



## 4. The Case for The Evergreen Line

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## The Case for The Evergreen Line

### Introduction

This section provides further details of the case for the Evergreen Line. The case is presented under the five main design principles that have been established for the project.

### Design Principles

#### Goal of the Evergreen Line

To increase transportation choice in the Northeast Sector and the region while providing significant economic, environmental, and social benefits.

#### Principles – Transportation

Use the Evergreen Line as the basis for developing a transportation network by:

- Increasing choice and supporting reduction in auto use;
- Ensuring speed, capacity, and reliability of the system;
- Integrating travel modes; and
- Increasing the overall capacity of the corridor.

#### Principles - Urban Development

Use the Evergreen Line to support the creation of complete communities and a compact region by:

- Supporting existing development; and
- Contributing to “city-shaping” by stimulating future concentrated and mixed use development.

#### Principles - People

Use the Evergreen Line to support the creation of identifiable and vibrant communities by:

- Creating a fully accessible system with station areas as community focal points; and
- Providing a pleasant pedestrian realm along the line.

#### Principles - Economics

Create a cost effective LRT system that contributes to the economic vitality of the community by:

- Ensuring cost efficient construction & operation; and
- Supporting a good business environment.

#### Principles - Environment

- Design the Evergreen Line to support environmental sustainability; and
- Ensure integrated design meets wide environmental objectives.



Portland, Oregon



## Transportation

The Evergreen Line is an essential link in an Integrated Transportation Network.

The Evergreen Line will extend the coverage of Greater Vancouver's transit network to cover the Northeast Sector of the region. This investment will realize a series of transportation benefits:

- The Evergreen Line will extend the coverage and help complete Greater Vancouver's rapid transit network by including the Northeast Sector of the region. As part of a network of transit services, the Evergreen Line connects with SkyTrain's Millennium Line and West Coast Express commuter rail. It also enables integrated travel throughout the network including the Expo Line, Millennium Line and the future Canada Line.
- The introduction of the Evergreen Line will immediately improve travel time for current transit riders by about 11 minutes in the peak hour. Based on the numbers of current transit riders and the estimated time savings associated with the new LRT service along the Northeast corridor, the annual transit user benefits are \$44.57 million.
- The introduction of the Evergreen Line will influence travel patterns of current transit users as well as attract new riders

to the system who would otherwise not travel on transit if the Evergreen Line were not introduced. The Evergreen Line will carry 6.6 million passengers in 2011, rising to over 10 million passengers a year by 2021. This is equivalent to approximately 950,000 passengers per route kilometre exceeding virtually all US systems.

- With the addition of the Evergreen Line, improvements to the local transit service, enhancing the connectivity to the broader transit network, and improving Millennium Line service, system-wide ridership will increase by about 5 million new transit trips annually and transit fare revenues will increase by more than \$12 million (2007) by 2021. Regional transit modal split will increase by 0.4%, from 13.8% to 14.2%.
- Transit users benefit from a more frequent, reliable, accessible and comfortable service.
- The Evergreen Line provides a viable transportation choice to residents, both those already living in the region and others that will be attracted by development in the corridor. For people in the corridor the line provides local and regional mobility without placing a burden on already-busy roads. Because their trips are not



Montpellier, France



Dublin, Ireland

on regional roads, they free capacity for longer-distance trips and goods movement on major roads and provincial infrastructure.

- The Evergreen Line operates in a segregated right-of-way with an end-to-end journey time of 24 minutes; it will not be significantly impacted by other traffic using the roadway and therefore offers competitive travel times and reliability in the face of traffic congestion. The introduction of the Evergreen Line will reduce the number of car trips annually by 1.9 million initially and this is estimated to increase to almost 3.6 million annual trips within a decade. Traffic congestion will continue to worsen through 2021; however, the Evergreen Line will improve the capacity of the corridor from a people moving perspective. The total annual road and transit user benefits resulting from the Evergreen Line is \$57.73 million (2007) and the net present value of total user benefits is \$143.46 million (2007).

- The Evergreen Line will enhance the people moving capacity of the Northeast Sector corridor. The Evergreen Line will have a carrying capacity of around 4,800 passengers an hour in each direction in 2021, the equivalent of four additional traffic lanes per direction. Given topographical constraints and development

along the corridor, expanding the roadway beyond two additional lanes is not feasible and would not supply the additional capacity required to address congestion. The total corridor capacity (LRT and road) in 2021 is up to 7,660 persons per hour per direction.

