



SOUTH OF FRASER

transit plan



2

Analysis of the Network for 2031 / 1 Million Residents



November 2007

Cover Photo: Dennis S. Hurd, April 2006



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Technical Memorandum

[Technical Memorandum No. 1:
Investment in Rapid Transit on Urban Land](#)

[Technical Memorandum No. 2:
Market Research](#)

[Technical Memorandum No. 3:
Cost Summary](#)

[Technical Memorandum No. 4
APC \(Automated Passenger Counter\) Data Analysis](#)

[Technical Memorandum No. 5
Facility Summary Sheets](#)



Phase 2 is a detailed examination of the current transit network including counts of passengers boarding or alighting by bus stop. This provides a profile that can be used to compare existing routes to new routes in the vision to determine the impact of changing the current system. This phase will also include a review of all facilities in the system (bus exchanges and terminals) and a creation of a bus network that represents the vision.

Introduction

The second phase of the South of Fraser ATP begins to add more detail to the long-range vision identified in Phase 1. This long range vision was adapted to an estimated population of 1 million residents south of the Fraser River by 2031 though

it is not time constrained. The network is tied to population and density rather than time, therefore if growth occurs faster than predicted then the service must be implemented at a faster rate. The corollary is also true, if growth slows, then the pace of transit expansion similarly slows.

While the Vision focused on high-level rapid transit and frequent bus corridors, Phase 2 provides an example of what a fully developed transit network would look like based on this vision. The 2031 network will replace the existing transit system as communities in the South of Fraser grow

with a system of rapid transit, frequent bus network, and local routes. It was developed through a process involving stakeholder input, market research and data review.

This phase also includes an examination of the infrastructure changes required to fulfill the vision. A review of necessary capital projects included expansion of bus exchanges, development of new transit centres, and introduction of transit priority measures including busways.

Interurban Rail Corridor Estimate of Ridership

One of the areas requiring further discussion from Phase 1 is the issue of the Interurban Rail corridor and its usefulness as a potential rapid transit line within the context of this plan. The

Inputs to 2031 Network

- **CMBC Service Planning**
- **D-W Services (operator of Langley Community Shuttles)**
- **Automated Passenger Count (APC) data review**
- **Municipal planning staff**
- **SoF ATP Technical Committee**
- **Market Research**

corridor was reviewed at length in Phase 1 and is shown on the 2031 maps of the network as a corridor worth preserving for long term use. With respect to priorities however, this corridor does not currently play a significant potential role in the creation of a rapid transit network, nor does it show mid-range potential because of the lack of growth in population or jobs within the area. The City of Surrey will continue to support the corridor as one of the few areas of light industrial within the City and the only one with easy rail access for the business. There has been discussion by various stakeholders and lobby groups regarding the use of the corridor for “Community Rail” or hobby rail and it is this potential as a tourist type service that should be focused on.

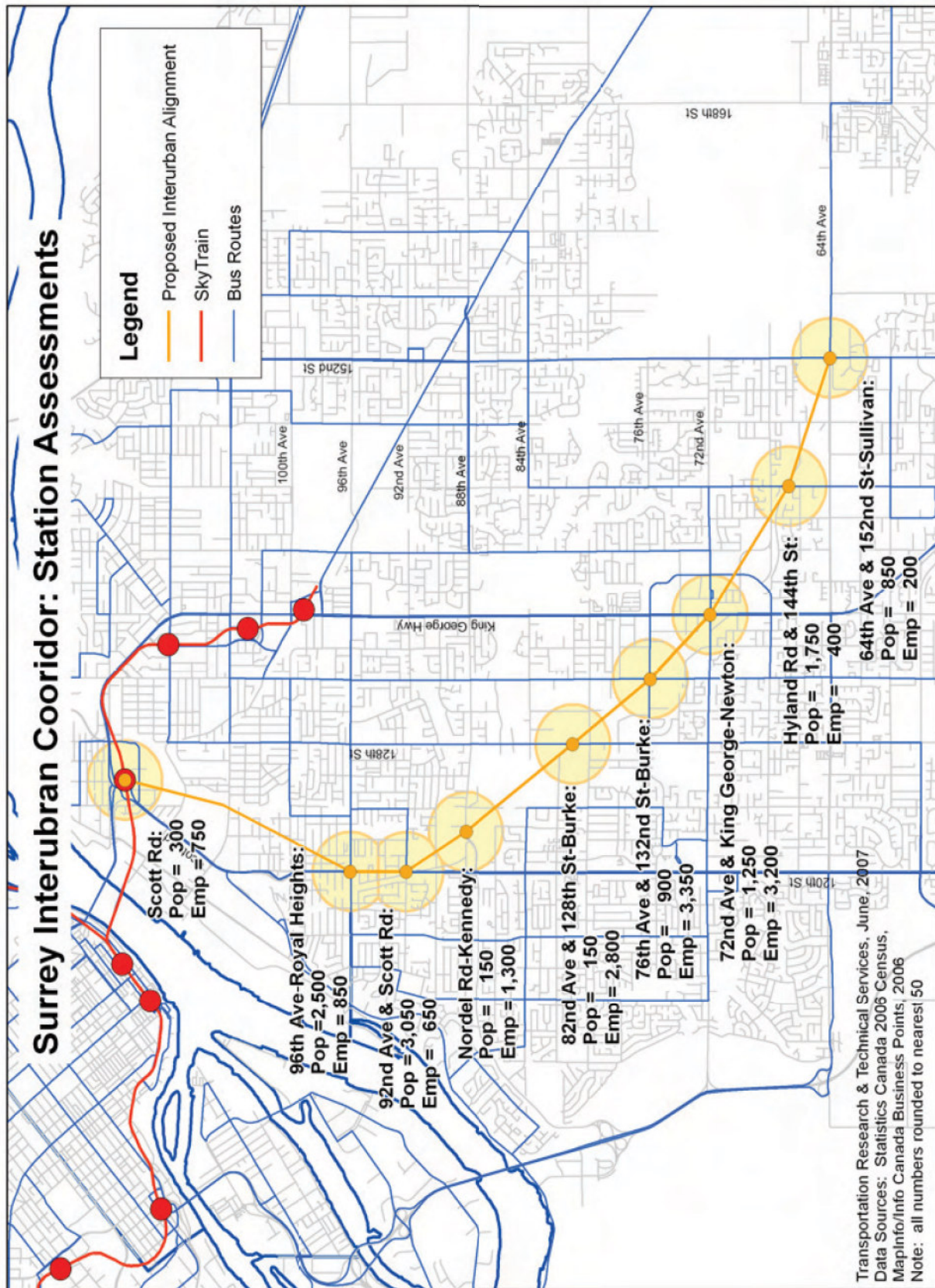
With respect to rapid transit costing, Phase 1 explored the potential cost of upgrading the line to allow for a two-way, all day, rapid transit service. In Phase 2, the current population and jobs were reviewed to determine if there was any potential ridership that would give the expenditure validity in the short term. Figure 1, shows the amount of population and jobs within walking distance of each station and it is readily apparent that these numbers are very small.

With respect to pure ridership (and not accounting for a line’s ability to act as a catalyst for large scale change in the urban fabric – see Technical Memorandum 1.) a rule of thumb is that a rapid transit line should have about 100,000 people, 30,000 jobs or can create and sustain approximately 40,000 trips per day – ideally combined in both directions for maximum use of the rail equipment.

With approximately 10,000 residents and 13,000 jobs, there is not the required density of jobs or population to generate the demand required for rapid transit. Utilizing the regional mode split (rather than the South of Fraser mode split of only 4%) of 11.5%, this area would likely only generate about 1000 trips per day, far short of what would be required to justify the investment in the corridor. In addition, a number of key stations are already on identified North-South corridors served by the Frequent Transit Network.

However, rail planning should be done in longer time spans of 50 to 100 years, therefore, there is potential along the corridor to be a key part of the network in the future. This potential justifies protecting the corridor for future use.

Figure 1: Population and Jobs along Interurban Corridor



The 2031 Transit Network

– Layers of Service

The creation of the 2031 Network involved using the Vision and applying a number of key transit planning rules in order to create the actual route structure that should be pursued for the South of Fraser. These planning rules were:

- **Simplicity:** the network should be simple to understand
- **Internal Travel:** the network should focus on movement within the South of Fraser
- **Connectivity:** town centre to town centre should be accomplished through “L-shaped” transfers.
- **Layers:** there should be distinct layers of service for each type of customer need; and
- **Service Levels:** the future network involves much more frequent service and longer hours of operation than currently exists.

The 2031/1 Million Residents Transit Network includes four distinct types of transit as described in Phase 1. Each of these layers of transit serves a different function, but work together as a network to meet the needs of the South of Fraser. Vehicles used will be appropriate to the service types, varying from small Community Shuttle buses to unique Rapid Transit vehicles. These service types include:

- Rapid Transit
- Frequent Bus Network
- Local Bus Service
- Neighbourhood routes

