Project Summary Report

for

"False Creek Flats Rail Corridor Strategy"

Submitted By

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Executive Summary

Vancouver is Canada's gateway for Asia Pacific Trade which emphasises the importance of railways for delivering goods to the rest of Canada and North America. Compared to moving goods by large truck, railways create 5 times less greenhouse gases and as an environmentally focussed City and region it is important that continued growth in goods movement can be accommodated by rail wherever possible.

Recent agreements (co-production agreement) between CN and CPR for coordinated rail operations have made significant increases in the short term rail capacity for the container terminals along the south shore of Burrard Inlet. These changes have focussed operations in an east/ west direction along the waterfront and has led to a decrease in freight rail traffic travelling from the waterfront terminals to nearby False Creek Flats.

The Flats are only 2 kilometres away and are home to over 95 acres of rail lands. The recent declining use in the False Creek Flats rail yards, as support for waterfront rail activities, is due primarily to the poor rail connection (BI Line) between the two areas. This rail line has two main limitations, the six at grade rail crossings along the line and the rail intersection with the east/west mainline (Heatley Diamond) at the waterfront.

As container traffic continues to grow and space is limited for rail yards along the waterfront, the City of Vancouver anticipates there will be a need to overcome the rail limitations of the BI line in order to better use the freight rail capacity within the Flats.

The False Creek Flats Rail Corridor Strategy was undertaken by the City of Vancouver with partial funding by Transport Canada, and with participation by Port Metro Vancouver, the Greater Vancouver Gateway Council (GVGC -representing the railway companies), TransLink, Vancouver Area Cycling Coalition (VACC), and Better Environmentally Sound Transportation (BEST). The goal of the study was to develop a corridor grade separation strategy that could be used to address one of the main limitations of the BI Line. As part of this strategy, structural cost estimates were developed as well as a discussion of the potential benefits and the priority for each location. This information will be used in the future to obtain property that may be required and as input in any future benefit cost analysis that could be undertaken as further capacity is required to service the south shore terminals. A summary of the highlights is provided in **Table 1** below.

Table 1: Summary of Rail Corridor Strategy

Location	Solution	Structural Costs	Priority	Property Required
Arterial Streets				
(1) Powell Street	Overpass	$15-30 M	This location would be the highest priority for rail benefit	Potential property required on south side of Powell
(2)Malkin Avenue	Overpass Replacement for Venables Street	$21-40M plus ~$15-20M to connect to viaducts	Highest potential for community benefit	Some property acquisition required
Bike Routes				
(3) Union Street	Overpass or underpass	$5-10M	Low priority, only if train volumes increase and other locations are grade separated	None
(4)Venables		$4-8M Ped/ Cyclist $12-24M vehicle		
(5) Central Valley Greenway	New Structure	$11-24M	To be determined by False Creek Flats Study	Some property acquisition may be required
Industrial Streets				
(6)Cordova Street East of Raymur Street	Close	Property acquisition and roadway costs	Low priority only if all other grade separations completed	Property required for rerouting streets
(7)Raymur Street South of Cordova Street				
(8)Parker Street/ Glen Drive				

This project has provided an understanding of the property requirements and potential structural costs required to improve the viability of the Burrard Inlet Line Rail Corridor. One lesson that has been learned as part of this project is that a change in rail operations can greatly affect the operating conditions along this rail line. As such it is important to protect this rail corridor and examine ways to improve its viability. Factors such as an increase in goods moved through the south shore terminals or a change in passenger or freight rail operations could increase the importance of this corridor and the supporting infrastructure in the False Creek Flats.

