
Integrating Frequent Transit Service & Corridor-based Transit Supportive Environments in the Metro Vancouver Region

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Abstract

Frequent transit networks have been developed in a number of metropolitan areas in North America, Australia, and Europe. TransLink has recently introduced a Frequent Transit Network (FTN) in the Metro Vancouver area. TransLink's FTN is an interconnected network of corridors with transit services operating every 15 minutes or more frequently throughout the day and into the evening every day of the week.

As part of its Regional Growth Strategy review process, Metro Vancouver is introducing a concept called Frequent Transit Development Corridors to shape land use in support of provision of frequent transit. TransLink and Metro Vancouver are working together to identify factors and develop policies that will help create a transit-oriented region focused around urban centres and the FTN.

A number of transit and land use indicators are being reviewed to help differentiate FTN corridors from other transit services. Two very useful indicators are related to transit demand: passenger boardings/road-km and passenger-kilometres/road-km. Almost all of the existing FTN corridors performed well on one or both of these indicators.

From a land use perspective, there are many ways to reach a defined threshold of transit demand to warrant frequent transit service. Of particular importance to development of the FTN will be understanding the types of land uses and densities that support frequent transit during off-peak time periods (e.g. on weekends and evenings).

The provision of high quality transit is an important lever for serving and shaping transit demand. In addition to extending the FTN and increasing service levels, the implementation of the planned rapid transit network in the region can further increase transit demand along frequent transit corridors. Another key tool to support the FTN network is the establishment of transit priority measures on roads to improve service reliability and transit travel time. When all these factors and others are implemented in a coordinated manner, a magnification of transit demand and level of service is possible within the region.

The Frequent Transit Network and Metro Vancouver's proposed Frequent Transit Development Corridor concept hold the promise of a bold vision for how to integrate land use, transit supportive infrastructure and frequent transit service. For the region to realize this vision, it will require collaboration and coordinated actions amongst all the key players in the region.

1 Background

Frequent Transit Systems

Frequent transit networks have been developed in a number of regions in North America, including Portland (Oregon), Metro Vancouver, Los Angeles, San Antonio, Minneapolis-St. Paul as well as internationally, including most notably in Adelaide, Australia.

While the names vary for these systems – everything from “frequent service” to “hi-frequency network” – they all share a common set of features:

- The frequency level used to define frequent service tends to be 15 minutes or better.
- The networks go beyond the rapid transit system to include frequent service on corridors served with the broader set of transit vehicle types – thereby expanding the reach of the network.
- An interconnected network of frequent transit corridors is provided and integrated with the rapid transit system. The network allows people to travel and make convenient transfers from any location along the network to any other location.
- The frequent transit network is used as a planning, communication, branding, and marketing tool.

This paper describes one of the newer frequent transit networks – one that has recently been established in the Metro Vancouver region. The paper presents experience so far in developing the network, and how the concept is starting to be integrated with corridor-based land use planning and transit-supportive environments through a Regional Growth Strategy process and future municipal planning processes.

TransLink’s Frequent Transit Network

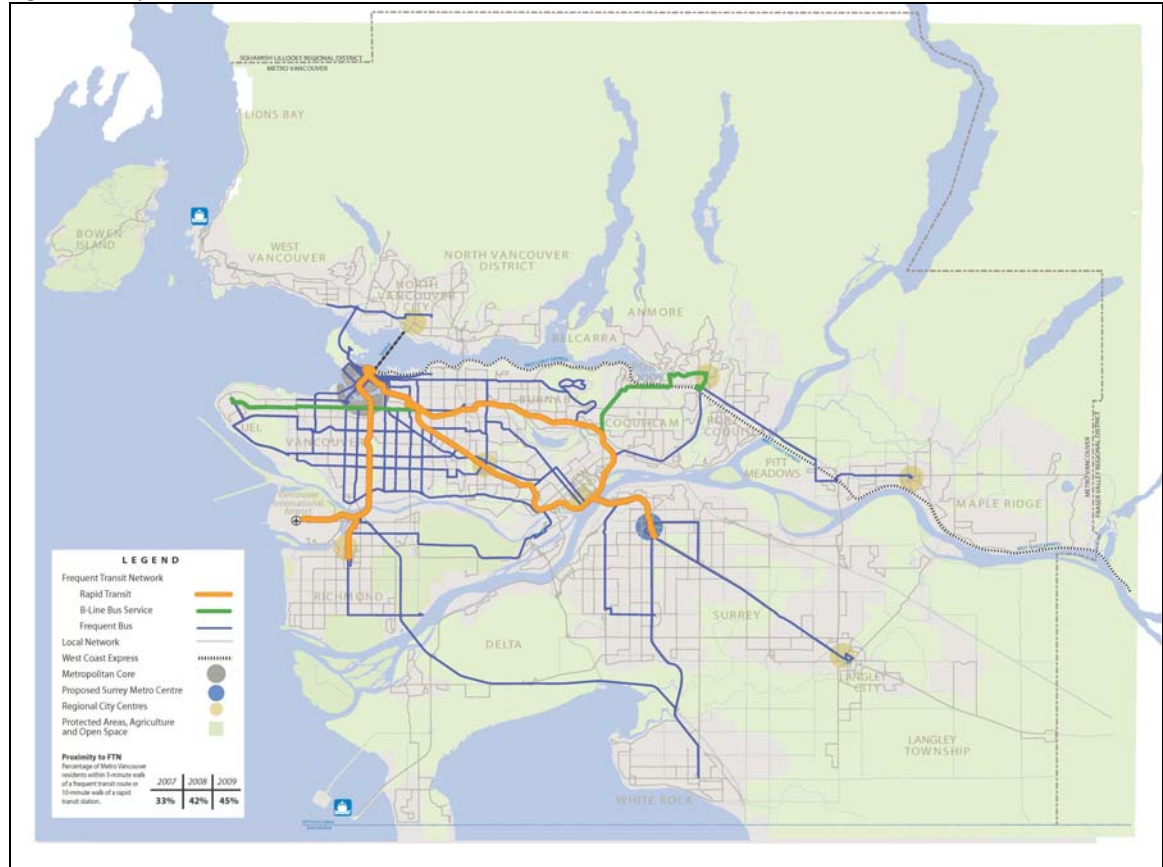
In 2007, TransLink (the regional transportation authority for the South Coast of British Columbia) introduced a Frequent Transit Network (FTN) in the Metro Vancouver region. TransLink’s FTN is defined as an interconnected network of corridors where transit service is provided every 15 minutes or more frequently throughout the day and into the evening every day of the week. The development and designation of the FTN in the Metro Vancouver region is intended to support and coordinate land use, development and traffic engineering decisions along the corridors. As such, the FTN serves as both a key service brand to the public as well as a policy and planning tool for TransLink and local governments.

