structure that varies by vehicle emissions standards. This type of rate structure delivers a pricing signal to encourage the purchase of low polluting, more efficient vehicles in support of environmental goals. In the UK and Ireland, the annual vehicle fee is based on vehicle CO₂e emissions. Rates in the U.K. range from \$0 for low emissions vehicles to \$727 for higher polluting cars. Meanwhile, rates in Ireland range from \$230 to \$3,179, and vehicles with no CO₂e emissions pay \$162 annually.

Variable by Distance Driven

A final option is a rate structure that varies by distance driven. This would involve manual odometer readings (either self-reported or undertaken as part of annual vehicle inspections) or reporting via on-board units (plug-in), smartphones, or vehicle telematics. Periodic audits would be required to aid enforcement. This is not a location-based system so cannot accurately isolate only travel undertaken in Metro Vancouver. Drivers may therefore be required to demonstrate (through receipts or other mechanisms) how much out of region travel should be discounted from the total odometer distance. The fee could also be integrated with a vehicle insurance rate that is varied by distance driven.

Future Role in Metro Vancouver

Under TransLink's legislation it has the authority to assess a charge on vehicles. A proposal to establish a vehicle registration fee was approved in 1999 by both the TransLink and Metro Vancouver Boards, but was never

implemented. TransLink requires Provincial support in order to implement an efficient and effective collection mechanism for this fee.

Revenue Potential

With approximately 1.3 million vehicles currently registered in the Lower Mainland, a vehicle registration fee could generate significant revenue depending on the rate at which the fee is set. For example, a flat registration fee of \$38 per vehicle could generate \$50 million annually, whereas a registration fee of \$72 per vehicle could raise approximately \$100 million annually.

Issues for Further Consideration

While TransLink has the authority to implement a vehicle registration fee, it does not have adequate administrative capacity to collect and enforce it. This role could potentially be performed by ICBC, but this arrangement has not been established.

Summary of Key Points from the Technical Evaluation

Higher Scoring Areas

- **Legislative authority** is in place for TransLink to implement a vehicle fee, although amendments may be required to support cost-efficient collection
- **Revenue potential** can be substantial, depending on the rate charged
- **Stable and predictable** source of funding, as the numbers of vehicles have been growing steadily over the past decade
- **Administratively easy and cost effective** relative to other funding sources, if supported by the Province and ICBC
- **Near-term potential** to meet funding needs
- **Transportation related**, so there is a clear link between those who pay it and the transportation improvements it funds

Lower Scoring Areas

- **Travel demand management** goals are not supported if vehicles are charged the same amount regardless of how much they are used
- **Fuel efficient vehicles** are not incentivized if all vehicles, regardless of size or fuel economy, are charged the same amount
- **Administrative agreement** is required with ICBC to implement efficient collection tapping into ICBC's network of brokers and annual vehicle registration process and to enforce payment

Regional Sales Tax

A regional sales tax would apply to the consumption of goods and services in the Metro Vancouver region, with revenues dedicated to funding transportation. Such a tax would be an increment in addition to GST and PST. The regional transportation network benefits all residents, businesses and visitors, and a sales tax measure would generate revenue across this broad base of beneficiaries. Sales taxes are sometimes instituted for a fixed period of time to support a set of priority investments.

Examples from Peer Agencies

In the United States, numerous cities and regions have instituted sales tax measures with revenues dedicated to transportation. Direct voter approval is usually required to implement such taxes in the U.S.

In the Seattle/Puget Sound region, a 0.9% sales tax serves as the single largest revenue source for the Sound Transit District. The region's transportation sales tax was increased from 0.4% to 0.9% in 2008 to support rapid transit investment. Similarly, in the Denver region, a total of 1.0% in transportation sales tax provides approximately \$400 million in annual funding. The first 0.6% is dedicated to fund base operations of the Regional Transit District; in 2004 voters approved an additional 0.4% percent tax to fund a transit expansion program.

Transportation sales taxes are particularly common in California. In the San Francisco Bay Area, seven of nine counties levy modest transportation sales taxes. Within the City and County of San Francisco, a 0.5% sales tax program generates more than \$70 million annually to fund an expenditure plan across all transportation modes. An additional 0.5% sales tax is collected in the three counties of the Bay Area Rapid Transit (BART) District, providing close to \$200 million per year to support transit operations.