- The Evergreen Line is one of the investments that has been identified by the province, the region and gateway industries to alleviate congestion, provide travel time savings and increase transportation choice to improve the movement of people and goods in the region.

- Each Evergreen light rail vehicle will be driver-controlled and will carry up to 200 passengers. The driver/passenger ratio will result in operating efficiencies and cost savings compared to an equivalent capacity provided by bus services. Initial rush hour frequencies of an Evergreen service every six minutes provide an hourly capacity of 2,000 passengers.

- The Evergreen Line is being designed to allow for system capacity increases in the future. Sixty metre station platforms will accommodate two-car light rail units carrying up to 400 passengers and further improving the operating efficiency of the system.



### LRT versus 97 B-Line

	LRT	97 B-Line
One Way Distance	11.2 km	12 km
Stations/Stops	12 (+ one future)	19
Service Frequency		
AM and PM Rush Hours	6 Minutes (2011); 5 minutes (2021)	7.5 Minutes
Mid-day	7.5 Minutes	10 Minutes
Evening	10 Minutes	15 Minutes
Early Morning and Late Night	15 minutes	30 Minutes
Rush Hour Capacity	2000 (2011) – 4800 (2021)	425
Annual Ridership - 2011	6.6 Million	2 Million
Annual Ridership - 2021	10.7 Million	3 Million
Approximate Travel Time (End- to-End)	24 Minutes	35 Minutes
AM Peak Travel Time (Douglas – Lougheed)	24 Minutes	32 – 35 Minutes
PM Peak Travel Time (Douglas – Lougheed)	24 Minutes	35 – 38 Minutes
Annual Operating Cost	\$14.04 Million (2013(2 years after opening))	\$5.7 Million



#### The Evergreen Line: Improving public transportation

The Evergreen Line replaces the 97-B service. The Evergreen Line has many transportation benefits over the existing B-Line with a higher frequency of service; greater rush hour capacity (with scope for future expansion); and a quicker and more reliable end-to-end journey time. This will result in a significantly higher public transport ridership in the Evergreen Line corridor.

#### The Evergreen Line Bus Integration Plan

Remaining bus services will be modified and a Bus Integration Plan will be introduced. The Bus Integration Plan will insure that the Evergreen Line is well integrated into the regional and local bus networks. To accomplish this:

- Buses will feed into the Evergreen Line neighbourhood stations to maximize access
- B-Line bus route savings will be re-invested into more frequent local routes and increased service area
- Local bus routes will be adapted to expand coverage and connectivity
- A bus integration strategy will be further developed through ongoing area transit planning that will include public and municipal consultation. Public consultation on new bus services will occur the year preceding introduction of the Evergreen Line to refine the bus Integration Plan



On Portland MAX Yellow Line community artists have worked with local neighbourhoods to design their local stations



## Urban Development

### Introduction

The Northeast Sector, and Coquitlam in particular, will remain as one of the fastest growing locations within the Greater Vancouver area. For the Evergreen Line to meet its full potential it will be important to ensure that the projected planning forecasts of population and employment growth are translated through the OCPs into local examples of Transit-Oriented Development (TOD) best practice that maximizes the benefit of investment planned for the Evergreen Line.

### The Evergreen Line supports future growth

- The Evergreen Line will support the creation of complete communities and a compact region, support existing development and contribute to “city shaping” by stimulating future concentrated and mixed use development.
- The implementation of the Evergreen Line provides an excellent opportunity to assist municipalities in their efforts to encourage economic development by supporting higher density Transit-Oriented Developments along the corridor. These developments support opportunities for local residents to live near their place of work, therefore reducing their reliance on the automobile and alleviating demand on the regional transportation network and freeing up

capacity for longer-distance trips and goods movement on major roads and provincial infrastructure.

### What is Transit-Oriented Development? (TOD)

Transit-Oriented Development principles have been developed and applied over the last twenty years to a series of new transit systems, particularly in North America. The techniques involve partnerships between the transit authority, local municipalities and private sector developers to design new developments clustered around transit stations. These are commonly of a more mixed use (retail/commercial/residential) and higher density than would otherwise be the case in the absence of transit.