The FTN was introduced to provide a level of service that allows a broad range of trip types and needs to be met and to indicate that there is a network of easy-to-use “show up and go” services where the public can access the transit network without needing to refer to a public timetable most of the time. The FTN does not refer to specific technologies or vehicle types used on the corridors, but rather refers to a high quality, reliable, and frequent level of service that is provided every day of the week.

The FTN has evolved quickly in Metro Vancouver, with the corridor length of the network increasing from 270 km in 2007 to 459 km by the end of 2009. The FTN includes all rail rapid

transit and frequent bus corridors in the region. The FTN may also include bus rapid transit and the SeaBus in the future as the network evolves. As of the end of 2009, the corridor length of the network consisted of 66 km of rapid rail transit on three SkyTrain lines, 27 km of limited stop B-line bus service on two corridors, and 365 km of corridors with frequent bus service (see Figure I).

Figure I: Frequent Transit Network in Metro Vancouver, 2009



Source: TransLink

On a per capita basis, the corridor length of the network was just over 200 m/1,000 persons in 2009, falling within the range of other frequent service systems reviewed (varied from about 150 m/1,000 persons in Minneapolis-St. Paul to about 250 m/1,000 people in Metro Portland). Currently, about 45% of the region’s population live within 400 m of a frequent transit corridor or 800 m of a rapid transit station (a 5- to 10-minute walk respectively). The network is densest in the City of Vancouver where approximately 90% of the population lived within 400 m of a frequent transit corridor or 800 m of a rapid transit station in 2009.

The FTN is one of the centrepieces of TransLink’s Transport 2040 long-term regional transportation strategy and its 10-year plans. Transport 2040 indicates that specific corridors of the FTN will be developed collaboratively with communities through ongoing planning and consultation processes and will require agreements between TransLink and municipalities to ensure success (1). Therefore, the FTN is not only an organizing framework for the region’s transit system, it also offers a structure for the future development of the region. In fact, one of the key

goals of Transport 2040 is for the majority of jobs and housing in the region to be located along the FTN.

Benefits of Frequent Transit Networks

There are various benefits associated with establishing and maintaining a network of frequent transit services that are integrated with land use planning and development.

From a transit user's perspective:

- Reduced journey times – both actual and perceived travel time
- Ease of use and improved convenience - it is not necessary to use a public timetable for most trips along the network
- Ease and convenience of transferring and reduced waiting times
- Facilitates shorter trips and trip-chaining where people can get on and off along the same corridor or along interconnected corridors for multiple trip purposes
- Enables a transit-oriented lifestyle by providing a consistent level of service, including a minimum frequency of service in the evenings and weekends, and
- Better meets the needs of an aging population which tends to make more mid-day trips.

From the transit service provider's perspective:

- Achieves higher transit ridership
- Provides better use of the capacity of the transit system outside weekday peak periods
- With good land use planning, can provide a more balanced load in the reverse peak travel direction for better capacity utilization of the transit system
- Provides a distinct service category which facilitates marketing and branding
- Improves the attractiveness of the transit service relative to travel by automobile
- Provides a pro-active tool that can be used to support and shape land use and development, and
- Provides a tool for fostering an appropriate transit-supportive road environment.

From a land use and transit planning integration perspective:

- Provides an incentive to communities to concentrate growth in centres and transit-supportive corridors.

From a land use development perspective:

- Considers frequent transit corridors to be a lever, similar in manner to fixed rail corridors but smaller in scale, for attracting density and transit-supportive land uses
- Provides increased certainty where good quality and frequent transit will be located in the future (through future designated FTN corridors) to guide and coordinate land use planning and transportation infrastructure planning
- May increase the demand for and therefore market value of land in proximity to the network, providing incentives for the highest and best use of the land for tax revenue, and
- Provides the ability to link urban centres and major activity areas with high quality and frequent transit service, which is a benefit for employees, customers, and leaseholders.

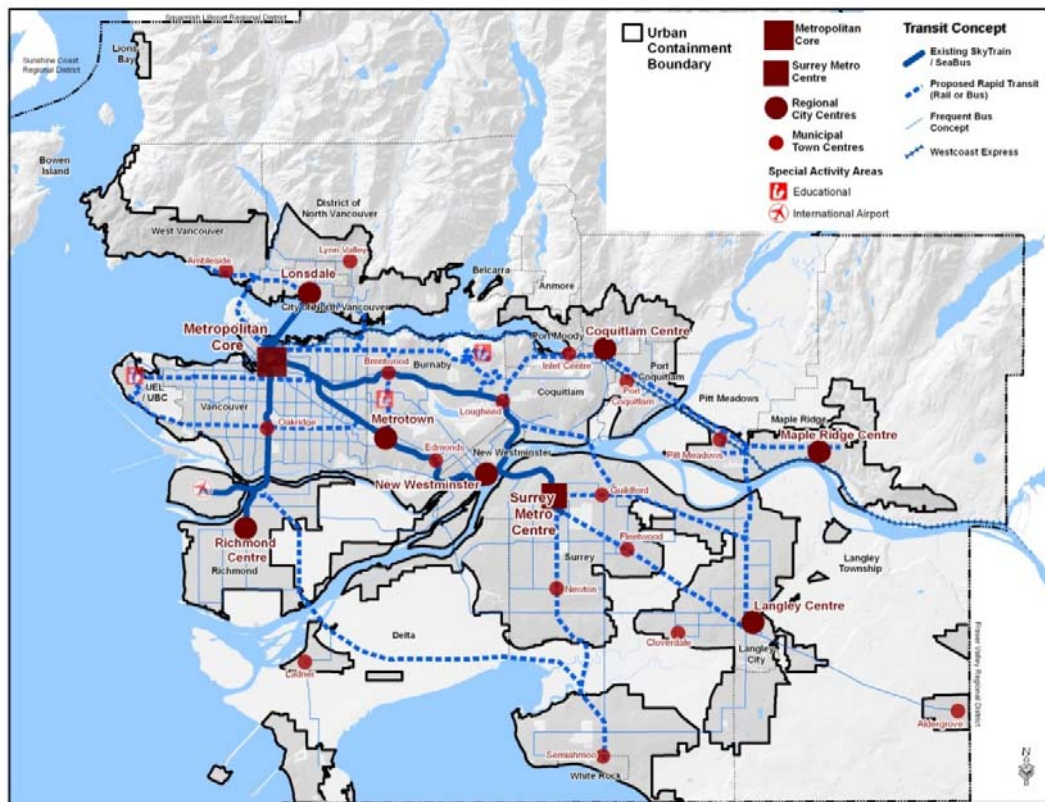
2 Integrating Frequent Transit with Transit Supportive Land Use and Infrastructure