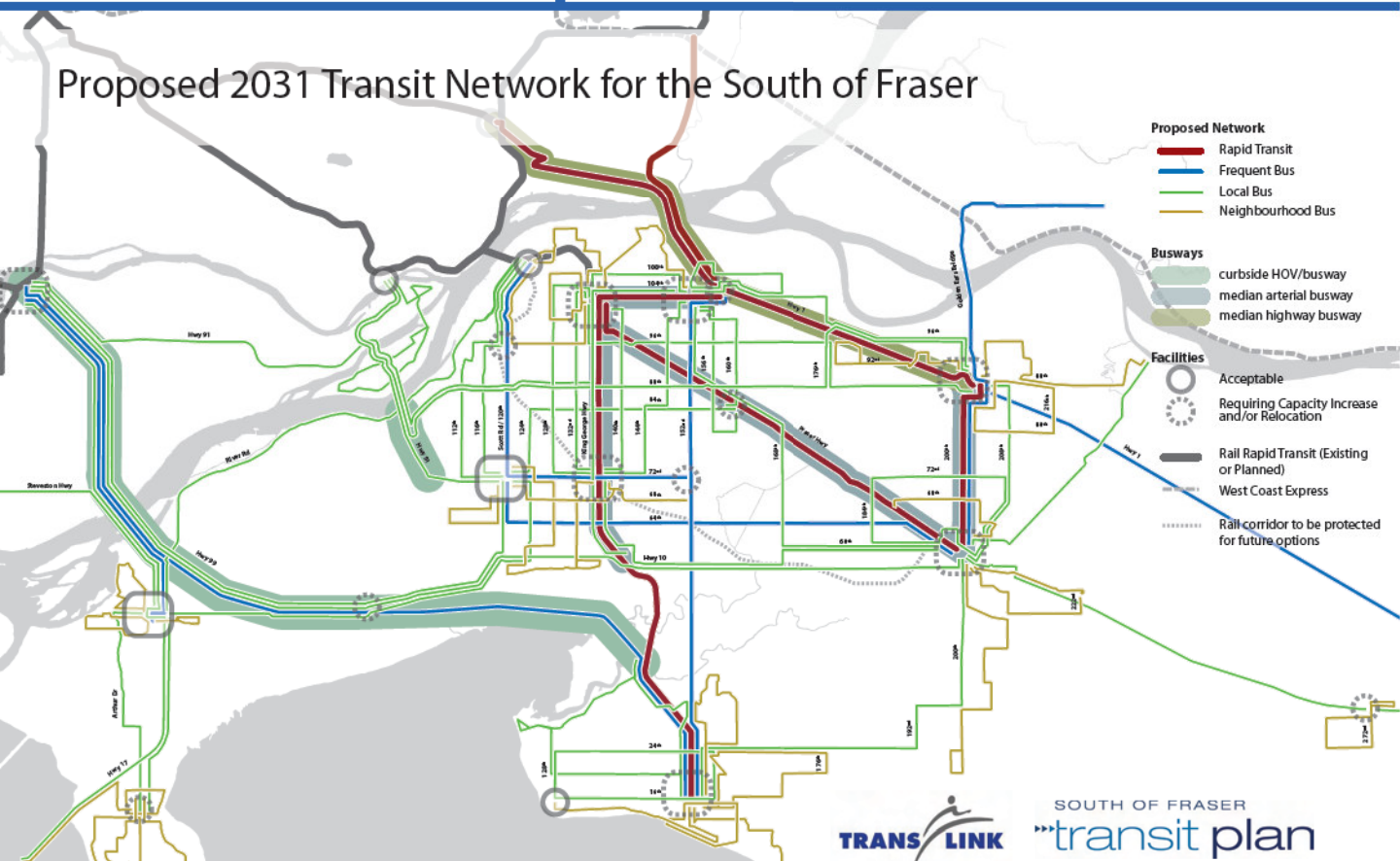
There are peak hour increases in service expected for some services, however, there will likely be few, if any, peak hour routings as is the case currently. As a network matures, the need for peak hour routes diminish because the network becomes more dense and the ability of customers to access the system increases.

With the opening of the Canada Line rail service from Richmond and the Vancouver airport to downtown, there will be a removal of all express bus routes that currently provide a no-transfer service to downtown. These services, primarily from White Rock/South Surrey and Tsawwassen, will terminate



at Bridgeport Station to avoid a duplication of service with the rail line. This should increase the reliability of the trip for customers, as well as reduce the stress of catching a particular trip out of downtown. There should be an increase in service frequency for routes out of Bridgeport that will provide greater opportunity for customers to travel to and from home.

Figure 2: Transit Network for 1 Million



Given the socio-economic markets in the White Rock/South Surrey and Tsawwassen/Ladner areas, there is likely to be a demand for a new layer of service that is not currently part of the TransLink stable of services. That service type is the value-added Regional Coach Service based on the customer service attributes associated with the West Coast Express. A similar type of regional service is provide in the Greater Toronto area by GO Transit to complement regional rail service. The GO Bus system links regional areas and it is proposed that a similar type service be created to serve longer commutes within the Metro Vancouver area as well as to the Fraser Valley and potentially to Squamish. The first routes that could be created would be from Abbotsford with potential routes from White Rock and Tsawwassen. These routes would feature highway

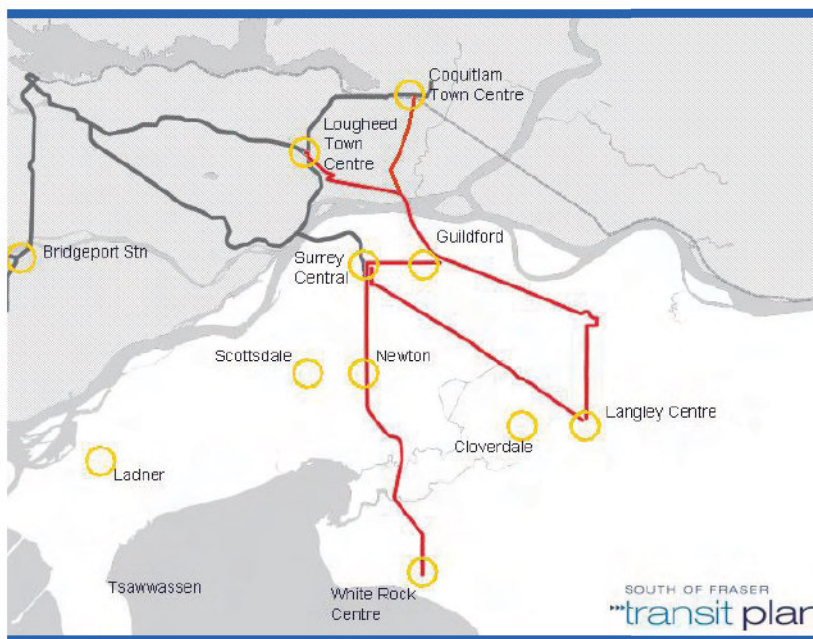
coaches and be branded as a value-added service similar to WCE and TrainBus. The entire network is shown in Figure 2 and described layer by layer in the following sections.

Rapid Transit

Overview

Rapid Transit is the core of the system, with high frequency and fast, high capacity service linking major regional centres and connecting into the regional rapid transit network.

Figure 3: Proposed Rapid Transit Corridors



In the South of Fraser, there are four corridors proposed (see Figure 3):

- King George Highway and 104th Avenue
- Fraser Highway
- Highway #1
- 200th Street

All corridors will be built with the future notion that, though they may start with Bus Rapid Transit, they would be easily adapted to rail when demand warrants.





The routes using these corridors will be:

- King George Highway to Guildford to 156th/Highway 1
- Surrey Central to Langley via Fraser Highway
- Highway 1 from 200th Street to Lougheed Town Centre (the origin of the route may vary from Langley or Abbotsford)
- Langley to Highway 1 via 200th Street (may be combined to be a single route continuing to Lougheed Town Centre)
- Highway 1 from 156th Street to Coquitlam Town Centre

Future routes to be considered:

- Walnut Grove to Coquitlam Town Centre via the Golden Ears Bridge and Highway 17
- South Surrey/White Rock to Simon Fraser University in Burnaby via Highway 1

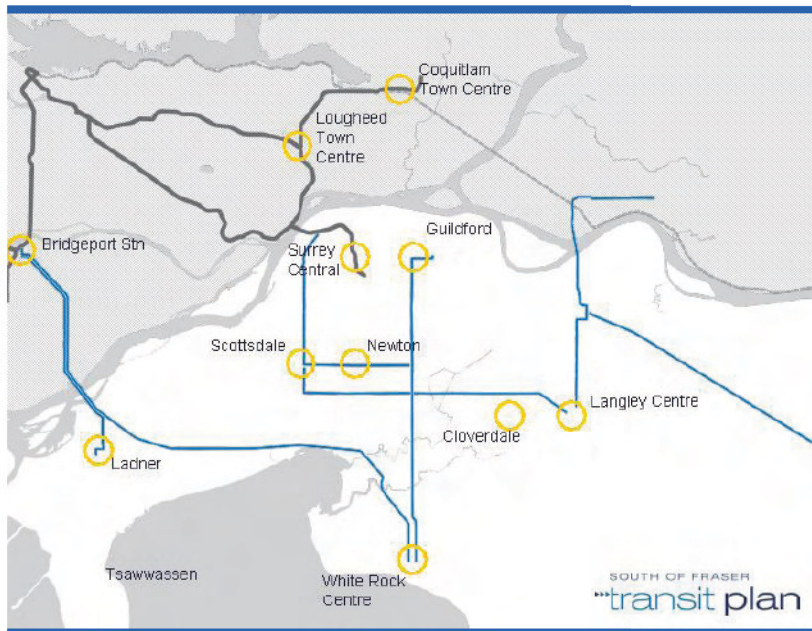
Characteristics

Vehicle	Bus or Rail based	 Rail	 Bus
Transit Priority	Dedicated Lanes and Traffic Signal Priority	Dedicated Lanes	 Signal Priority
Minimum Frequency		Peak: 5 Minutes	Off Peak: 10 Minutes
Hours of Service		Start: 6:00 AM	Finish: 1:00 AM
Station Spacing		Minimum: 1000 metres	Maximum: 2000 metres
Customer Amenities	Fare Collection: Off Board	 Station	 Real Time Information

Frequent Bus Network

This is a higher-level bus service, providing consistent and frequent local service on major corridors. This service will be a minimum of every 15 minutes, 15 hours a day, 7 days a week. Peak hour service will be increased to match demands.