Future Role in Metro Vancouver

A regional sales tax is not currently identified as a revenue measure available to TransLink under its legislation. Provincial action would be required to authorize a transportation sales tax measure in the region.

Revenue Potential

A regional sales tax for transportation in Metro Vancouver could generate significant revenue at a relatively low rate of assessment. Preliminary projections estimate that each 0.1% increment of sales tax would yield approximately \$50 million in

annual revenue (although there is some elasticity impact). A 0.25% regional sales tax would generate \$125 million/year while a 0.5% regional sales tax would generate almost \$250 million/year for regional transportation. Development of more precise revenue estimates would require further analysis and a refined definition of the structure of a potential tax measure (such as rate and any exemptions).

Issues for Further Consideration

Additional investigation of a potential regional sales tax would entail analysis of policy tradeoffs, development of funding priorities, and assessment of approval and administrative requirements. A regional sales tax should be considered in comparison to other revenue measures with a stronger user-pay component. More detailed policy analysis would be warranted to evaluate equity considerations and potential leakage of retail sales to locations outside of the region.

Most sales taxes identify a specific program of transportation investments, and the use of potential revenue should support improvements across modes and deliver benefits region-wide. In addition to identifying funding priorities, policy development would address the requirements for approving a new sales tax and for establishing processes for collection and allocation of revenues.

Summary of Key Points from the Technical Evaluation

Higher Scoring Areas

- **Revenue potential** is significant as a small tax rate is assessed across a broad base
- **Reliability** is relatively predictable, although revenue would vary with economic fluctuations
- **Administration** of the tax is straightforward and associated costs are minimal

Lower Scoring Areas

- **Link to transportation users** is not present and sales tax does not reduce automobile demand
- **Economic leakage** is a concern, if higher tax rates shifted purchases outside of the region

Carbon Tax

The rationale for earmarking carbon tax revenues to transportation is that approximately 36% of BC's greenhouse gas (GHG) emissions come from transportation, of which automobiles and light trucks are the largest sources. In Metro Vancouver, transportation's share of regional GHGs is even higher, at 45%. Given this, raising revenue from a carbon tax and using it to invest in transit, cycling, and walking can contribute to reducing GHG emissions by discouraging use of carbon-based fuels for transportation and expanding sustainable choices.

Current Role

The BC Carbon Tax rate was set in July 2008 at \$10/tonne CO₂e⁶ and reached \$30/tonne in 2012 where it has remained. The tax is currently required by legislation to be revenue neutral. All revenue collected is returned in the form of reductions in personal and corporate taxes, plus low-income tax credits. In Fiscal Year 2012/2013, the Province collected and redistributed \$1.1 billion through the BC Carbon Tax.

Future Role in Metro Vancouver

There are three approaches to using carbon tax revenues to fund transportation investments:

Approach 1: Reallocate some or all of the existing BC Carbon Tax back to the region from where it was collected. Some of the provincial revenues which are generated could be directed to the regions and a portion used for regional transportation in Metro Vancouver.

Approach 2: Allocate the incremental increase in future BC Carbon Tax revenues back to the region from where it was collected. A share of any new incremental revenues from the BC Carbon Tax could be directed to the Metro Vancouver region and a portion of that regional revenue used for regional transportation.

Approach 3: Implementation of a new Regional Carbon Tax (similar in scope to BC Carbon Tax, but levied only within Metro Vancouver and on top of the BC Carbon Tax) - A regional carbon tax could be implemented with all or a portion of the revenue being used for regional transportation in Metro Vancouver.

Revenue Generation Potential

The revenue potential varies considerably by approach and by assumptions. The following is the revenue potential assuming \$10 and \$20/tonne respectively would be allocated for regional transportation:

- Under approach #1, the maximum revenue potential is between \$190M and \$380M/year⁷
- Under approach #2, the maximum revenue potential is between \$150M and \$250M/year⁶
- Under approach #3, the maximum revenue potential is between \$71M and \$115M/year

Issues for Further Consideration

The BC Government indicated in 2013 that existing carbon tax rates will be frozen until 2018. Approach #1 and #2 are most feasibly applied on a Province-wide basis. Under approach #1, lost revenue would need to be made up from other provincial revenue sources. Under approach #2 and #3, this may create a) leakages and b) potential competitive disadvantage with neighbouring jurisdictions. However, California already has a cap and trade system and Washington and Oregon State are considering a carbon tax, which would create a more level playing field.