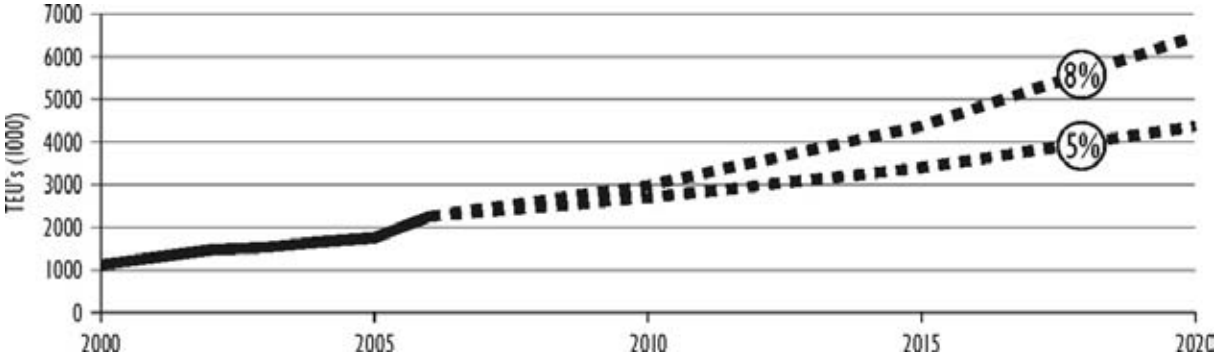
Under current rail conditions, the Powell Street grade separation is the only grade separation that could provide benefit to freight rail operations, with a focus on removing constrictions along the east/West mainline. This would need to be further examined under the South Shore Rail Corridor Study and the City is coordinating with the project leads, Port Metro Vancouver and Transport Canada.

1.0 Context

Containerized trade transiting through Vancouver's Asia Pacific Gateway, is served by terminals on the south shore of Vancouver's Burrard inlet, Roberts Bank, and the Fraser River. The south shore container terminals, Centerm and Vanterm, represent approximately 50% of the container terminal capacity of Port Metro Vancouver. Both terminals have had recent capacity upgrades, increasing the capacity by 700,000 Twenty Foot Equivalent Units (TEU- a unit of measurement equivalent to one twenty foot shipping container) to a total of 1.5 million TEU.

Current container traffic volumes are over 2.2 million TEU (based on 2006 statistics). Of this total, approximately 1.2 million TEU is served by the south shore terminals. Depending upon the timing of introduction of new terminal capacity at Roberts Bank, the south shore terminals could be operating at stated capacity between 2010 and 2015.

Figure 1: Historical and forecast container volumes through the Port of Vancouver



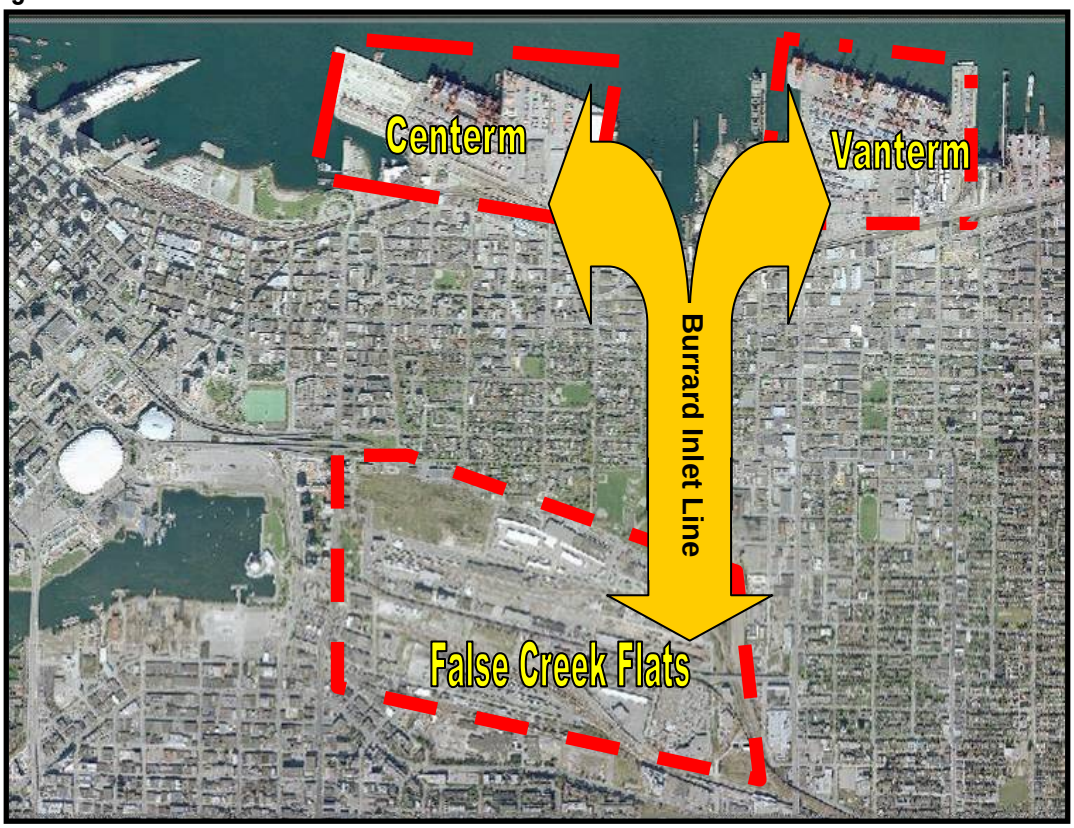
At the south shore, approximately 50% of import containers are loaded directly to rail cars. The other 50% leave the terminal by truck. Those containers loaded to rail cars are primarily destined for Toronto and Montreal, with a small percentage destined to mid-western and eastern U.S. As import traffic volumes through the south shore terminals grow, the number of containers loaded to rail cars will continue to grow, and it could be argued that the percentage of volume relative to trucks will also increase as a result of demand from eastern locations outpacing local demand.