Figure 4: Frequent Bus Network



Route Descriptions

Route	Destination	2031 Peak Headway	Description
F-A	Langley - Maple Ridge	12	Links Town Centres via 200th St. Corridor and Golden Ears Bridge
F-B	White Rock - Guildford	10	Links Town Centres via 152nd St. Corridor
F-C	72nd - Scott Road Station	6	Thru Service on 72nd Ave. from 152 St. to Scott Road
F-D	White Rock - Bridgeport	3.5	Links White Rock Centre with Canada Line via Highway 99, 152nd St., South Surrey Park & Ride
F-E	Scottsdale - Langley	15	Links Scottsdale with Langley via Scott Rd., 64th Ave and Fraser Hwy
F-F	Walnut Grove - Abbotsford (Hwy 1)	12	Highway 1 service linking Walnut Grove with Abbotsford

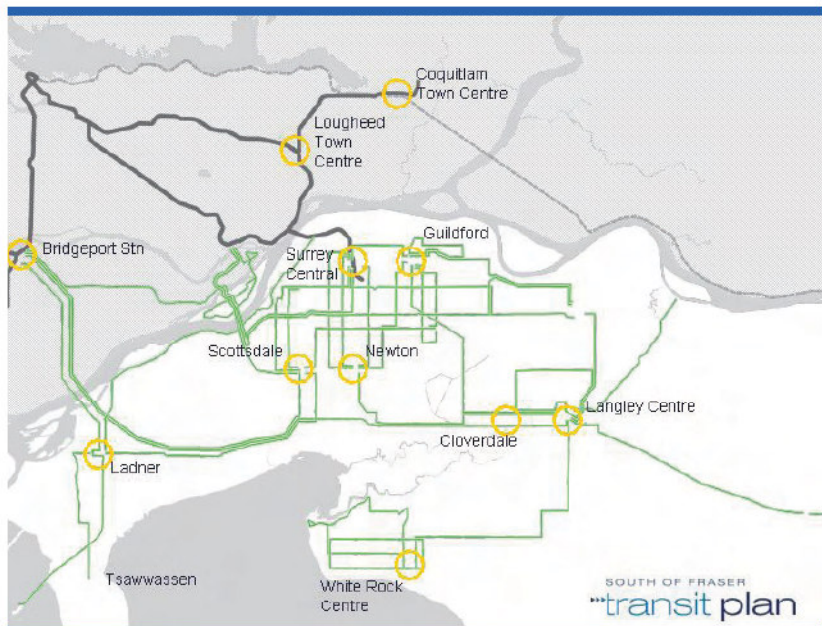
Characteristics

Vehicle	Size is based on demand	 Regular Bus	 Articulated Bus
Transit Priority	Traffic Signal Priority		 Signal Priority
Minimum Frequency	Peak: Minimum 15 Minutes but lower based on demand	Off Peak: Minimum 15 Minutes to 9PM 30 minutes after	
Hours of Service	Start: 6:00 AM	Finish: 12:00 AM	
Station Spacing	Minimum: 250 metres	Maximum: 400 metres	
Customer Amenities	Enhanced Bus Stops	Static Schedule and route Information	

Local Bus Service

Regular bus service for short and medium distance trips within and across the South of Fraser

Figure 5: Local Bus Service





Route Descriptions

Route / Destination	2031 Peak Headway	Description
22nd St. Stn - Walnut Grove via Hwy 91, 88th Ave, 96th Ave	15	New east-west service, routing through Port Kells and Annacis Island employment
22nd St. Stn - Annacis Island	8	Existing route connecting Annacis Island with SkyTrain
Bridgeport Stn - Surrey Central via Hwy 91, 88th Ave, King George Hwy	15	New route connecting Surrey and North Delta with the Canada Line
Bridgeport Stn - Langley via Hwy 99, Hwy 10	20	New route providing direct service between the Canada Line and Langley TC
Bridgeport Stn - Scottsdale via Hwy 99, Hwy 10, Scott Rd.	12	New all-day route connecting Canada Line directly with the Scottsdale area
White Rock - Langley via 24th Ave, 192nd St., 200th St.	15	New route to provide a direct connection between White Rock/South Surrey and Langley Town Centre/Willowbrook Mall
White Rock - South Surrey via 16th - 24th	10	New route providing internal circulation along 16th and 24th Avenues
Langley - Walnut Grove via 208th St.	15	New route connecting Langley Town Centre, Willoughby and Walnut Grove
Clayton - Willoughby via 208th St., 72nd Ave, 184th St., 60th Ave	20	Improved service to Clayton Heights and new east-west connections in Langley
Guildford - Langley via 152nd St., Fraser Hwy, 168th St., 60th Ave	15	Local service in Fleetwood, Fraser Hwy and Cloverdale
Newton - Langley via Hwy 10, 168th St., 60th Ave	20	New route on Hwy 10 and 60th Ave
Langley - Aldergrove via Fraser Hwy	15	Improved existing route
Newton - Surrey Central via 132nd St.	12	Improved core Surrey service
Newton - Surrey Central via 128th St.	12	Improved core Surrey service

Route / Destination	2031 Peak Headway	Description
Guildford - Fraser Heights via 104th, 108th	10	Improved service through Fraser Heights
Scottsdale – 22nd St. Stn via 72nd, Hwy 91	10	Connection from Scottsdale to SkyTrain in New Westminster and Annacis Island
Newton - Guildford via 72nd Ave, 144th St., 84th Ave, 148th St.	15	Improved service linking Town Centres
Newton - Surrey Central via 140th St.	12	Improved core Surrey service
Fleetwood - Guildford via 160th St.	15	Direct connection with Fleetwood
Surrey Central - Guildford via 108th Ave	12	Improved east-west service between Town Centres
Scottsdale - Scott Rd. Stn via 112th St., Scott Rd.	10	Improved local service through North Delta
Scottsdale - Scott Rd. Stn via 116th, Scott Rd.	15	Improved local service through North Delta
Ladner - Scott Rd. Stn via River Rd.	12	Improved service linking Ladner with SkyTrain via Tilbury
White Rock - Crescent Beach via 20th Ave, 128th St., Crescent Rd., King George	10	All-day local service connecting South Surrey and Park & Ride
Ferries - Bridgeport Stn via Hwy 17, Hwy 99	30	Tsawwassen Ferry service connection to Bridgeport Station and Ladner
Tsawwassen - Ladner via 56th St., Arthur	10	South Delta connecting service
Guildford - Walnut Grove via 104th Ave, Barnston Dr, 96th Ave	12	Improved local service parallel to Hwy 1
Surrey Central - Walnut Grove via 96th Ave, 88th Ave	20	New east-west route connecting Surrey and Langley including South Port Kells
Fleetwood - Guildford via 156th St.	15	Direct connection with Fleetwood

Route / Destination	2031 Peak Headway	Description
Surrey Municipal Ctr – Guildford via King George Hwy, 104th Ave	10	Local service underlying BRT
Tsawwassen - Bridgeport via Hwy 17/99	8	Peak-only service linking to Canada Line
Aldergrove - Abbotsford	20	Connector service with Abbotsford
Scottsdale - Fleetwood via 124th St., 84th Ave	20	New east-west route through mid-Surrey
Ladner - Scottsdale via Hwy 10, 124th St.	20	Delta Connector service

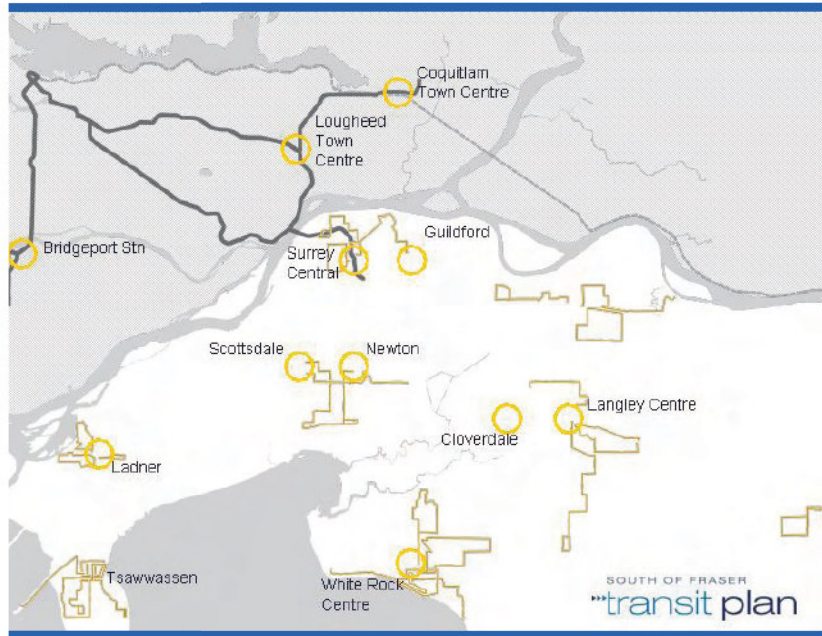
Characteristics

Vehicle	Size is based on demand		
		Regular Bus	Community Shuttle
Transit Priority	Traffic Signal Priority possible		
Minimum Frequency	Peak: Minimum 30 Minutes but lower based on demand	Off Peak: Minimum 30 Minutes to 9PM 60 minutes after	
Hours of Service	Start: 6:00 AM	Finish: 11:00 PM	
Station Spacing	Minimum: 250 metres	Maximum: 400 metres	
Customer Amenities	Weather protection where possible	Route Information at key locations	

Neighbourhood Bus Service

Neighbourhood bus service serves shorter trips within communities linking neighbourhoods with local activity centres and the rest of the transit network. These routes are likely provided with smaller vehicles, however demand and local desires will dictate the service. Each route is distinct and has a purpose.