Summary of Key Points from the Technical Evaluation

Higher Scoring Areas

- **Fairly reliable** revenue source due to a large and relatively broad base, at least in midterm
- **Administration** of any of the approaches might be relatively easy, since a Provincial carbon tax collection system is already in place
- **Price signals** provided to encourage purchase and use of fuel-efficient vehicles, decrease amounts of driving and foster walking, cycling and transit

Lower Scoring Areas

- **New Policy direction** is necessary to use the BC Carbon Tax as a funding source, departing from the revenue neutral basis of the current carbon tax, or to implement a new regional carbon tax
- **Equity** concerns may arise since the current tax applies to all carbon emissions, not just transportation-related emissions
- **Long term revenue** could decline over time without increases in the tax rate, with improved energy efficiency
- **Competitiveness and Leakage** issues could arise, with higher provincial carbon tax or a new regional carbon tax encouraging the shift of economic activity outside the province or the region

⁶ CO₂e stands for carbon dioxide equivalent which is a measure of GHG emissions taking into account other gases.

⁷ Maximum based on 50% of provincial revenues transferred to Metro Vancouver region (roughly per capita). If Metro Vancouver region's share of provincial revenues is based on emissions, then the revenues from Approach #2 would be similar to that of Approach #3.

Land Value Capture

Land Value Capture for regional transportation refers to a range of funding mechanisms by which a portion of the increased land value derived from improved accessibility or other benefit is captured by the public sector and reinvested in the transportation system. There are three broad categories of land value capture mechanisms.

From Transportation Agency real estate activities

TransLink could increase its revenues by greater direct participation in urban development opportunities associated with transportation infrastructure, including:

- Using air rights over transit infrastructure (noting TransLink's rights are limited)
- Acquiring additional lands, when acquiring land for regional transport infrastructure, and developing these lands
- Designing station facilities to maximize the potential for retail and service uses, and/or
- Joint development whereby the agency partners with another agency or private developer to develop property that it owns

From taxes on property

Under this category, all properties contribute property taxes annually for regional transportation within the defined taxation area for a defined period of time (or on-going). This includes:

- General property tax (portion used for regional transportation)
- Special assessment district (or benefitting area tax)
- Tax increment financing

From charges applied to new development

These are one-time charges or contributions from new urban development projects and include:

- Development fees
- Zoning-based amenity contributions (density bonusing and community amenity contributions)
- Cash-in-lieu of reduced off-street parking

Where has Land Value Capture been used?

Land Value Capture has been used to fund transportation in Canada, the U.S. and abroad. In Metro Vancouver, there is already some use of Land Value Capture to fund specific regional transport infrastructure (e.g. Capstan Way and Lincoln stations). In addition, general property tax is a major funding source for TransLink.

Future Role in Metro Vancouver

The availability of various Land Value Capture tools depends on the B.C. legislative context. After property tax, the main tool that is currently available to TransLink without legislative change is a benefitting area tax whereby the authority can adopt a higher tax rate for areas in proximity to regional transportation infrastructure.

There are also other tools that are available to TransLink without legislative changes but require close cooperation and revenue sharing with municipalities. These include the tools of density bonusing, community amenity contributions, cash-in-lieu of reduced off-street parking requirements and the road-portion of development cost charges/levies.

Legislative change would be required for the use of development cost charges/levies for rapid transit infrastructure, tax increment financing as well as providing broader real estate powers to TransLink.

Revenue Potential

Special Assessment Districts, Tax Increment Financing and Development Cost Charges/Levies have the potential to generate funds in the tens of millions per year. Density bonusing, community amenity contributions and cash-in-lieu of reduced off street parking each have potential for generating up to \$10 million per year annually for regional transportation (rough estimate).

Issues for Further Consideration

Consultation with municipalities, the development community and the Provincial Government is required to determine the most appropriate and acceptable types of land value capture mechanism(s).

Summary of Key Points from the Technical Evaluation (varies by mechanism)

Higher Scoring Areas

- **Administration** should be facilitated as existing Land Value Capture collection systems are already in place by most municipalities, although these systems would need to be modified

Lower Scoring Areas

- **Revenue potential** is higher for property-tax based mechanisms as they have a wider base but do not generate as much revenue as other large potential funding sources.