Improved accessibility to more rail capacity and flexibility in operations could result in higher use of rail to overcome the challenges related to a port in the heart of a metropolitan area. As roadways become more congested rail becomes more viable for shorter haul rail links to access industrial lands that can be used for rail intermodal services. This also has the added benefit of reducing the growth rate of trucks using city streets and potentially reducing emissions impacts. These trends are supported by the City of Vancouver. Trade volume growth through Vancouver will rely increasingly on rail transportation due to transportation economics, as movement by rail (per

tonne-km) is 5 times more efficient in terms of fuel consumption and greenhouse gas emissions[1] than tractor trailer trucks.

Available rail capacity at the south shore terminals is very important to encourage future intermodal growth at these terminals. To accommodate the short term critical needs for rail, CN and CPR have agreed that the two railways will share key sections of track to improve the fluidity of rail operations over existing infrastructure in the Vancouver area (the co-production agreement). This will help to address short term rail capacity requirements for the south shore terminals. However, for long term needs, or if this agreement were to end, there is a critical need for more rail capacity to support the intermodal operations at these south shore terminals. In the longer term, improved rail connections to the False Creek Flats would provide increased flexibility for rail operations and improved access to additional rail yards (See Figure 2).

Figure 2: False Creek Flats in relation to the Waterfront Terminals



The False Creek Flats is an area adjacent to the Downtown at the east end of False Creek and is just over 2 kilometers from the Burrard Inlet waterfront. The Flats has long been home to Port and city-serving activities, particularly rail in its central and eastern areas with approximately 95 acres of land dedicated to rail. Vancouver City Council has recognized the importance of the Flats for its city serving industrial, service

[1] Rail Association of Canada, Trends in Freight Energy Use and Greenhouse Gas Emissions 1990-1999, September 2001

and transportation uses and adopted the "Industrial Lands Strategy" in 1995 to protect these uses and surrounding industrial land uses. In 2003 Council approved additional planning in the Flats with one of the directions to "maintain and strengthen the role of the industrial area in the eastern Flats in servicing the Port and Downtown". These policies emphasize the desire to protect the industrial area and help support Port rail activities.

The False Creek Flats currently has four main rail yards, three of which have primarily been used for goods movement related to port operations on the south shore of Burrard Inlet. These yards are shown in Figure 4 and include;

- CN Main Yard- This yard has traditionally been used as a support yard for container traffic from the south shore terminals. Rocky Mountaineer Tours also uses Main Yard for arrival and departure from its station.
- BNSF Yard- This yard generally supports the barge operations at Burrard inlet.
- Glen Yard- This is a smaller yard that is used primarily for staging grain and container cars.
- VIA Facility-Amtrak and VIA currently use this station for passenger arrival and departures

The False Creek Flats has land available, with supportive zoning and policy, to expand rail capacity and support future growth. However, since the co-production agreement between CN and CPR was implemented the role of the False Creek Flats rail yard as a supporting yard for the South Shore Terminal operations has declined. This is due to limitations in the Burrard Inlet Line (BI Line) that links the south shore terminals to the False Creek flats.

2.0 Burrard Inlet Line Corridor

The Burrard Inlet Line (BI line) is currently a single track rail line approximately two kilometres long that connects the False Creek Flats to the Burrard inlet waterfront. There are a total of nine crossings including three existing structures, two arterial streets that cross at grade, three industrial streets that cross at grade and a major east/ west bike route that crosses at grade.