Figure 6: Neighborhood Bus Service





Route Descriptions

Destination	2031 Peak Headway	Description
Scottsdale - Newton via 68th Ave	30	New east-west service on 68th Ave
White Rock - Morgan Creek	15	New route into Morgan Heights community
Ocean Park - White Rock via Marine	15	White Rock beachfront service
White Rock via Johnson, Marine, Stayte	15	Local White Rock route
Grandview Heights via 16th Ave, 24th Ave	15	New route to Grandview Heights

Destination	2031 Peak Headway	Description
Border - White Rock via Johnson, Buena Vista, Hwy 99	60	New route to US Border Peace Arch Crossing
North Ladner via Ladner Trunk, Ferry, 57th	10	Improved existing Ladner route
South Ladner via 44th, 45th, 47th, Ladner Trunk	10	Improved existing Ladner route
East Ladner via Ladner Trunk, Holly Park	20	Improved existing Ladner route
Tsawwassen Heights - South Delta	10	Local service in Tsawwassen
Boundary Bay - South Delta	20	Improved existing Boundary Bay route
Ferries - Tsawwassen Town Centre	30	New route connecting with Tsawwassen Ferry terminal
English Bluff - South Delta	10	Tsawwassen community circulator route
Tsawwassen Town Centre - Beach Grove	15	All-day community route through Beach Grove
Aldergrove Circulator	20	Local service within Aldergrove
Scottsdale - Newton via 128th St., McLellan, 132nd St.	20	Improved existing route through Panorama Ridge
Scott Rd. Stn - Surrey Central via Bridgeview, Bolivar Heights	20	Improved existing route through Bridgeview and Bolivar Heights
Surrey Central - Guildford via Grosvenor Rd.	15	Improved existing route in North Surrey
West Whalley - Surrey Central via 108th Ave, 128th St., 100th Ave	20	New West Whalley circulator
Langley - Fort Langley via Langley Bypass, Glover Rd.	15	improved existing route, including service to Trinity Western

Destination	2031 Peak Headway	Description
Yorkson - Walnut Grove via 200th St., 80th Ave, 216th St., 88th Ave	20	New route in Yorkson area
Walnut Grove - Fort Langley via 96th Ave, Walnut Grove, 88th Ave	20	Improved existing route in North Langley
Port Kells - Walnut Grove via 92nd Ave	15	New route to Port Kells area
Fernridge - Langley	30	Improved existing route south of Langley Centre
Langley - Murrayville via Fraser Hwy, 53rd Ave, 48th Ave	20	Improved existing route through Murrayville
Langley - Langley Hospital via Fraser Hwy, 52nd Ave	20	Improved existing route north of Fraser Highway
Clayton - Langley via 68th Ave	20	Improved east-west route to Clayton area
Surrey Central - Scott Rd. Stn via 96th Ave, Scott Rd.	20	Local service on 96th Ave
Sunshine Hills - Scottsdale	20	New route in Sunshine Hills area Characteristics

Characteristics

Vehicle	Size is based on demand	 Regular Bus	 Community Shuttle
Transit Priority		Traffic Signal Priority possible	
Minimum Frequency		Peak: Minimum 30 Minutes but lower based on demand	Off Peak: Minimum 30 Minutes to 9PM 60 minutes after
Hours of Service		Start: 6:00 AM	Finish: 11:00 PM
Station Spacing		Minimum: 250 metres	Maximum: 400 metres
Customer Amenities		Weather protection where possible	Route Information at key locations

Regional Coach Service

Overview

Regional Coach service provides a value added service for longer regional and inter-regional single seat trips where customers prefer to travel with greater convenience and amenities. Inter-regional service from the Fraser Valley and Squamish-Lillooet Regional Districts would be considered first with intra-regional services considered based on customer requests.



Route Descriptions

Routes being considered are:

- Abbotsford into downtown Vancouver,
- Abbotsford to Lougheed Town Centre
- Abbotsford to Coquitlam Town Centre
- White Rock to downtown Vancouver
- Squamish to downtown Vancouver
- Coquitlam to downtown Vancouver, and
- Tsawwassen to downtown Vancouver. There is a potential

for this type of service to utilize bus lanes and busways in the South of Fraser to gain significant time advantages, particularly for areas in the Fraser Valley.

Characteristics

Vehicle	Size is based on demand	 GO Transit Highway Coach	 TrainBus Highway Coach
Transit Priority	Signal Priority	Bus Lanes where available	
Minimum Frequency	Trips are based on demand		
Hours of Service	Start: 6 AM	Finish: 12 AM depending on demand	
Station Spacing	Limited stops at key locations		
Customer Amenities	Stations at key locations	Route Information at key locations along with real time informations	

Rapid Transit Infrastructure (bus lanes and busways)

Rapid Transit requires dedicated right of way in order to be competitive with the automobile. This allows the service to provide fast and consistent service whether by rail or by bus. There are three types of infrastructure contemplated for the South of Fraser:

Highway Shoulder Bus Lanes

These are lanes at the side of the road dedicated to buses only (or emergency vehicles). Shoulder lanes have been used extensively throughout the United States and have proved an effective use of existing resources. Highway 99 currently has some bus lanes in place, however, this plan envisions an extension of those lanes from Bridgeport Station to the King George exit in South Surrey. In addition, Highway 91 from 64th to the Alex Fraser Bridge is also required. These will require agreement with the Ministry of Transportation.

Arterial Median Bus Lanes

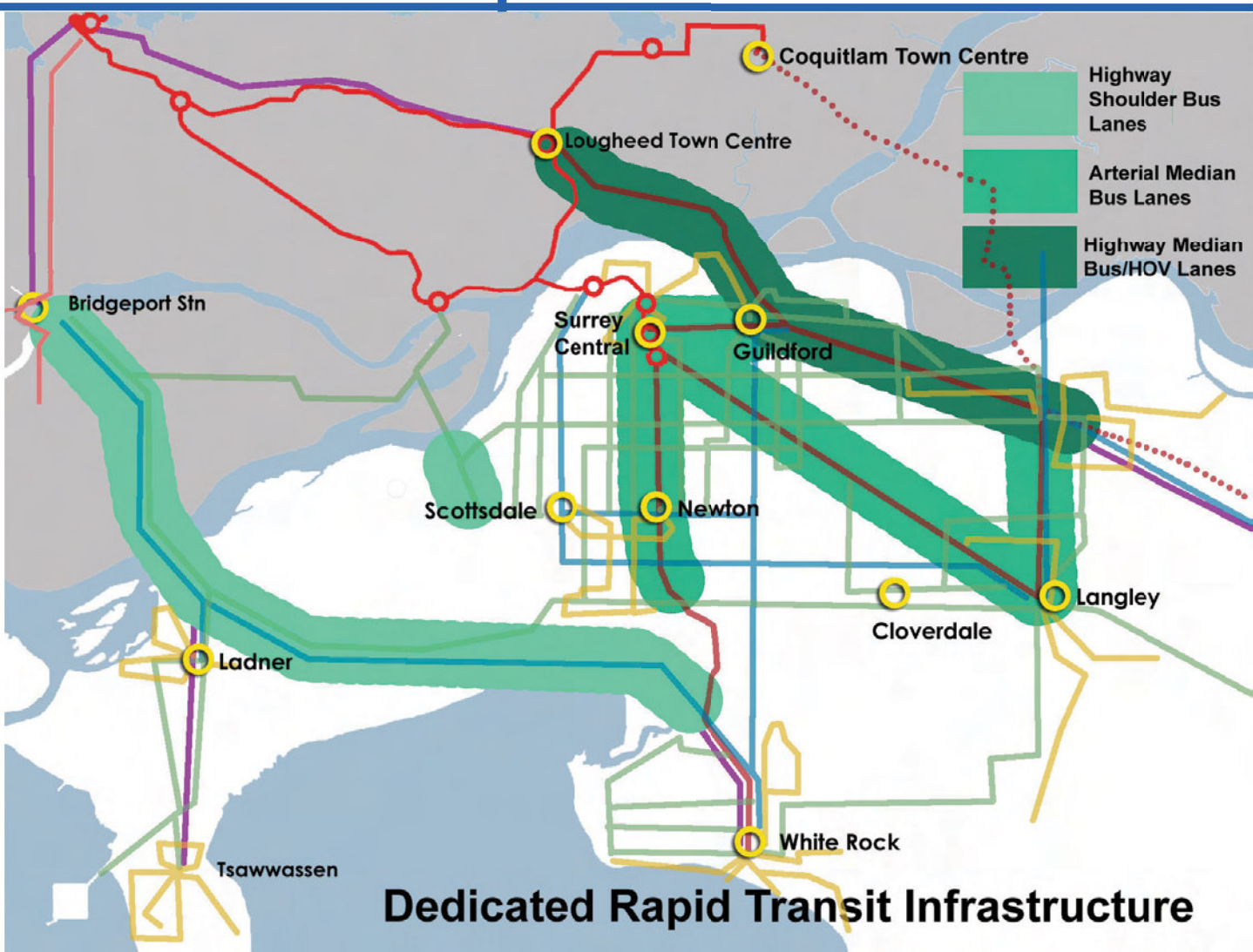
These are centre or median bus lanes down the middle of city roads that are fully separated and built to future rail standards to allow a shift from bus to rail when warranted by demand. These types of lanes require extensive consultation and agreement with affected municipalities. There are four sections of roadway considered for this type of infrastructure:

- 104th Avenue from 156th Street/Highway #1 to King George Hwy. This may be a long term solution with curbside lanes used until sufficient right-of-way can be acquired over the mid-term.
- King George Highway from 104th Avenue (via Surrey Central Station) to Surrey City Hall (there is potential for dedicated lanes in South Surrey, however, the limited road right-of-way may prevent this.)
- Fraser Highway from Surrey Central Station to Langley Town Centre (in the Willowbrook Mall area).
- 200th Street from Willowbrook Mall (and connections to the Fraser Highway service) north to the future Highway #1 bus interchanges between 200th Street and 204th Street.

Highway Median Bus/HOV lanes

Highway #1 has been identified by both TransLink and the Province as a rapid transit corridor based on buses. Median lanes will be built to allow buses to travel from 200th Street through to the Port Mann bridge and then on to Lougheed Town Centre via a connection around Government Street. There will be only 3 stations along the busway at around 200th Street, 156th Street and Lougheed Town Centre. Routes will also continue onto Simon Fraser University or to Coquitlam Town Centre after crossing the Port Mann bridge. Currently the lanes have been identified as bus/HOV though the definition of HOV has not yet been finalized.

Figure 8: Dedicated Rapid Transit Infrastructure



Bus Facilities

Bus facilities refers to transfer locations where buses either provide a large scale transfer option, where buses require a turnaround, or where it is the end of the route and operators require layover time. A total of 21 facilities were identified through the planning review of which a total of 17 require improvements. These facilities have been analyzed by the number of routes anticipated to use them, the frequencies of each route and the geographic area they represent. Most have been examined in conjunction with each other to spread out the layover needs around the region. An example of this analysis is shown in Figure 8.