Mobility Pricing (Roads)

Mobility pricing is a general term to describe greater use of user fees in the transportation system. It is particularly applicable to the road and transit networks. When applied to the road network it can take a variety of forms, but in general it involves charging for the use of specific facilities (e.g. roads or bridges) or for driving within a defined network, facility/corridor, or zone. Charges may vary based on distance travelled, type of facility, time of day, levels of congestion, vehicle weight, or vehicle emissions. Mobility pricing can be applied to new or existing facilities. In addition to the revenue objective, mobility pricing typically seeks to manage congestion, reduce VKT, and shift some trips to more sustainable modes.

Tolls

One form of mobility pricing is to place tolls on identified road links within the regional road network. A charge is levied for passing the toll point. This form of mobility pricing is already in place in the region on the Golden Ears Bridge and the Port Mann Bridge. Charges can be varied based on time or location of a given trip and type of vehicle. Vehicles can be equipped with on-board transponders to facilitate open-road tolling.

Road Usage Charge

An alternative form of mobility pricing is a charge assessed across the entire road network based on measured usage. The continued growth and adoption of vehicle telematics (which use wireless communication) is reducing the barriers to a direct charge based on road usage. Telematics are already used for fleet management, to aid navigation, and provide additional services. A road usage charge system could therefore be a marginal cost layered on top of existing systems rather than a standalone in-car system.

Examples from Peer Agencies

Existing examples of mobility pricing make use of tolls, either on a single facility (e.g. SR520 bridge in Seattle) or as part of a cordon around the central city (e.g. London, Stockholm). The cordon-based approach has been successful in reducing congestion and generating revenue to support transport investment. Current research and associated pilot projects are largely focused on system-wide pricing. The only operational full network charge is for heavy goods vehicles in Central and Eastern Europe. The State of Oregon has passed initial legislation to authorize a voluntary road usage charge and other US States are exploring the concept as a replacement for the gas tax.

Future Role in Metro Vancouver

TransLink's legislation allows tolls only to be charged to recover all or part of the cost to provide "designated projects", "major crossings", or "improvements to the major road network". The Provincial tolling policy requires a reasonable untolled alternative to be in place. New legislation would therefore be required to allow for a comprehensive tolling system or a road usage charge.

Revenue Potential

Tolls placed on the major regional water crossings could generate \$150-\$200 million at a \$2 toll and \$400-\$50 million at a \$3 toll. A road usage charge has the potential to generate substantial revenues, though implementation and operational costs could be significant. With a charge of \$0.02 to \$0.05 per km, gross annual revenue would be between \$250 million and \$625 million.

Issues for Further Consideration

TransLink must work with regional and Provincial partners to consider all mobility pricing options. Key issues include pricing structure, revenue potential and distribution, the privacy of customer information, and key outcomes such as economic and equity effects. The relationship to other revenue sources linked to vehicle operating costs, such as fuel taxes, would need to be considered.

Summary of Key Points from the Technical Evaluation

Higher Scoring Areas

- **User pay** relationship is strong due to charging based on road usage
- **Revenue potential** is substantial and not as subject to declining trends associated with fuel taxes
- **Congestion reduction** benefits could be realized via incentives for reducing peak-period auto travel

Lower Scoring Areas

- **Technology** and support systems are still in development, leading to uncertainties
- **Coordination** with the Province is required as pricing would impact use of transportation facilities for which they are responsible, including the tolled Port Mann Bridge
- **Fuel efficient vehicles** are not incentivized unless discounts are offered by vehicle type
- **Equity** considerations and effects on lower income drivers should be addressed

TAX SHIFT – FROM FUEL SALES TAX TO MOBILITY PRICING

CONTEXT

As a funding source, mobility pricing offers the possibility of reducing, eliminating, or optimizing other taxes, in particular existing charges related to automobile ownership and use. Fuel sales tax has a number of major challenges that challenge its viability as a long-term transportation funding source. These challenges can be summarized as:

- Vehicle efficiency is improving as a result of technical advances and government regulations in this area. Average fuel efficiency is now 11.4 L/100 km compared to 11.9 L/100 km in the early 2000s. New national fuel economy regulations for light-duty vehicles are expected to increase average fuel efficiency further in the next 15 years. The result is that less fuel is required to operate a vehicle, with the side effect being a reduction in fuel sale volumes and the associated tax revenues. While an increase in the fuel economy has benefits for the environment, these vehicles still contribute to road wear and tear as well as congestion, yet their tax contribution through fuel sales is lower.
- Metro Vancouver experiences leakage from drivers purchasing fuel outside of the region (other parts of BC or the US) where the market price of fuel is lower due to the regional transportation tax (17 cents per litre) not being in place.⁸ This creates a mismatch between the transportation infrastructure that is used and required (within Metro Vancouver), and where the taxes are being collected (outside Metro Vancouver).
- Though overall Vehicle Kilometres Travelled (VKT) is growing in the region, this is as a result of a growth in vehicles. The average VKT per vehicle is declining, resulting in the associated drops in fuel consumption. It is uncertain

⁸ The extent of fuel sale leakage in any given time period is difficult to predict because it is strongly influenced by the Canada/US exchange rate.

whether this trend will continue but it does represent a major challenge for the level of revenue collected.

In addition to the above challenges, fuel sales tax is not an efficient TDM policy compared to mobility pricing. While placing the tax on fuel does link payments to distance driven, the price signal is not immediate for every trip (i.e. the price is often ignored once the tank is filled) and the price cannot vary by time of travel or location of the travel. Taken together, these revenue and policy challenges require us to consider how auto-based prices can be restructured. The introduction of mobility pricing on the road network, as outlined in the Vision, provides the opportunity to consider this further.

LESSONS FROM ELSEWHERE

A large number of jurisdictions that rely on fuel sales tax for funding all or part of their transportation system are working on strategies to transition to a new funding solution. In the US fuel tax revenues are used to fund roadways at the Federal and State levels through the Highway Trust Fund. At a time of expanding needs and increasing costs, fuel taxes are inadequate to meet the needs. This is compounded by fuel tax rates not keeping pace with inflation. As of April 2014 there are concerns that the Highway Trust Fund will be insolvent by September 2014.

The greatest innovation can be found at the State level where a number of studies and pilot programs are exploring a road usage charge to supplement or replace fuel taxes. The most advanced of these is in the State of Oregon where initial legislation has been passed to authorize a voluntary road usage charge as a replacement for the fuel tax. The charge is approximately 1 cent per km in lieu of the tax placed on fuel at the pump.

A similar policy conversation is taking place in the UK and Australia where road usage charges are being considered as a viable alternative to fuel taxes. The conversation also includes shifting from fixed taxation, such as vehicle ownership and registration fees, to a fee based on distance driven.

REFORMING FUEL SALES TAX IN METRO VANCOUVER

The fuel sales tax currently collected by TransLink is at a rate of \$0.17/litre and generated approximately \$335million in 2013. The introduction of mobility pricing

on the road network represents an opportunity to shift tax away from fuel sales and towards a charge based on distance driven. In addition to the \$0.17/litre that TransLink collects, fuel sales are also subject to Provincial and Federal taxes. These taxes face the same challenges and the long-term move to mobility pricing must also consider how a shift will occur to ensure other levels of government collect sufficient revenue to meet their objectives.

Initial analysis on the impact of a mobility pricing system on the fuel sales tax, at the rates described in the Vision and the Funding Framework, suggests that if \$110m of revenue can be used annually towards reducing the fuel sales tax from the period when mobility pricing is introduced, approximately 6 cents can be taken off the fuel sales tax. This would result in a reduction to the portion collected by Translink from \$0.17/litre to \$0.11/litre.

The amount of tax shifting that can occur depends on the rate charged under mobility pricing and other auto-based prices, and the overall annual funding goal.

CONCLUSION

From a revenue and policy perspective, a tax shift from fuel sales tax to mobility pricing is desirable. This can overcome the declining revenues associated with fuel tax and meet broader objectives of managing demand, in particular congestion, on the road network. Alternative systems of distance-based pricing are also now increasingly feasible and can support the transition to a mobility pricing system. Initial estimates demonstrate that a mobility pricing rate of \$0.02/km could offer the opportunity to decrease the fuel tax by 6 cents (with no change in overall revenue). As there is a direct link between mobility pricing and the amount of vehicle kilometres driven (and fuel consumed), further detailed work would be required to analyze this relationship in the context of reforming fuel tax rates.