The addition of a transit station generates a concentration of movement that adds vitality to the TOD with increased activity commonly leading to improvements in local business and increases to land and property values. The application of TOD techniques can act as a catalyst to accelerate the rate of development and also encourage higher value and higher density development. This “Smart Growth” approach is consistent with the compact region requirements of the LRSP.



## The importance of the Evergreen Line for shaping Urban Development: Support from the Northeast Sector Municipalities

“ As a strong advocate of the Livable Region Strategic Plan, the City of Burnaby views the Evergreen Line as a key component of the regional growth strategy to link regional and municipal town centres by rapid transit. The City's Official Community Plan has long recognized the need for rapid transit along North Road to Coquitlam Town Centre to transport, without more roads, the thousands of Coquitlam area residents who work and go to school in Burnaby. The Evergreen Line is critical to support the continued development of the Lougheed Town Centre and the other three town centres in Burnaby as sustainable communities where people don't need a car to go to work, school, shop and play. ”

BURNABY -Mayor Corrigan

“ The Evergreen line is a critical piece of the Liveable Region Strategy (LRSP). We may have to prevent further development in Port Moody unless the Evergreen line is built. The Evergreen line is needed now. We accepted additional density in areas like Newport Village where the LRSP says regional growth should be concentrated. Coquitlam is considering adding 30,000 people on its slopes. These developments match the LRSP's goals of reducing sprawl and saving agricultural land. Without the Evergreen Line, development in the Northeast Sector will grind to a halt and move up the valley. For the Province, there is a choice to be made between supporting the Evergreen line and sustainable development or returning to an era of sprawling distant suburbs and more traffic congestion. I am determined that the Northeast Sector will not be passed over again for rapid transit. ”

PORT MOODY -Mayor Trasolini

“ Coquitlam Council has been steadfast in its commitment to the Livable Region Strategic Plan and patient while other rapid transit projects have jumped the queue. We have acted in good faith by planning for and taking on growth along the rapid transit corridor and in the Regional Town Centre. The Northeast Sector has the ridership now for light rapid transit and that ridership will continue to grow. We have met our obligations to be part of a liveable and sustainable Greater Vancouver. People in Coquitlam are eagerly anticipating completion of the Evergreen Line in 2011. ”

COQUITLAM -Mayor Wilson



Homes close to both Luas Dublin LRT lines saw an additional 15% price rise over and above the general increase in prices during the period 2002-2004. Source: Douglas Newman Good Property Agency