Metro Vancouver's Frequent Transit Development Corridors

Metro Vancouver is a regional government consisting of 21 municipalities, the Tsawwassen First Nation, and one Electoral Area, and it has a mandate to plan for growth and change in this region. Its current growth strategy, the *Livable Region Strategic Plan*, was adopted in 1996, and is now under review. The draft Regional Growth Strategy has a planning horizon to 2041, at which time Metro Vancouver anticipates an additional 1.2 million people for a total population of 3.4 million, and an additional 550,000 jobs, for a total of about 1.4 million jobs.

Metro Vancouver has a long history of regional planning, with an urban structure based on a number of well-connected urban centres. Downtown Vancouver forms the primary hub of activity for the region, but the region also has a number of region-serving centres (called Regional City Centres in the current draft strategy) and a number of smaller, municipally-focused centres (referred to as Municipal Town Centres) (see Figure II). In addition, the Surrey Metro Centre is envisioned as the predominant “downtown” for the south of the Fraser subregion in the future. The current draft strategy intends to reinforce and continue to build and develop this important network of centres.

Figure II: Draft Regional Growth Strategy Regional Transit Concept



Source: (2)

The draft Regional Growth Strategy is organized into five main goals:

1. Create a Compact Urban Area
2. Support a Sustainable Economy
3. Protect the Region's Natural Assets
4. Develop Complete and Resilient Communities, and
5. Support a Sustainable Surface Transportation System

One of the objectives in reviewing the draft Regional Growth Strategy was to create a stronger connection between the land use and transportation elements of the region. To this end, goals 1 and 5 have been written to complement each other. Particularly, goal 1 contains a strategy that focuses more growth within Urban Centres and proposed Frequent Transit Development Corridors. This strategy responds to the region's need to strategically allocate growth in locations that are or are intended to be rich in public amenities, including public transit. It intends to build upon and complement the existing hierarchy of Urban Centres. The term "Frequent Transit Development Corridors" was chosen in part to echo the Frequent Transit Network terminology employed by TransLink. The map shown in Figure II shows a conceptual location of the future FTN network. The future network requires additional review and discussion with the municipalities and should be considered preliminary.

The draft Regional Growth Strategy contains some key policies for the Frequent Transit Development Corridors, including:

- Specifying that growth within the corridors is mainly to be residential, with some local serving commercial uses – regional-scale office development is intended to be directed primarily to the Urban Centres
- Development of the corridors should be nodal – the draft Regional Growth Strategy wants to emphasize a strategic distribution of growth rather than promote a new form of linear sprawl
- Municipalities are to concentrate higher densities within the Urban Centres and the corridors, and discourage higher densities outside of these locations
- Industrial areas within corridors are generally to remain for industrial uses and not to be converted to higher density residential or commercial use – the intent is to protect the region's limited supply of industrial land

The draft Regional Growth Strategy articulates these concepts through policy statements ("actions" in the draft Regional Growth Strategy), a set of guidelines describing the Frequent Transit Development Corridors, and policy projections that set out a regional amount and shares for population and jobs that the region anticipates will locate within the corridors over the time frame of the plan. Setting out policy projections for population and employment levels for the various urban geographies (Urban Centres, Frequent Transit Development Corridors, and the General Urban Area) is new to this plan, and provides a very clear picture of where growth will go in the region, as well as signifies the important role of Frequent Transit Development Corridors as areas for growth.

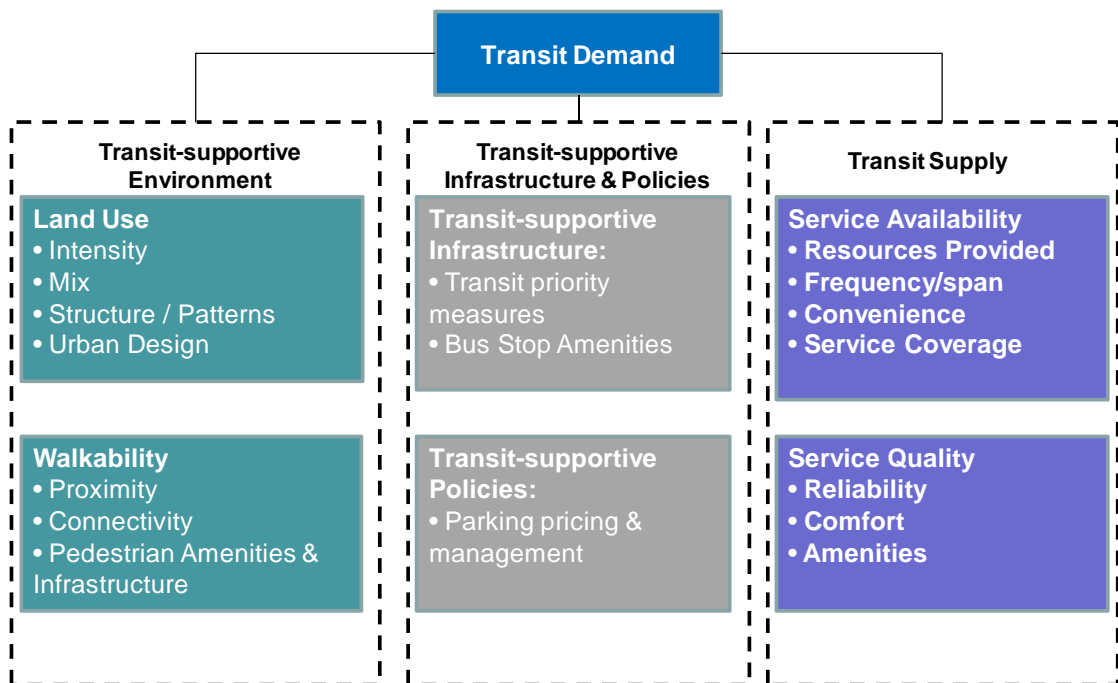
Vision and Goals of the Frequent Transit Network and Frequent Transit Development Corridors