One of the main challenges in the South of Fraser transit network is the interdependence of the facilities. Routes in other areas of the region have termini that can be used to allow for operator down time such as along Marine Drive in Vancouver, Lonsdale Quay or Park Royal in the North Shore and Ladner Exchange in Delta. However, within Surrey and the Langleys, there are few options available. In order to make improvements to the system, there are a few key facilities that require changes – particularly if the Urban Transportation Showcase Project’s Transit Village project at Surrey City Centre is to succeed. These are the facilities that link up the Rapid Transit network. For a full review of infrastructure, see Technical Memorandum 3.

Surrey Central

Surrey Central will change dramatically under the proposed Transit Village project with a movement away from the current exchange to on-street facilities. This requires layover to be moved to other exchanges in the region such as Newton, Langley, South Surrey and Guildford.

South Surrey/White Rock

This facility is currently on-street and has effectively reached its limit in terms of the number of buses and the amount of curb space used. In order to improve service in the future, this facility requires significant upgrading. Proposals to redevelop the Semihamoo Mall provide an opportunity to work with municipal partners and developers to create a new facility.

Newton Exchange

Newton Exchange has limited potential for expansion in its current location and is less desirable for connections to a King George rapid transit system and a future system along the Interurban corridor than a facility located adjacent to King George.

Guildford Mall

The on-street facility is potentially one of the worst in the entire network from a passenger comfort, operational efficiency and safety viewpoint. Guildford Mall is currently in the proposal stage of redefining the area and new transit facilities are required in order to improve local and regional services.



156th Street/Highway #1

With the creation of the Highway #1 Busway system there is a need for an exchange south of Highway #1 at 156th street. This will enable passengers to transfer to or between Highway #1 services, to local services or to the 104th Street/ KG services. The planning process is currently underway to identify potential sites.

200th Street/Highway #1

Similar to the 156th Street terminal, there will need to be a new facility developed in the area of 200th street to allow for a number of passenger movements between local and regional services as well as inter-regional connectors. Planning work has been underway for some time to identify the size, requirements for buses and passengers, as well as possible site locations.

Langley Town Centre

The current Langley bus terminal is located within the City of Langley and serves largely as a terminus for the routes originating in Surrey, as well as local Community Shuttle routes. The site and location are somewhat limited in terms of providing for future increases, possible park and ride, as well as connections to the rapid transit network. The City of Langley has recently (November 2007) finished a downtown transportation plan that sees the role of this facility in its current location being central to the development future of the area. Current work on this facility in terms of vision see a much larger facility (more than 2.5 times the number of layover bays) and connectivity to the Fraser Highway and 200th Street services to allow transfers from rapid transit to local services. In addition, this has been identified as a potential area for future Park and Ride. More work will be required to try and reconcile these distinctly different visions for the bus exchange or to determine if both are capable of being utilized.



Figure 9: Facilities around the Region

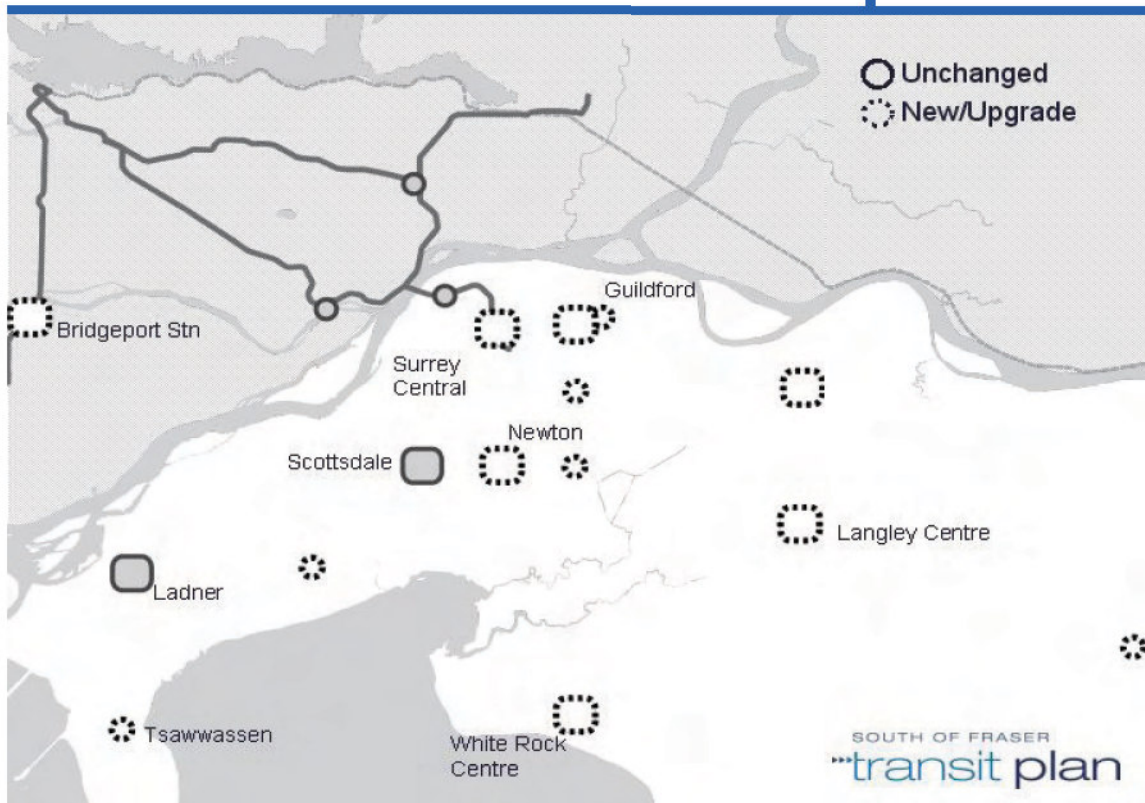
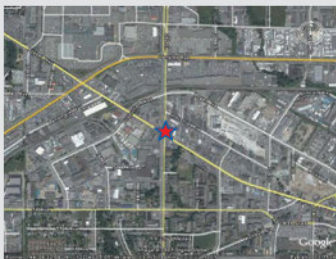
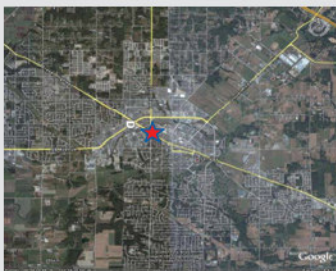


Figure 10: Example of Facility Summary

Langley Centre

Note: The transit exchange as shown depicts the facility required for the South of Fraser Area's "Network of 1 Million People"

Location



Description

The terminus for 16 routes, including two rapid transit lines, this relocated exchange will also provide an improved focal point in this Regional Town Centre. Significant transfer movement is expected at this station for both local and regional travel. As the furthest east significant location and focal network design, it will also provide considerable layover capacity – much larger than the existing facility. The new location will improve efficiency of the Fraser Highway and 200th Street rapid transit lines by minimizing unnecessary routing.

Routes/Layover Requirements

Route	Name	Direction or Terminus	Service Type	Vehicle Type	Peak Headway (min)	% recovery at this station	Layover requirement (rounded)
B-A	Surrey Central - Langley (Fraser Hwy)	Term	Rapid	BRT	5	70%	5
B-C	Langley - Walnut Grove (200th St)	Term	Rapid	BRT	5	50%	2
F-A	Langley - Maple Ridge (200/Dewdney)	Term	FBH	S	12	50%	1
F-E	Scottsdale - Langley (64)	Term	FBH	S	15	50%	1
L-D	Bridgeport Stn - Langley (Hwy 10/Hwy 99)	Term	Local	S	20	50%	2
L-F	White Rock - Langley (24/192/200)	Term	Local	S	15	50%	1
L-H	Langley - Walnut Grove (208)	Term	Local	S	15	50%	1
L-I1	Clayton - Willoughby (208/72/184/60)	Term	Local	S	20	100%	2
L-J	Guildford - Langley (52/Fraser Hwy/168/60)	Term	Local	S	15	50%	1
L-K	Newton - Langley (Hwy 10/168/60)	Term	Local	S	20	50%	1
L-L	Langley - Aldergrove (Fraser Hwy)	Term	Local	S	15	50%	1
H-C22	Langley - Fort Langley (Langley Bypass/Glover)	Term	Neighbor	CS	15	50%	1
H-C16	Ferridge - Langley (200/206/204/Grade/208)	Term	Neighbor	CS	30	100%	1
H-C27	Langley - Murrayville (Fraser Hwy/53/48)	Term	Neighbor	CS	20	100%	2
H-C18	Langley - Langley Hospital (Fraser Hwy/ 52)	Term	Neighbor	CS	20	100%	1
H-C29	Clayton - Langley (68/203/204/Langley Bypass)	Term	Neighbor	CS	20	80%	1
Terminating routes / Total Volume / Total Capacity Required		16				80%	24