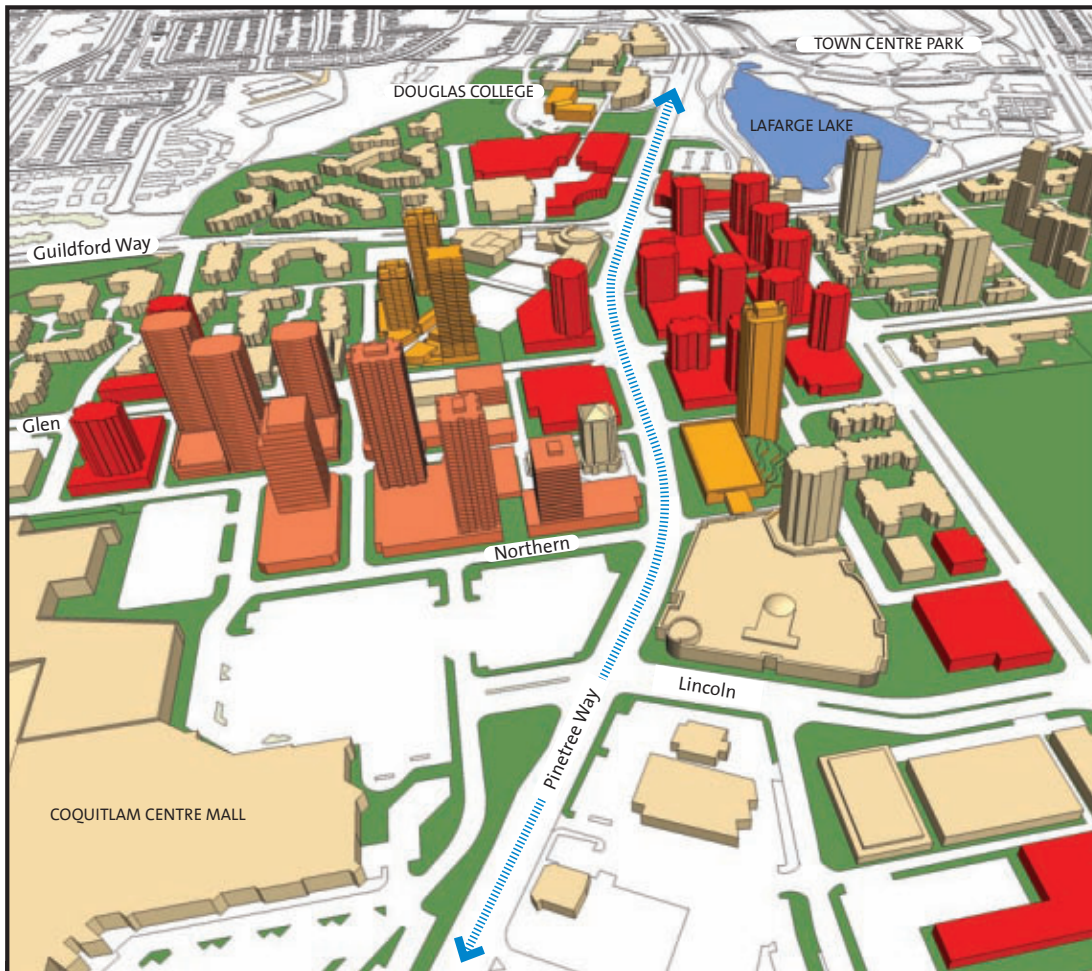


### The Evergreen Line and TOD opportunities

TransLink and the cities of Burnaby, Port Moody and Coquitlam have been working in partnership during the Project Definition Phase of the Evergreen Line to ensure that all TOD opportunities are identified as part of the project. Among the highlights are:

- **Lougheed Town Centre** – A major new interchange between the Evergreen Line and the SkyTrain network with potential for an increased density of commercial development.
- **Cameron Street** – The Evergreen Line station will act as a catalyst for further high density commercial and residential development in this area.
- **Burquitlam Transit Village** – The existing Burquitlam Plaza is recognized by Coquitlam to be a major opportunity to introduce a new mixed-use development focused on the Evergreen Line station.
- **Moody Street** – The Evergreen Line station will act as a catalyst for further 2-3-storey commercial/residential development in this area.
- **Coquitlam Exchange** – This station will become a major transfer point linking the Evergreen Line, West Coast Express services, local buses, and Park & Ride. The station is being designed to maximize the amount of development land to allow a TOD to be taken forward on the Coquitlam Exchange site.
- **Coquitlam Regional Town Centre** – A new “downtown” is envisaged for Coquitlam and this will be supported by the Evergreen Line and three new stations at Lincoln, Civic Centre/ Guildford and Douglas College. (see extract from Coquitlam’s Regional Town Centre Area Plan Update).

**Coquitlam's Regional Town Centre Core Area** (Fall 2006)



	<b>Existing</b>		<b>Under Construction</b>		<b>Development Application Under Review</b>		<b>Regional Town Centre Concept Plan*</b>
 <b>Future Light Rail Transit Route</b>							

**Note:** Buildings shown under Regional Town Centre Concept Plan represent potential building height and massing under existing land use and zoning regulations. Actual development applications may vary significantly.

This figure has been prepared for illustrative purposes only. It is not a legal document. If any contradiction exists between this figure and the relevant City of Coquitlam Bylaws, Codes or Policies, the text of the Bylaws, Codes or Policies shall be the legal authority.

\* *Coquitlam Regional Town Centre: Concept Plan and Urban Design Guidelines*, adopted by Council Resolution, 1996, Revised 2004.