The overall vision for the region's Frequent Transit Network, the Centres and proposed Frequent Transit Development Corridors concept is to create a transit-oriented region, where transit will be

well used, comfortable, convenient, and reliable, being used for a large portion of trips in the region. This vision is in support of the goals of the draft Regional Growth Strategy and several of the goals of Transport 2040, including a target to more than double the share of walking, cycling, and transit in the region by 2040. Transit will play a critical role in achieving this target, being the key sustainable mode choice for trips that are too long for walking or cycling and servicing the greatest variety of trip needs.

In order to accomplish this vision and achieve the goals it will be critical to integrate the provision of enhanced transit supply with a supportive land use environment and land use mix together with enhanced transit passenger and walking amenities, as well as transit-supportive infrastructure (see Figure III). These can be thought of as demand factors for transit and they are closely related to one another and can mutually reinforce each other.

Figure III: Transit Demand Factors for Creating a Transit-Oriented Region



On the transit supply side, the overall vision is for the extent of the Frequent Transit Network to grow over time in order to have a larger portion of the region’s population and jobs located within walking distance of the network as well as for its frequency and quality of service to increase as demand increases. The result would be more origins and destinations being able to be accessed on the network and more of the region’s population, jobs, and activity areas being served by the network.

As the region’s Frequent Transit Network is developed, a magnification in transit ridership is anticipated. Mees identifies this as the Network Effect. According to Mees (3):

“The key to, and principal prerequisite for, the network effect is that passengers transfer between services. Rather than try to second guess people’s travel needs with a plethora of routes, the public transport operator makes it possible for passengers to guide themselves to diverse destinations, just as motorists navigate

the road system. Public transport emulates the flexibility of the car from the all-important perspective of the passenger.”

The end result of a well developed frequent transit network is what Mees calls a “go anywhere, anytime” service that for many trips begins to match the convenience of the car.

To be truly effective, the provision of enhanced transit supply must be supported by a transit-supportive land use pattern along the frequent transit corridors, including sufficient densities and a land use mix that fosters transit ridership levels over the full frequent service operating period. This would involve land uses that generate sufficient trips in the evenings and on weekends. The proposed Frequent Transit Development Corridors within the draft Regional Growth Strategy provide the policy and planning tool for municipal governments to plan for a transit-supportive environment.

In addition, transit supportive infrastructure and policies would have to be established. This could include transit priority measures that would be implemented along the FTN to ensure reliability of the service and improve transit travel speeds. To be even more effective, a parking management strategy and a strategy to integrate the FTN corridors with the needs of pedestrians and cyclists would further support transit.

At bus stops, on sidewalks and across neighbourhoods, basic and enhanced amenities, such as sidewalks and bus shelters, would have to be included to create a pedestrian friendly environment, thereby providing a desirable experience for the total door-to-door journey.

The end result is to foster a culture and built environment based on frequent transit use and an integrated set of transit services that are conducive to living a transit-oriented lifestyle.

Defining the Network – Corridors vs. Routes

Spatially, a frequent transit network can either be defined from a corridor or a route perspective. In Metro Vancouver, TransLink uses a definition for its FTN that is corridor-based, rather than route-based. For example, two routes serving a corridor may not individually meet the FTN level of service but their combined service may, in which case the corridor is included in the FTN.

A corridor-based definition is also more consistent with how municipalities view planning for land use and infrastructure. A corridor perspective is also well suited to transit users who travel along a corridor and may take a variety of transit vehicles regardless of route number to travel to their destination. However, other transit riders may need to take a bus only operating on a particular route and therefore may think of the service only from the perspective of the specific route he/she rides.

Using corridors to define the network provides a number of challenges and opportunities. One opportunity is the ability to use overlapping or interlined routes that separately do not meet frequent service levels, but together meet the minimum headway levels. This works only in situations where there is a sufficiently long corridor for a transit rider to be able to choose from any of the overlapping routes for their trip needs.

Another advantage is that for long corridors where only part of the corridor provides sufficient transit demand to warrant frequent service, part of the corridor can be designated as being on the FTN. This allows the short-turning of transit vehicles to provide a frequent level of service to a continuous portion of the corridor where justified by transit demand.

One of the challenges with a corridor-based system is communicating the corridor concept and schedule to the public, as people are more used to route-based schedules and maps. One of the few transit systems surveyed that use corridors for communicating their frequent service is in Adelaide, Australia. In Adelaide, a term called Go Zones are distinguished on transit maps by a dashed red line that runs on either side of the corridor where there are one or more routes that provide frequent service.

Identifying and Defining Frequent Transit Development Corridors

At the time of writing this paper, Metro Vancouver is consulting with its member municipalities and the general public on the draft Regional Growth Strategy, including the Frequent Transit Development Corridor (FTDC) concept. As the FTDC concept is still evolving, the draft Regional Growth Strategy simply introduces the framework for the concept. In this regard, the strategy has set out general locations where the corridors may exist, namely along the Frequent Transit Network as to be defined in cooperation with TransLink. The draft Regional Growth Strategy does not set out the precise locations for the corridors. These will be identified over time, in cooperation between Metro Vancouver, the member municipalities and TransLink. However, the draft Regional Growth Strategy proposes some guidelines for FTDC corridor identification - corridors are to be located:

- within the Urban Containment Boundary
- not to be located in non-urban areas (e.g. not located within conservation / recreation or agriculture areas), and
- are not to be located within industrial areas.

In this respect the Frequent Transit Network and Frequent Transit Development Corridors differ, because the FTN is a network that may be operated through non-urban areas in order to reach other destinations. The Frequent Transit Development Corridors in some instances will be portions of the FTN corridors, depending upon local circumstances, but would always be based on the FTN. Coordination is therefore required to ensure that both the FTN and Frequent Transit Development Corridors are compatible and reinforce one another.