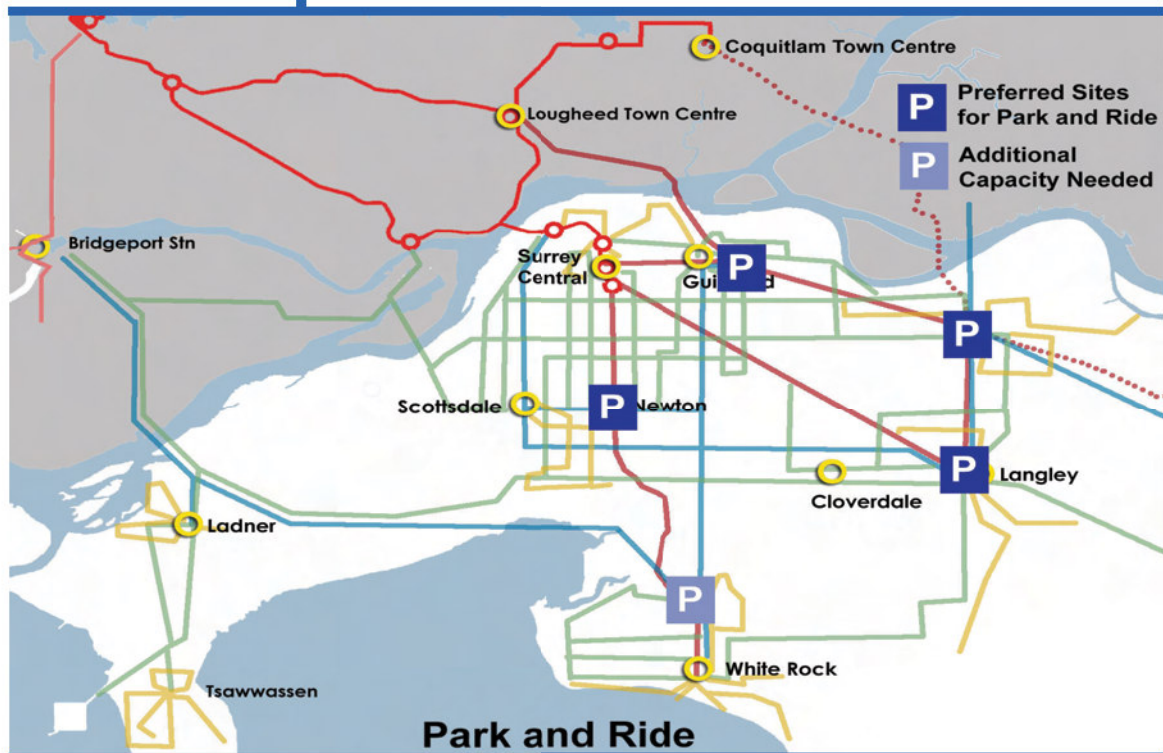
Park and Ride sites

TransLink currently does not have a regional park and ride policy or strategy, however, current practice has been to provide facilities at rail stations and specifically identified bus transfer locations. There will be work undertaken on a Park and Ride policy in 2008, however, the philosophy for this plan has been to intercept customers at the earliest opportunity. For most, this will mean extending the bus network as deep as possible into the neighbourhoods but for others, this means a place they can drive to in order to catch a bus. A number of sites have been identified as preferred sites based on interaction with the rapid transit network. (See Figure 11)

- 200th and Highway #1
- 200th and Fraser Highway
- Newton Exchange
- 156th and Highway #1

In addition, based on the enthusiasm that White Rock/South Surrey residents have embraced the new South Surrey Park and Ride, there may need to be an expansion of park and ride facilities in that area.

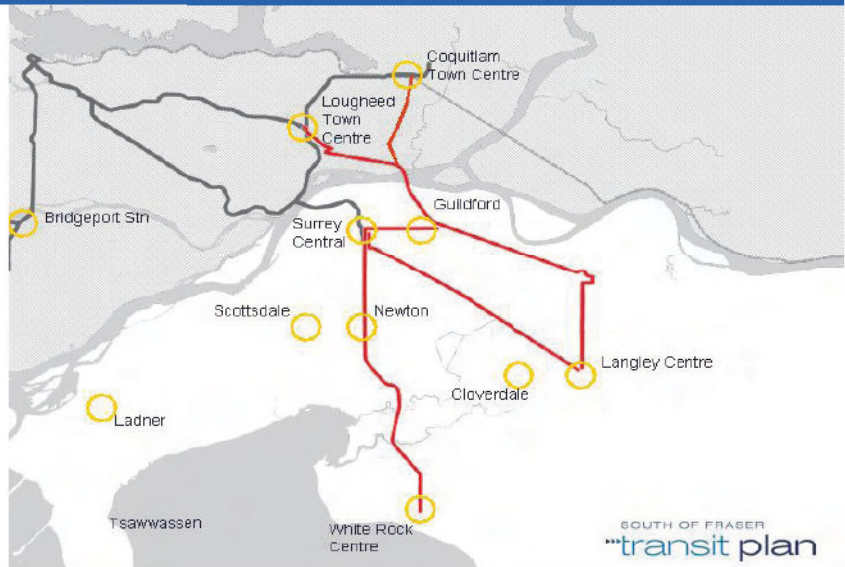
Figure 11: Potential Park and Ride locations



The Network in Layers

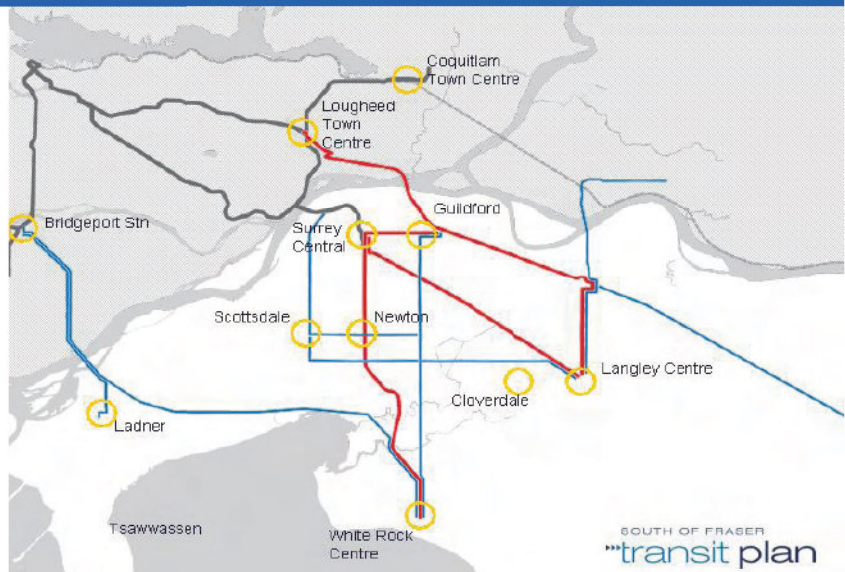
Rapid Transit provides linkages to the regional network along key routes

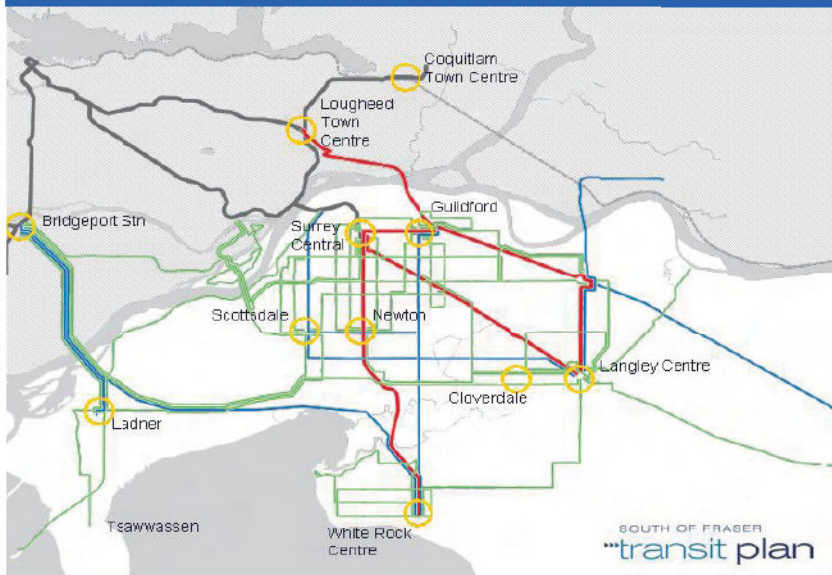
Figure 12a: Key Rapid Transit Routes



Frequent Bus Service enhances the Rapid Transit service, completes the Frequent Transit Network and creates a framework linking all town centres.

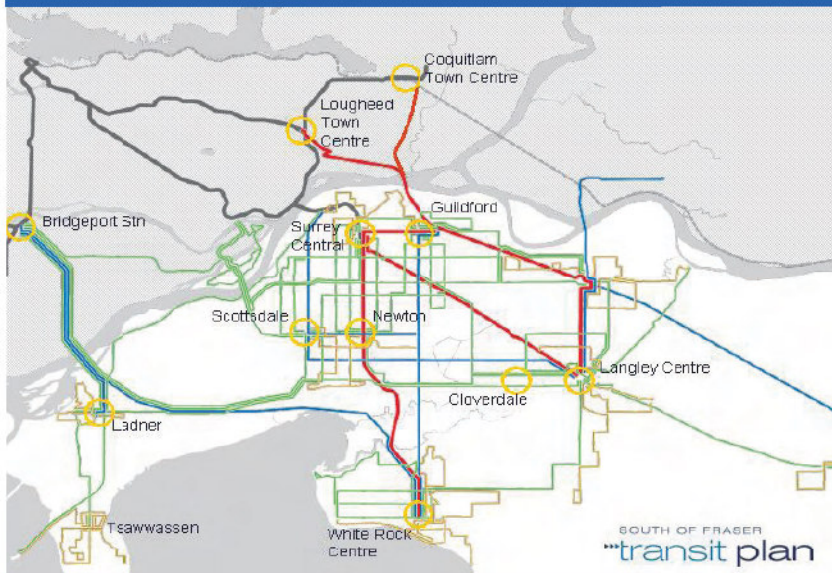
Figure 12b: Frequent Bus Service Framework





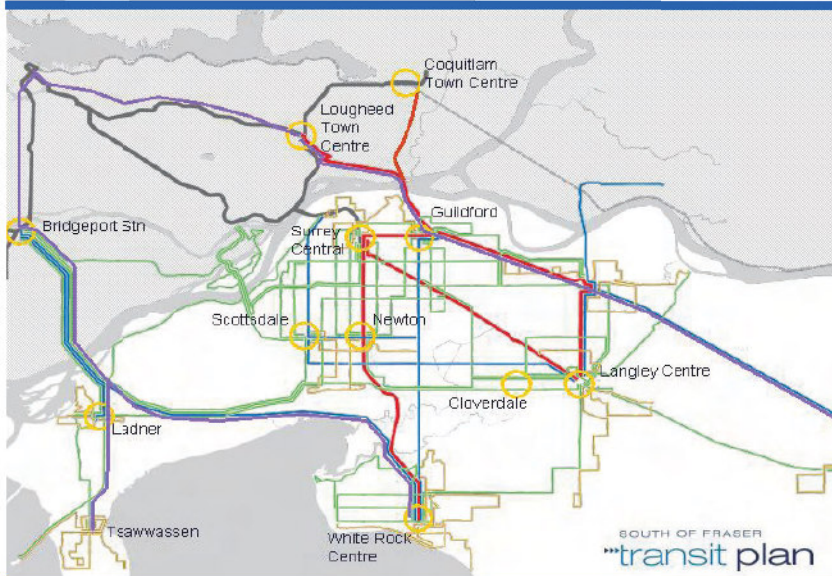
Local Bus service fills out the network along local roads providing good transfer opportunities as well as direct connections to the Frequent Transit Network

Figure 12c: Local Bus Network Connections



Neighbourhood service provides for short locally based trips around neighbourhoods and to key transfer locations and town centres.