“ The Town Centre is intended to be a focal point or “downtown” for the Northeast Sector of the Greater Vancouver region, providing a full array of retail, office, cultural recreational and educational facilities for this part of the region ”



## People

### The Evergreen Line Stations

The Evergreen Line stations will become a focal point within each community that is served, whether for local residents and businesses or visitors from beyond the Evergreen Line corridor. The principal benefits provided by each station are summarized as follows:

- **Lougheed** – a major interchange with SkyTrain and local bus routes and serving the Lougheed Mall (175 stores, 7.3 million shoppers/year)
- **Cameron** – local neighbourhood station serving new high density mixed use development in Burnaby and existing medium density development in Coquitlam
- **Burquitlam** – station is a focal point for Transit Village and connecting buses to Simon Fraser University
- **Albert/Barnet** – a local neighbourhood station, also serving the Moody Secondary School
- **Moody** – a local neighbourhood station, serving Port Moody's Historic Arts District ("City of the Arts"), Port Moody Elementary School and an interchange with West Coast Express and local bus services
- **Buller** – a local neighbourhood station serving Moody Middle School, existing and new residential developments, including new development accessed by the CP Rail Pedestrian Overpass
- **loco** – a local neighbourhood stop providing easy access to Newport Village and adjacent new high density residential developments

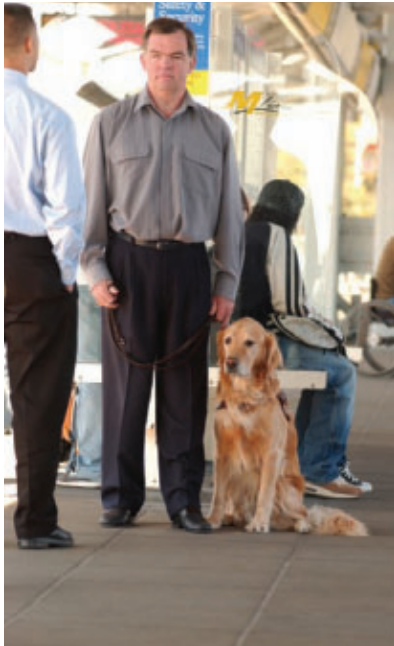
- **(Falcon)** – a future station location, subject to the City of Coquitlam’s longer term development plans
- **Lansdowne** – a local neighbourhood station that will be a focal point for new Transit-Oriented Development as part of the expansion of the Coquitlam Regional Town Centre
- **Coquitlam Exchange** – a major Transit-Oriented Development opportunity, combined with a key transfer point between the Evergreen Line, West Coast Express, local bus services and Park & Ride
- **Lincoln** – serving the expanding commercial facilities in the Regional Town Centre and providing access to the Coquitlam Centre Mall (200 stores, 11.5 million shoppers/year), Henderson Place and Westwood Mall
- **Civic Centre/Guildford**– providing access to the Civic Centre, City Hall and Evergreen Cultural Centre
- **Douglas College** – providing direct access to the expanding Douglas College David Lam Campus

**The Evergreen Line – Community Building**

TransLink and its municipal partners are working together with local communities along the Evergreen Line to ensure that issues raised are considered through the development of the project. This approach to positive engagement with local residents and businesses ensures that the final Evergreen Line design incorporates the community’s needs and suggestions where possible.

Key “people-friendly” benefits of the Evergreen Line will include:

- Easy access, low platforms with step-free access to Evergreen light rail vehicles
- Safety and security measures, including well signed and lit pedestrian routes to and from stations; traffic signals at intersections to provide easy access to stations in the centre of the road; stations visible by neighbours and passing vehicles
- An “integrated design” approach that incorporates public realm improvements, including improved sidewalks, tree planting and landscaping, and provision of parking to support local businesses
- A Public Arts program to allow local communities to work with TransLink to help establish a local identity for Evergreen stations and the line
- A Community Engagement program to address issues during Evergreen Line construction and future years of light rail operations
- Evergreen Line design to “Crime Prevention through Environmental Design” (CPTED) standards