The draft Regional Growth Strategy proposes guidelines for municipalities to consider in developing the corridors. These guidelines set out the general uses expected within the corridors (mainly residential, with some expectation of local commercial serving uses) and some guidance on the width of the corridors. During consultation with the municipalities, it has become evident that the guidelines may not be clear enough as to the expected development of the corridors over time. Metro Vancouver intends to work with the municipalities to develop the guidelines for corridors in order to provide a clearer picture of how the corridors may develop.

3 Preliminary Findings of Technical Analysis

At the time this paper is being written, TransLink is in the process of analyzing and reviewing the technical criteria for defining FTN corridors and refining the FTN concept. The discussion below represents preliminary findings and none of the figures are intended to be policy thresholds.

The technical analysis is being centred on:

- Transit demand and performance
- Land use, and
- Transit-supportive infrastructure provision.

To date, the focus of the analysis has been on transit demand and performance with some initial scoping of land use parameters.

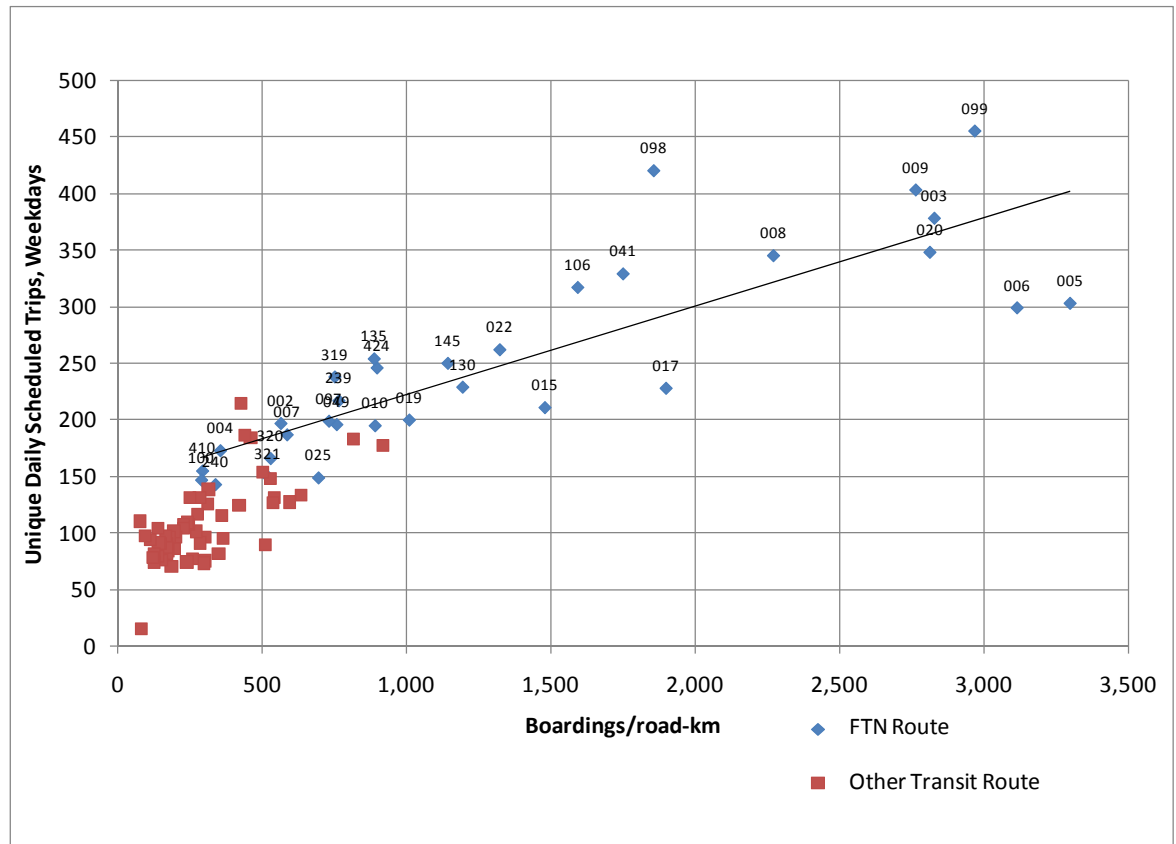
Transit Demand Characteristics of Frequent Transit Corridors

To better understand the characteristics of the FTN versus other transit services, a number of key transit performance indicators are being considered. Frequent transit services operating along FTN corridors and other transit routes were then analyzed according to these indicators.

This section focuses on two key transit demand indicators: boardings/road-km and passenger-kilometres/road-km.

A key relationship for the FTN is between service frequency and boardings/road-km, which is a measure of transit demand. As a proxy for frequency, the number of scheduled trips on weekdays is used. As can be seen in Figure IV, there is a strong correlation between boardings/road-km and unique daily scheduled trips. For reference, 120 scheduled trips would be the minimum number of trips required for a 15 minute level of service for 15 hours a day in both directions. Therefore approximately 120 to 150 scheduled trips per day would be the lower figure for frequent transit service depending on the daily span of frequent service that is offered. It appears that routes with performance of at least 400 to 500 boardings/road-km are associated with over 120 scheduled trips per day on weekdays.

Figure IV: Weekday Boardings/Road-km vs. Unique Daily Scheduled Trips, January-April 2008