Figure 12d: Neighbourhood Service



Highway Coach Service provides a value-added alternative for long distance commuting.

Figure 12e: Highway Coach Service

Changing the Network - Market Research



Research Objectives

Following extensive public consultation and market research in Phase I, Phase II was designed to obtain input from residents and others traveling to, from and within the South of Fraser area, regarding:

- The perceived likelihood of using the system's four types of transit service (rapid transit, frequent bus, local bus, and neighbourhood bus);
- The ease of understanding the proposed system and transit service types;
- The ease of getting to top destinations;
- A comparison of the existing and proposed systems;
- Public opinion on the proposed transit exchanges/Park and Ride locations.

Methodology

A market research survey (see Technical Memorandum 2) was conducted via both a follow-up telephone survey among participants of the 2006 Phase I research, and a web panel survey of "TransLink Listens" panelists located in the South of Fraser communities.

Telephone survey respondents were screened to identify the "target population", that being current or potential transit users residing in South of Fraser communities, or those who travel there on a regular weekly basis. Between June 8 and July 10, 2007, a total of 325 respondents completed the telephone survey while viewing maps of the proposed future transit plan concept sent to them earlier.

The web survey questionnaire did not contain all questions asked in the phone survey. In addition, some open-ended questions from the web survey were not coded, but the verbatim comments are available in a separately bound Technical Memorandum. A total of 380 residents completed the web survey between July 12 and 27, 2007. As with the phone survey results, the web survey responses were weighted to match the target population on the basis of age, gender, region and transit use.

Support for the Proposed Transit Network

Overall, current and potential transit customers in the South of Fraser Area indicated strong approval for the proposed plan's overall concept and direction. Whereas respondents who completed the web survey were 78% supportive, the phone survey respondents were 94% supportive.

Of the four proposed types of transit service, the rapid transit network had the highest level of support (two-thirds being likely to use it), while the neighbourhood bus concept had the least. In general, those familiar with the current transit system were much more likely to say they would use the proposed system. While North Surrey/North Delta residents were the most likely to take transit regularly and support the proposed plan, South Delta residents were the least likely. South Surrey/White Rock residents showed significant interest in using the proposed transit network.

Two-thirds of the residents felt the network would be easier to use than the current one (Langley and Cloverdale residents felt especially so), and eighty percent felt the proposed network was an improvement over the current system.

Respondents who did not see the proposed plan as an improvement felt:

- It would not change their personal travel time or system usage;
- Multiple transfers would increase their travel time;
- The loss of current routes and express buses would be undesirable;
- The increase in service frequency would be insufficient; and
- It would not provide sufficient incentive (such as cost and/or time savings, or increased convenience) to switch from personal vehicle to transit.

Current and potential customers who were supportive of the proposed network felt it was an improvement due to:

- Rapid transit reducing travel time and congestion;
- Rapid transit meeting the need for service expansion and more routes;
- Increased service frequencies;

- Increased choice in transportation options; and
- Increased connectivity with other communities in the region.

More than 700 total participants reviewed maps of the current and proposed systems and the majority (between 66% and 71%) found the proposed system would make it easier to get to their main destinations. When comparing the proposed system to the existing system, more than 80% of the respondents believe that the proposed network was better. The sole exception to this were residents of South Delta who believe that the current system with a single seat ride into downtown is preferable. Most respondents felt that the strongest elements of the new system are:

- The rapid transit network
- The expansion of the route system
- The increase in frequencies
- More transportation choice.

Based on these results, it would appear that residents support the proposed network. Full results are available in Technical Memorandum 2.

Changing the Network – A Data Review

Once the proposed network had been created, the next challenge was to determine the validity of the changes using empirical data. The main source of data was from Automatic Passenger Counters (APCs) that are placed on 15% of the bus fleet and record the access and egress from the bus of every passenger by stop. Over a number of months, the buses move through the system to provide a reasonable sample size of every single route, every run, and every variation. This data can then be used to determine how the route functions, where passengers are transferring, which are the major and minor stops, as well as total route demand. Typically, the data has been displayed and analyzed as shown in Figure 13.

Figure 13:
Route #340

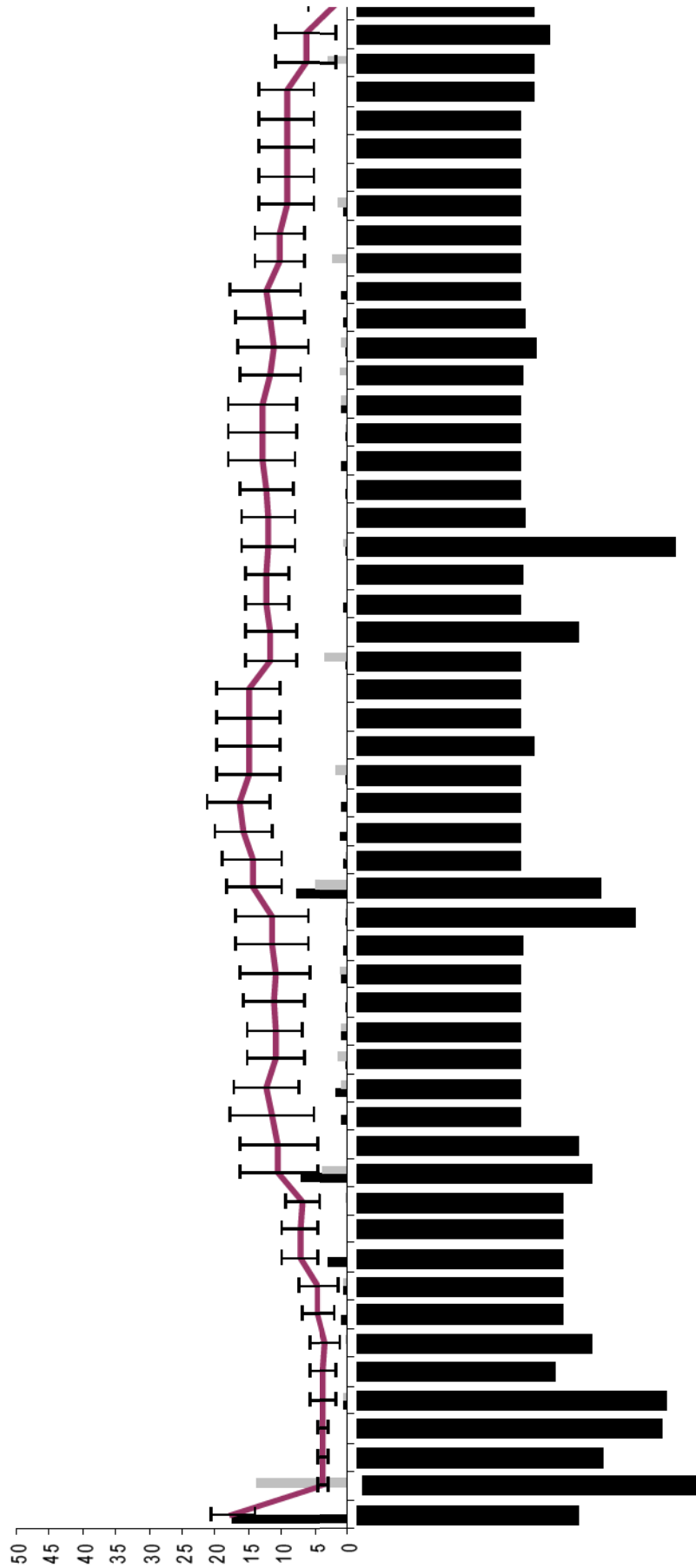


Figure 13 shows a typical route structure with a line representing the average passenger load along with the range at each stop. In addition, it shows the movement of passengers through the route. In this example there are a large number of passengers getting on the bus at 22nd Street Station only to leave the bus at the first stop on Annacis Island. Once the bus arrives at Scottsdale exchange, most remaining passengers disembark and new passengers get on. Most of the new passengers then exit the bus at Newton Exchange and are again replaced by passengers wanting to go to a variety of stops on the section towards Cloverdale. This tells us that the route is acting as three distinct routes put together. First is the 22nd Street Station to Scottsdale, then Scottsdale to Newton, finally, the legs to either Cloverdale or Guildford. As a result, the proposal to split these sections into different routes can be verified. By understanding the patterns of movement, we can determine if a proposed or altered route will be a positive or negative for the majority of current and future customers.