Salt Lake City, Utah

## Economics

### The Evergreen Line is cost-effective

- The Project Definition Phase of the Evergreen Line included further technical work and consultation to better define the project. The estimated capital costs have been updated to reflect the current design and market conditions. The estimated capital cost for the proposed Evergreen LRT Line is \$970 million (2007) or \$86.2 million per kilometre.
- The Evergreen Line compares favourably to other LRT systems in North America, as identified in the benchmarking survey. The Evergreen Line capital costs, the ridership numbers and station spacing are consistent with other North American LRT systems. The Evergreen Line has relatively higher costs and lower passenger numbers than many European systems (not unexpected given higher European population densities and more compact city design) but still falls within the range of European systems.
- By 2021, Evergreen Line revenues are expected to exceed annual operating costs from system-wide incremental fare revenues, bus savings and advertising revenues. It is expected that the Evergreen Line will recover over 90% of its annual operating costs shortly after opening in 2011. By 2021, the Evergreen Line will be generating annual net revenues of over \$0.6 million (2007).
- An Operations and Maintenance Centre is required for the Evergreen Line and will be the first light rail vehicle facility in the Lower Mainland. This one-time investment will support future extensions to the LRT system.



Nottingham, UK

## Evergreen Line: The Costs And Benefits

### Estimated Annual Operating & Maintenance Cost:

- 2013 (post 2011 opening and ramp up period)- \$12.21 million plus \$0.77 million (police) plus additional SkyTrain operating costs \$1.06 million: total \$14.04 million (2007\$)
- 2021- \$13.16 million plus \$0.77 million (police) plus additional SkyTrain operating costs \$1.06 million: total \$14.99 million (2007\$)

Annual Bus Cost Savings: \$1.53 million

Evergreen Line ridership: 6.6 million per annum (2011),  
10.7 million per annum (2021)

- Annual Incremental Revenues system-wide \$12.20 million (2007\$)

- The construction of the Evergreen Line will generate some 6,860 person-years of direct, indirect and induced employment in British Columbia providing estimated federal and provincial tax revenues of \$27 million and \$37 million respectively.
- The operation and maintenance of the Evergreen Line will generate employment from on-board operations and from the Operations and Maintenance Centre functions. Employment created from the on-going operations and maintenance of the Evergreen Line is equivalent to 121 full-time positions including 93 direct and 28 indirect jobs
- Gross Domestic Product (GDP) benefits during construction (direct, indirect and induced): \$391 million



Houston, Texas

## Environment

Though it is not a requirement, TransLink has “opted in” to the B.C. Environmental Review Process under the B.C. Environmental Assessment Act. The project will be reviewed by provincial and federal government agencies through an environmental assessment process facilitated by the B.C. Environmental Assessment Office (BCEAO). The process is open to the full participation of stakeholders and the general public.

The assessment will identify all of the potential environmental, economic, social, heritage and health impacts, and define how they will be mitigated through project design. Areas of study for the impact assessment include:

- Contaminated sites
- Socio-economic and community impacts
- Climate/air change, i.e. air quality during construction and operation
- Noise during construction and operation
- Geotechnical, i.e. slope stability, groundwater
- Biophysical- terrestrial and aquatic, i.e. tree removal
- Archaeology, traditional use and heritage
- Electric and magnetic field emissions

The results from these studies will be compiled into a single document titled “Application for Environmental Assessment Certificate”. Members of the public, First Nations and stakeholders will be given an opportunity to review the study findings during a comment period determined by the BCEAO. During this time TransLink will hold consultation activities in order to provide an opportunity for public review and comment.

The environmental work for the permit application is currently underway. Many of the qualitative benefits of the Evergreen Line will not be available until this work is complete. However, the following discusses the environmental benefits of the Evergreen Line.





The line supports regional and municipal growth management strategies that otherwise could not be achieved, helping to limit the impacts of growth on the environment and sustain the livability of the region.

The Evergreen Line has the following environmental benefits:

- The Evergreen Line reduces vehicle travel in the Lower Fraser Valley by an estimated 31 million kms per year by 2021. This results in Common Air Contaminants (CACs), being reduced by 355.5 tonnes per year, of which 43.5 tonnes are smog forming. This total represents a 0.5% reduction of CACs in the Northeast Sector.
- The estimated net reduction of Greenhouse Gas (GHG) emissions is 10,592 tonnes. This represents a 0.03% reduction in the estimated total of GHG emissions produced in the Lower Fraser Valley in 2021.
- The amount of tree canopy will be more than doubled.
- The line runs through an existing transportation corridor, therefore the effect on waterways and green zones is minimal.