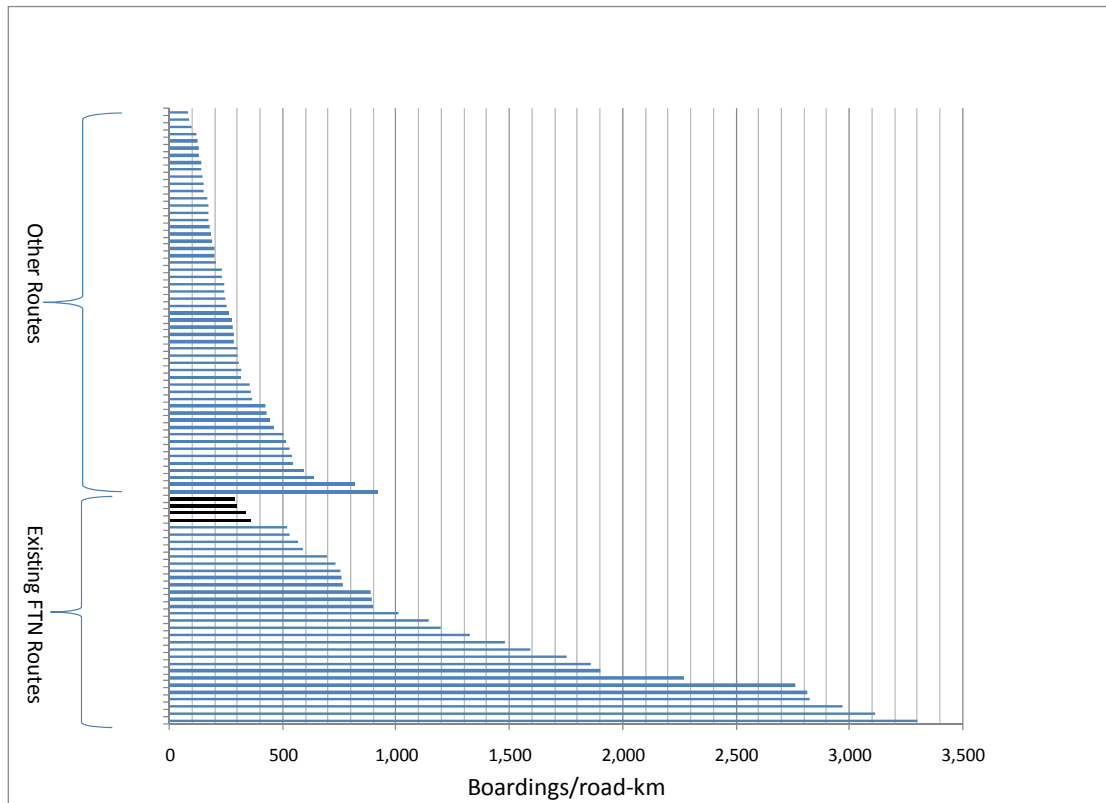


Based on the analysis, two transit demand indicators were identified that were considered to be the most useful in distinguishing current FTN routes and corridors:

- Boardings/road-km – The number of boardings occurring along the route or corridor divided by the length of the route or corridor
- Passenger-kilometres/road-km – The number of passenger-kilometres along the route or corridor divided by the length of the route or corridor

Figure V shows the boardings/road-km for existing FTN routes in Metro Vancouver in comparison to other transit routes. It appears that approximately 400 to 500 boardings/road-km is a threshold above which a route supports FTN levels of service on weekdays. Weekend demand is also important and it appears that above 400 boardings/road-km on Saturdays (80% of the weekday value) and roughly 300 boardings/road-km on Sundays (60% of the weekday value) support FTN levels of service based on current performance. This performance level could be evaluated as one of the performance targets for current and future FTN corridors.

Figure V: Weekday Daily Boardings/Road-km by Route, Existing FTN vs. Other Routes, January-April 2008

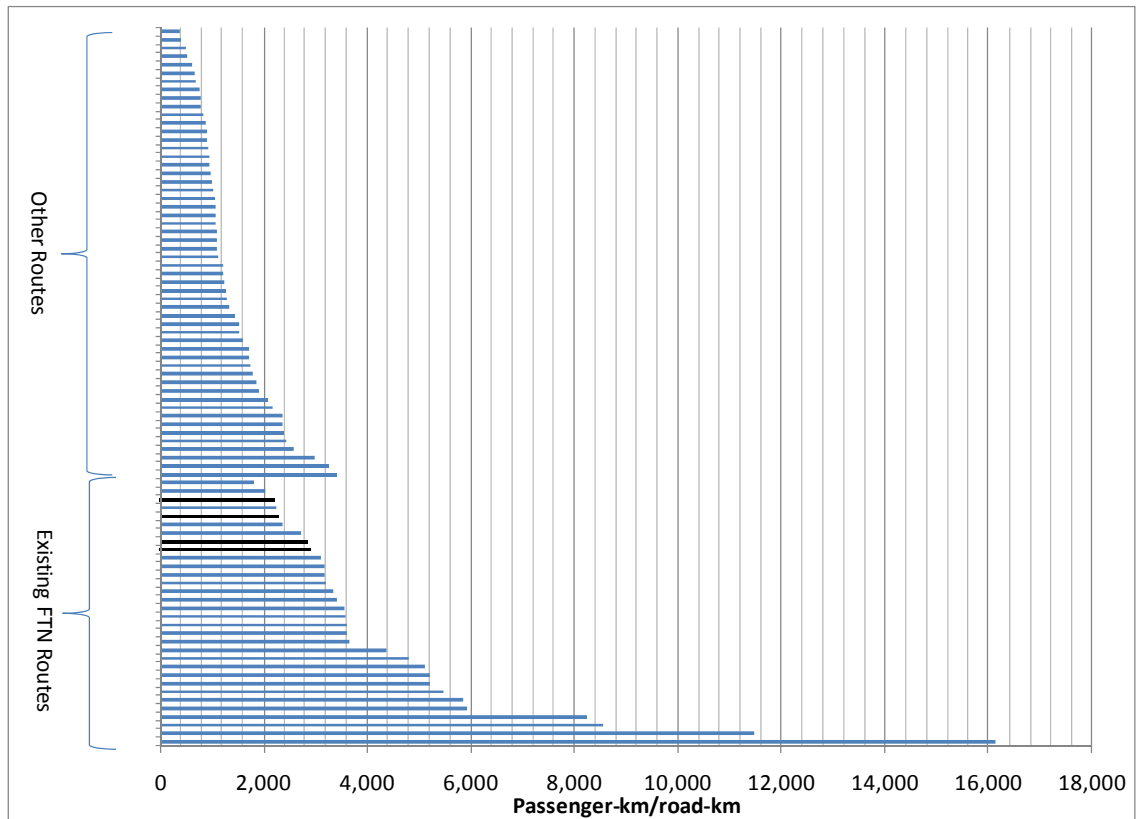


There are four existing FTN routes in Metro Vancouver that currently fall below the 500 boardings/road-km threshold on weekdays (shown as black bars). These four routes are all longer distance routes. One of the disadvantages of the boardings/road-km indicator is that it is biased against longer distance routes and also biased against routes that operate at higher speeds, such as a route that operates for portions on a highway.