There are a number of specific route types within the proposed network:

1. Routes that are relatively unchanged
2. Routes that are new but contain sections of existing routes
3. Routes that are existing but will not continue
4. Routes that are brand new in areas yet to develop

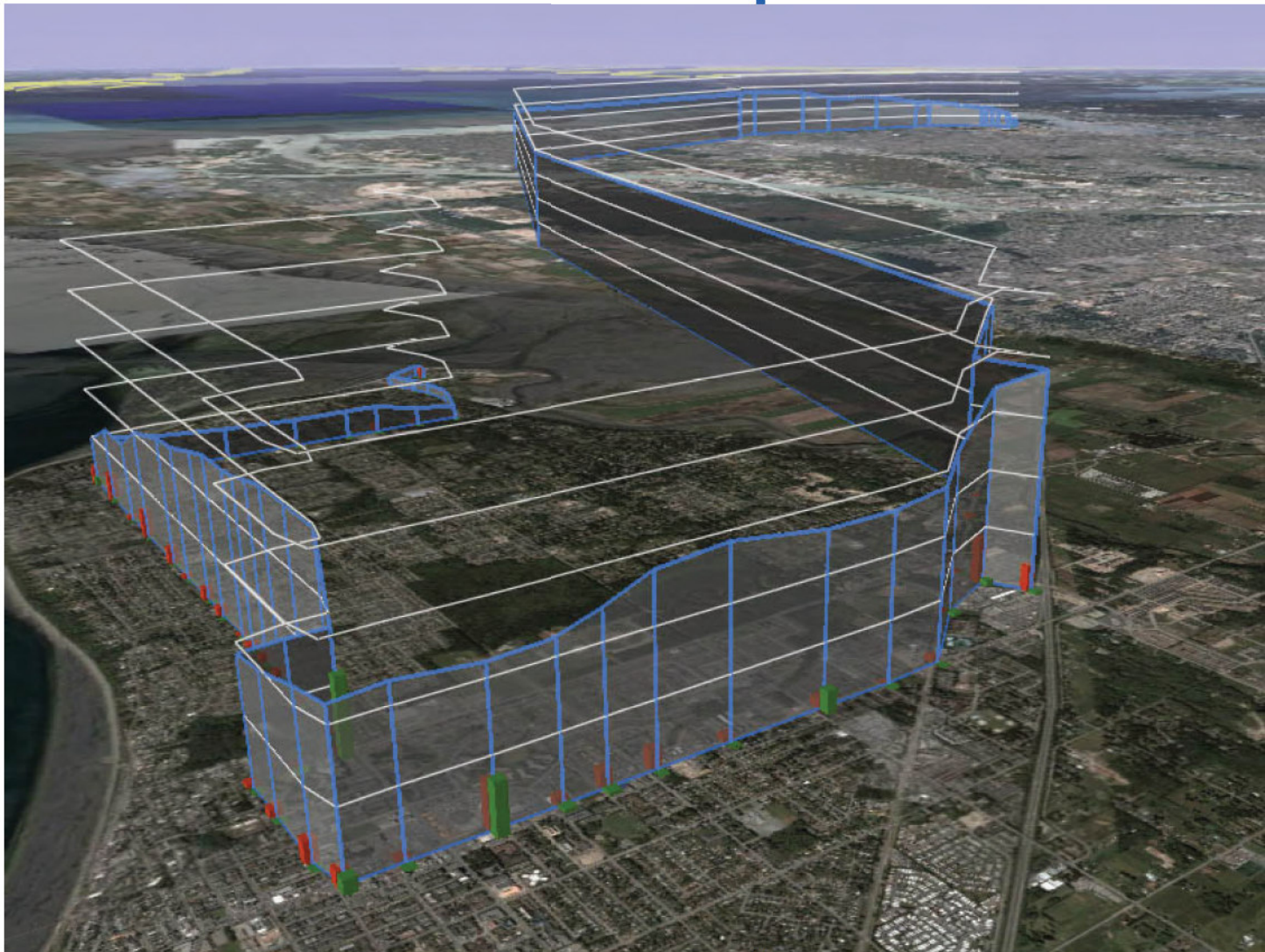
Analysis on route types 1 and 3 was undertaken but utilized only where a decision had to be made regarding final termini of a route or where a transfer opportunity may have existed due to alternate peak and non-peak hour routings and a new route could be created. Types 4 cannot be analyzed as there is no data available. Therefore, the majority of the research was undertaken on Type 2 where the proposal is to create new routes using sections of existing service. In order to fully understand the geographical underpinnings of the proposed routes, a new methodology was established.

Figure 14: Peak Hour Routing in White Rock



The new methodology started with an overlay of the route onto Google Earth so that it can be viewed within the context of the urban environment and density as the peak hour routing into White Rock is shown in Figure 14. The next step is to marry together this static view with the empirical data.

Figure 15: Static View of Passenger Movement



As seen in Figure 15, it becomes more intuitive to understand the movement of passengers within the context of the urban fabric and route patterns are easier to examine. The full set of analysis can be found in Technical Memorandum 3.

The results of the analysis were that the majority of the proposed network was confirmed with only two exceptions. One proposed route from Scottsdale exchange routed directly to Surrey Central. This was altered based on the APC data that showed passengers preferred Scott Road Station as the terminus but that a new route from Surrey Central would be required to provide a transfer opportunity at Scott Road for North Delta residents. The #340 will be broken into separate routes and Kittson Parkway will be served by a neighbourhood route out of Scottsdale exchange due to the low demand. Service to Aldergrove will likely be provided by

a neighbourhood route out of Langley with the creation of a rapid transit route along the Fraser Highway.

The Proposed Network – Financial Implications

Dedicated Curbside Busways

Curbside Bus Lanes are proposed on Highway #91 from 72nd Avenue to the bridgehead, and along Highway #99 from the King George exit to Bridgeport Station. Based on research in Canada and the US, it is estimated that an average cost per kilometre for a curbside bus lane is approximately \$1.4 Million. The costs are estimated as follows:

- Highway #99 20 kilometers \$28 Million
- Highway #91 3.5 Kilometres \$4.9 Million

- **Total cost for curbside busways is \$32.9 Million**

Dedicated Centre Median Busways (and LRT Convertibility)

Median Rights-of-way are proposed for rapid transit lines on 4 corridors with a phased approach with Bus Rapid Transit initially, replaced ultimately by LRT on several of the corridors. Costing has been based on the Federal Transit Administration's Characteristics of Bus Rapid Transit for Decision Making for both the right of way and the stations. Costs are estimated at \$20 Million per kilometre, \$2.5 Million per station and \$1.5 Million per vehicle. The costs are estimated as follows:

- King George Highway/104th Avenue
14.7 Kilometres 12 stations \$324 Million
- Fraser Highway
15.2 Kilometres 5 stations \$317 Million
- 200th Street
6.2 Kilometres 4 Stations \$134 Million
- Highway #1 Provincial Cost for Infrastructure \$0
- 85 BRT vehicles \$127.5 Million

- **Total Capital Cost (excluding bus exchanges) \$902.5 Million**

Improved and New On- Street Facilities

On-street facilities refer to loops, transfer points, or exchanges where a number of routes come together and allow passengers to transfer between routes. Examples include Ladner Exchange, Newton Exchange and the on-street transfer point at Guildford Mall. A total of 21 facilities were identified through the study with 17 requiring significant improvements or new facilities. Facility improvements may include purchase of land, reconstructing passenger areas, curb lines and landscaping. It is estimated that the cost will average out to \$3 Million per facility.

- **Total capital cost for facility improvements is \$51 Million.**

Transit Centres

Transit centres are the storage and maintenance centres where buses are parked and maintained on a daily basis. There is currently one such facility in Surrey covering a majority of the routes in the South of Fraser with express services for White Rock/South Surrey, and Ladner/Tsawwassen served out of the Richmond Transit Centre. The main contractor, Coast Mountain Bus Company estimates that the most cost effective size for a transit centre is approximately 200-250 buses. Based on a total fleet of 600 vehicles, it is recommended that the South of Fraser services be served by three (3) transit centres in total. Therefore, along with improvements to Surrey Transit Centre, and a potentially small new facility for contracted operations in Langley, two additional centres should be built. The new facilities are estimated to cost \$70 Million each with a further \$10 Million set aside for upgrading Surrey Transit Centre and creating a new facility for contracted Langley service.

- **Total Capital Cost for Transit Centres is \$160 Million**

Transit Fleet

The total fleet estimated for the network is shown below:

<i>Fleet</i>	<i>Existing</i>	<i>Future</i>	<i>Total New</i>
Bus Rapid Transit vehicles	0	85	85
Articulated Buses	5	5	0
Highway Express	64	64	0
Highway Coach	0	31	31
Standard buses	121	295	174
Community shuttles	34	110	76
Contingency (40 ft.)	-	10	10
Total	224	600	376

Estimated Cost Per Unit

- BRT vehicle \$1,500,000
 - Articulated bus \$600,000
 - Highway Express \$450,000
 - Highway Coach (Over-the-road) \$1,200,000
 - Standard bus \$400,000
 - Community shuttle \$140,000
- **Based on the estimated 2007 cost per vehicle type, the additional capital cost is \$249 Million.**

Park & Rides

Park and ride stalls have been estimated at 2000 with an average cost per 100 stalls of \$1 Million.

- **The total Cost for Park and Rides is estimated at \$20 Million**

Transit Priority Measures

Transit priority is defined in this plan as traffic signal priority, queue jumpers or peak hour parking restrictions to allow the buses to travel consistently through the network. These measures have been estimated on an intersection basis with 250 intersections likely needing improvements. Each intersection cost is estimated at \$15,000.

- **Total Cost is estimated at 3.75 Million**

Wayside Passenger Amenities

Passenger amenities consist of improved wayfinding, real-time passenger information, or stop enhancements. The estimated cost per stop is \$25,000.

- **Total cost is estimated at \$10 Million**

Staffing and Annual Operational Costs

Staffing is one of the variables that dictate whether the system can proceed expanding at a rapid pace. It is estimated that for every bus, the staffing required is 3 operators and 1.5 office, supervisory, maintenance, and administrative staff. Based on an expansion of 376 buses, the operating companies will need to hire 1130 new operators and 560 other staff for a total increase of almost 1700 employees.

- **The operating cost are estimated at \$100 per operating hour with 3700 annual operating hours per bus. This equates to 1.4 million additional annual hours at a cost of \$139 Million.**

Cost Summary

- **The total capital cost of the plan (2007\$) is estimated at \$1.3 Billion.(see Technical Memorandum 3 for costing summary)**

Desired Impact of the Plan

The goal of the proposed network is to dramatically change the way that people move around the South of Fraser region as well as to impact the regional transportation network. The estimated mode share for transit is currently around 4.5% and the goal is to improve that to 11.5% by the end of the plan. Currently South of Fraser residents have a lower standard of service than the regional average with only 1.32 Service Hours per Resident compared to 2.06 regionally. This plan seeks to increase transit to such an extent that the service hours per resident not only rises at the pace of growth but markedly exceeds it to finish with 2.22 service hours per resident.