#### Evergreen Line Sustainability Principles

Sustainability principles address ways of meeting the needs of the present without compromising the livability of the region for future generations. For the Evergreen Line the following guiding principles have been established:

- Use “Best Practices” to guide the design and construction of the Evergreen Line to minimize waste production and resource consumption
- Create an LRT system that is designed and operated to achieve energy efficiency in all phases of operation and construction, consistent with TransLink’s Environmental Policy and Emission Policy
- Rainwater management designed to facilitate the infiltration of rainwater through impervious surfaces and minimize the heat island effect
- Design stations and streetscapes to enhance the quality of the public realm and support the creation of identifiable, accessible and vibrant communities



Montpellier, France



Houston, Texas



Portland, Oregon

- Include landscaping and street trees in streetscape design. Street trees enhance the human scale of street sections, filter air, provide weather protection, and buffer pedestrians from automobile traffic. Landscaping along the Evergreen alignment will ascribe to the following sustainability principles:

- Minimize water consumption through plant selection. Preferred species will be native to the area and drought/wet weather tolerant
- Encourage water infiltration through proper subsoil preparation and good irrigation design
- Plan for the mature natural size of plant species
- Ensure that the design of landscaping fits with the character of the area

- Landscaping should be designed for low, chemical pesticide free maintenance

#### The Evergreen Line is supported in its Community:

- The Evergreen Line has been developed through extensive community and stakeholder consultation at all phases. It has been identified from a set of alternative alignments and technologies as the most supportable and beneficial for the existing communities to achieve their share of regional development.

- A 40% expansion of the region's rail rapid transit network with the Canada Line between Vancouver, Richmond and the airport, and the Evergreen Line from Coquitlam Centre and Port Moody to Lougheed Town Centre SkyTrain Station enjoys 94% support from people across the region as projects of importance to Greater Vancouver, according to an April 17, 2006 Ipsos Reid public opinion survey.



Strasbourg, France



#### The Evergreen Line is the right solution:

- A Multiple Account Evaluation (MAE) report was prepared to provide an update of the MAE presented in the March 2004 Alternatives Study, which compared alternative routes and technologies for the proposed rapid transit line connecting Lougheed Town Centre and Coquitlam Town Centre. The updated MAE compares the currently proposed Evergreen LRT system and alignment to three alternative technologies, conventional bus, bus rapid transit (BRT) and SkyTrain, along the same alignment.
- BRT, as a result of having the lowest capital investment, has the most favourable Overall Project NPV and Benefit Cost ratio. However, by 2021, the system will be operating at full capacity with no practical means for expansion to meet the longer-term ridership needs of the region. BRT is an interim solution and investment in rail will be required prior to 2021 to realize the transportation and economic objectives for the region.

- Both LRT and SkyTrain, although more capital cost intensive compared to BRT, will provide a reliable rapid transit service to the Northeast Sector for the long term. Rail systems strongly support long-term economic development, primarily because they are more permanent and will therefore attract more commercial and residential development
- LRT has a lower capital cost than SkyTrain and superior customer features while SkyTrain generates greater ridership and travel time benefits. However, the additional capital cost of \$300 million for SkyTrain is a significant factor favouring LRT. These capital cost savings can be used for other projects that are also required to address the region's transportation needs.



Dublin, Ireland

## Dublin, Ireland - A best case example

### Introduction:

The Greater Dublin area has a population of over 1.5 million. As part of a wider “Dublin Transportation Initiative” 20-year Plan a Light Rail Transit network was proposed in the mid-1990s. The Dublin LRT system, known as LUAS opened in 2004 and consists of two lines, connecting the suburban residential areas to the downtown commercial and retail core. Ridership on the LRT system exceeded forecasts within the first year of operation and additional capacity is being provided with longer trains.

### System Details:

Route Length	Green Line – 9 km, Red Line – 15 km
Number of Lines	2
Number of Stops	Green Line: 13, Red Line: 23
Frequency	Weekdays 5 – 15 minutes, weekends 7.5 minutes – 20 minutes
Ridership	20 million passengers per annum (first operational year)
Fare System	Pre-purchased tickets, machines and agents selling 1, 7 and 30 day tickets

### Light Rail Vehicles:

Length	29.6 m/40.8 m mixed fleet
Width	2.4 m
Floor heights	Partial Low Floor
Capacity	Standing 230/310 seats 56/80
Max. speed	70 km/hour