A second indicator that was found to be useful for distinguishing FTN routes is passenger-kilometres/road-km. Figure VI shows the number of weekday passenger-kilometres/road-km. All of the FTN routes except one exceed 2,000 passenger-kilometres/road-km on weekdays. The one exception is the route that travels along Cambie Street, where construction of a new SkyTrain line may have adversely affected transit demand.

Figure VI also shows that the four routes which were shown in black on Figure V (meaning that they did not meet 500 boardings/road-km), do exceed the 2,000 passenger-kilometre/road-km threshold on weekdays. These routes are the longer distance routes. It appears that the use of both indicators in tandem can measure performance on FTN routes and provide a basis for identifying and prioritizing future FTN routes, bearing in mind that the threshold level is illustrative at this time and not a policy threshold. These indicators also work well together, as the boardings/road-km indicator is a measure solely of the density of ridership whereas passenger-kilometres/road-km is a function of both ridership and distance travelled.

Figure VI: Weekday Passenger-kilometres/Road-km by Route, Existing FTN vs. Other Routes, January–April 2008



Finally, it should be noted that one of the key advantages of the boardings/road-km indicator is that it can be easily calculated at a segment or corridor level by aggregating boardings data from individual bus stops. This indicator is therefore well suited to a corridor-based approach and can be supplemented by the passenger-kilometres/road-km indicator for added depth. One of the disadvantages of the passenger-kilometres/road-km indicator is that it is more complex to calculate at a segment or corridor level.

Transit Performance Indicators

A number of other potential transit performance indicators have also been identified for consideration. The ones that have emerged as most interesting so far in the process include:

- Overall passenger boardings (a transit ridership indicator)
- Passenger turnover rate (a land use indicator)
- Directional balance (a land use and capacity utilization indicator)
- Transit vehicle speed (a vehicle performance indicator)
- Passenger load (passenger-kilometres/seat-km) (a capacity utilization indicator)
- % of boardings during the peak period (a peak period indicator)
- Boardings per service hour (a productivity indicator)

These indicators provide further insights into the nature of transit usage along the FTN corridors and some have implications for land use planning. For example, the directional balance indicator measures the percentage of the boardings occurring in the peak direction during the peak

morning (6-9am) and peak afternoon (3pm-6pm) periods. At 50%, this indicator means that the passenger boardings in both directions are exactly balanced during the morning or afternoon peak period. A high value for this indicator indicates that there is significant unused capacity on the transit system in the reverse peak direction. This indicator has implications for land use planning as it helps to identify locations to potentially focus future development to better balance the loads on vehicles and make more effective use of transit service.

Passenger turnover rate is also an interesting transit indicator with land use implications. The indicator shows how much turnover occurs along each kilometre of a route. Routes with a higher passenger turnover rate tend to have the widest mix of land uses. These routes seem to attract shorter trips and possibly offer opportunities for more trip-chaining.

Core Land Use Indicators Supporting Transit Demand Associated with Frequent Service

From a transit demand perspective, there are many ways to reach a certain level of boardings/road-km or passenger-kilometres/road-km associated with frequent service. It is anticipated that each FTN corridor would have its unique land use characteristics which generate sufficient transit demand for frequent transit service.

The key land use drivers of transit demand are related to people's proximity to transit service, urban form, land use intensity and density, land use distribution and diversity, network connectivity, and walkability. Sample indicators to be analysed further are:

- Population density
- Employment and enrolled post-secondary student density
- Retail and institutional floor space (or retail and institutional employment)
- Land use mix (e.g. dissimilarity)
- Street connectivity
- Proximity of population, dwellings, and jobs to frequent transit corridors and rapid transit stations, and,
- Street and neighbourhood walkability (pedestrian-friendliness).

A unique aspect of the FTN is the additional focus on transit demand and frequent service in the off-peak periods such as evenings and weekends. Land uses that generate and attract trips during off-peak periods are different than those associated with peak period commuting. Land uses that tend to generate off-peak trips include shopping areas, movie theatres, entertainment uses, education institutions with evening or weekend classes, and restaurants. In contrast, land uses that only have a high concentration of office jobs may not generate adequate transit demand to warrant frequent transit service on evenings and weekends. It is necessary to have a good mix of land uses to support both peak and off-peak ridership for frequent service. It is also desirable to have sufficient transit demand in the reverse peak direction to better use the capacity of the transit system.

The Urban Centres in Metro Vancouver tend to provide the highest concentration and diversity of land uses which attract evening and weekend trips. Therefore, the Urban Centres underpin the Frequent Transit Network, not only during peak periods on weekdays, but also in the evenings and weekends.

An indicator that will be explored as part of the analysis concerns walkability. As every transit trip starts and ends as a walk trip, walkability is highly important for making transit an attractive travel option. A useful indicator for measuring the pedestrian environment has been developed by Dr. Larry Frank and other researchers, called the walkability index (4). The index includes four variables: land use mix, residential density, street connectivity, and net retail area. Walkability has the potential to be an interesting measure to consider in assessing the Frequent Transit Network and will be explored later in the process.

4 Establishing Transit Supportive Infrastructure and Amenities

Another aspect of creating a transit supportive environment is the provision of transit priority measures. A TransLink report on bus priority measures in the region (5) identified three main classes of measures:

Road Reservation – Reserving road space for public transit vehicles, such as bus only streets or malls, busways, exclusive bus lanes, bus queue jumpers, HOV lanes, and bus bulges.

Traffic Control Measures – Using traffic control measures, devices, and management schemes to give buses preferential treatment, such as bus-activated signals. These measures are designed to reduce the signal delay for approaching buses.

Legislative Measures – Involve the use of regulatory measures that can be applied to give priority to buses, including exemptions from traffic prohibitions, such as being permitted to make a turn, which is prohibited to other road vehicles.

Transit priority measures can result in improved transit travel time and service reliability, two important elements of providing high quality transit service and attracting ridership. TransLink funds 100% of the transit priority improvements in Metro Vancouver.

TransLink shares responsibility for a Major Road Network with the local municipalities. TransLink coordinates and funds major capital projects on the Major Road Network and also allocates funds to the municipalities on minor capital projects. Many of the frequent transit corridors are located on sections of the Major Road Network. This allows TransLink an opportunity to improve the efficiency and safety along the FTN.

TransLink also provides funding to the municipalities on transit-related infrastructure improvements in the region such as bus stop and passenger area improvement.

Transit priority measures and amenities are critical for creating a transit-oriented region. In addition, transit amenities, such as bus shelters and benches, as well as creating walkable streets and neighbourhoods, are important for creating a pedestrian friendly environment.

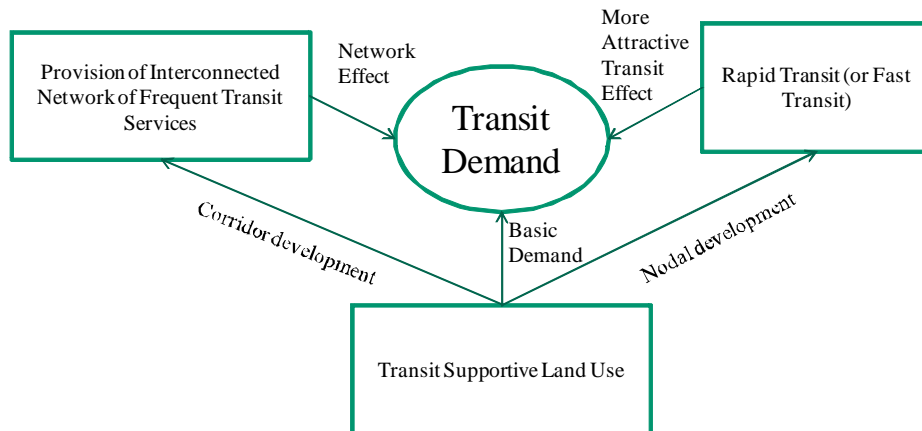
5 Transit Demand Triple Play

As noted, an interconnected network of frequent transit service corridors can result in a significant increase in ridership through the Network Effect. On top of this increase, further ridership can result from the provision of rapid transit or fast transit services like the limited stop B-Line service. BC's Provincial Transit Plan (6) and TransLink's Transport 2040 identify a number of potential future rapid transit corridors including the Evergreen Line to the Coquitlam and Port Moody area, the extension of the rapid transit system in Surrey, possible rapid transit (bus or rail) along the Broadway corridor in Vancouver, and potential rapid transit (bus or rail) in other parts of the region. One of the key strategies from Transport 2040 is to make early investments that encourage development of communities designed for transit, cycling, and walking and rapid transit will be an important element of this. Surveys have shown that limited stop B-Line service and rapid transit attracts a significant share of their riders from former car drivers or passengers. This reiterates the notion of a coordinated land use, transportation infrastructure, and transit provision approach. Rapid or fast transit requires sufficient density and mix of uses along the corridor with sufficient development at the station nodes to provide the ridership to make these investments viable.

With coordinated development, a triple play of transit demand can occur (see Figure VII). The initial transit demand comes from land use. Over time, a basic network of frequent transit service can emerge if there is a transit supportive environment in place. The frequent transit network can then be developed further to include more interconnecting corridors, which has a positive feedback where transit demand is magnified. If development is coordinated and significant transit demand results from it, this could lead to the establishment of higher order frequent transit service such as a high frequency bus service or a bus or rail rapid transit line along the corridor. The expansion of the rapid transit system would result in fast and frequent service and thus attracts existing riders to use the system more as well as new riders. This demand in turn further supports the demand for the frequent transit services through transfers.

A significant increase in transit usage can result with the combination of a land use, network, and rapid transit effect when coordinated together. Land use is the key element that underlies this magnification effect on transit demand. The opening of a SkyTrain rapid transit line between the Richmond City Centre, Vancouver International Airport, and Downtown Vancouver in 2009 as well as a new frequent bus corridor being added in Richmond will provide an opportunity to observe changes in service provision and the resulting increase in transit usage both over the short term as well as the longer term as development occurs around the stations and along this rapid transit corridor.

Figure VII: Transit Demand Triple Play



Over time it is possible that the Frequent Transit Network may also be expanded to include community shuttles operating with frequent service that operate within or connect to the Urban Centres or certain rapid transit stations. Community shuttles provide service using smaller vehicles to destinations over shorter distances. Currently, two community shuttle routes are already operating at frequent service levels in downtown Vancouver. These services provide a greater reach and may be important for providing connections to and from the frequent transit network, particularly for routes that are less linear in nature.

6 Summary

The Frequent Transit Network has evolved quickly in Metro Vancouver since it was established in 2007. TransLink is in the early stages of developing a Frequent Transit Network and Metro Vancouver is concurrently working on developing and consulting on the Frequent Transit Development Corridor concept and promoting the integration of land use and transit-supportive infrastructure in conjunction with the local municipalities.

Frequent Transit Networks and Frequent Transit Development Corridors in Metro Vancouver can be used to focus growth and attract density and transit-supportive land uses, similar to development around stations for a fixed rail corridor, but smaller in scale.

Work is currently underway to identify indicators which characterize FTN transit usage and supportive land use. A number of indicators were reviewed to help distinguish FTN corridors. Two useful indicators found to date are both transit demand indicators: boardings/road-km and passenger-kilometres/road-km, and almost all the existing FTN corridors performed well on one or both of these indicators. One of the next steps will be to relate these indicators with the underlying land use variables that support this level of transit activity.

From a land use perspective, there are many ways to reach a certain level or range of transit demand to achieve frequent transit service. Of particular importance to the FTN will be to understand the type of land uses and densities that support transit on weekends and in the evenings.

The provision of transit supply is an important lever for supporting and sometimes leading transit demand. Extending the FTN to new corridors where existing or anticipated transit demand warrants improved service and increasing service levels in existing frequent transit corridors will continue to foster a more transit-oriented region. The provision of rapid transit can further increase transit demand along frequent transit corridors and on interconnecting routes. Another key tool to support the FTN network is the establishment of transit priority measures to improve transit travel time and service reliability. When all factors are implemented in a coordinated manner, a magnification of transit usage is possible within the region.

Additional research and consultation with municipalities, stakeholders, and others will be undertaken as part of the process to develop an implementation framework for the FTN and the FTDC concept. The Frequent Transit Network and the Frequent Transit Development Corridor concept hold the promise of a bold vision for how to integrate land use and coordinate the provision of land use and frequent transit service. Together, they will be important tools for meeting key regional land use, transportation and sustainability objectives.

7 References

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