2.1 Existing Structures

The track currently crosses underneath Hastings Street (35,000 vehicles per day and 6 bus routes) and Terminal Avenue (43,000 vehicles per day and 1 bus route) and an existing pedestrian overpass at Keefer Street which is 2 blocks south of Hastings. These structures are shown as viewed from the rail corridor in Figures 3a, 3b and 3c.

Figure 3a: Terminal Avenue Passing Over the Glen Yard

Figure 3b: Passing Under Hastings Street

Figure 3c: Pedestrian Overpass of the Burrard Inlet Line

2.2 Arterial Streets

The BI Line currently crosses two major east/ west arterial streets at grade as shown in Figures 4a and 4b these streets include Powell Street **(**32,000 vehicles per day and 6 bus routes) and Venables Street (30,000 vehicles per day and 1 bus route).

Figure 4a: Powell Street At Grade Crossing

Figure 4b: Venables Street At Grade Crossing

2.3 Industrial Streets

The corridor has three at grade crossings within industrial areas along the rail corridor. These are generally angled crossings with poor sight distances and limit the speeds that trains can travel through this area. These intersections are currently being reviewed to determine how they could be closed or rerouted while maintaining access to the industrial areas. These locations include Cordova Street, Raymur Street and Parker Street/ Glen Drive (see figure 5a, 5b and 5c).

Figure 5a: Cordova Street At Grade Crossing

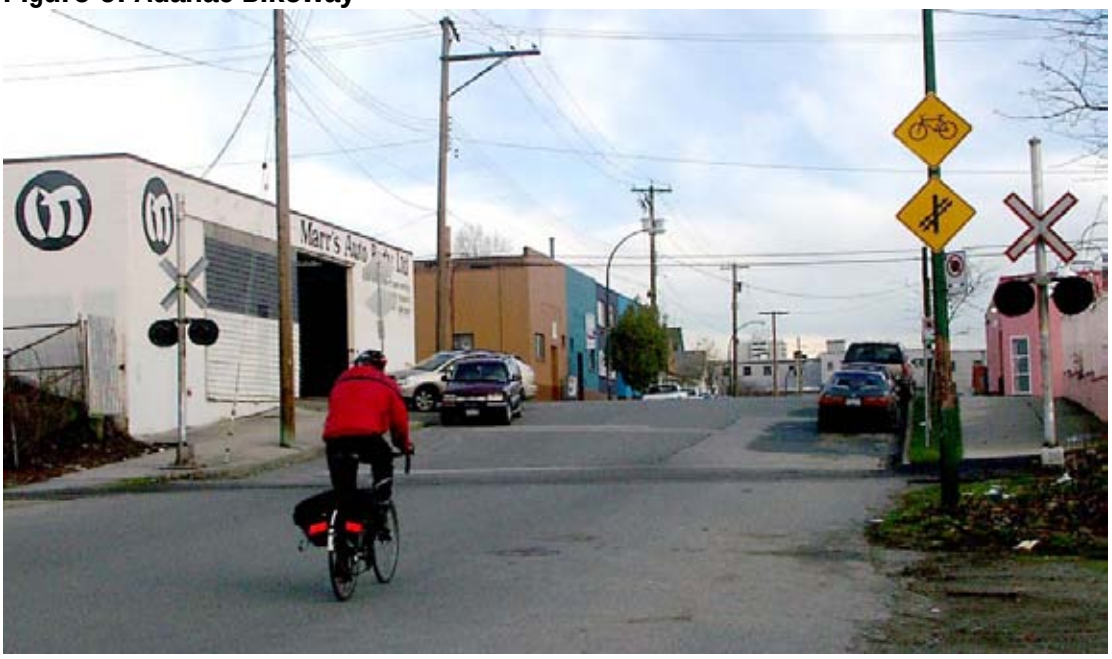
Figure 5b: Raymur Street At Grade Crossing

Figure 5c: Parker Street & Glen Drive At Grade Crossing

2.4 East/ West Bike Route

Another at grade crossing is the Adanac Bikeway along Union Street (See Figure 6). This bikeway is the City's busiest bike route and at this location currently accommodates over 2000 cyclists per day.

Figure 6: Adanac Bikeway



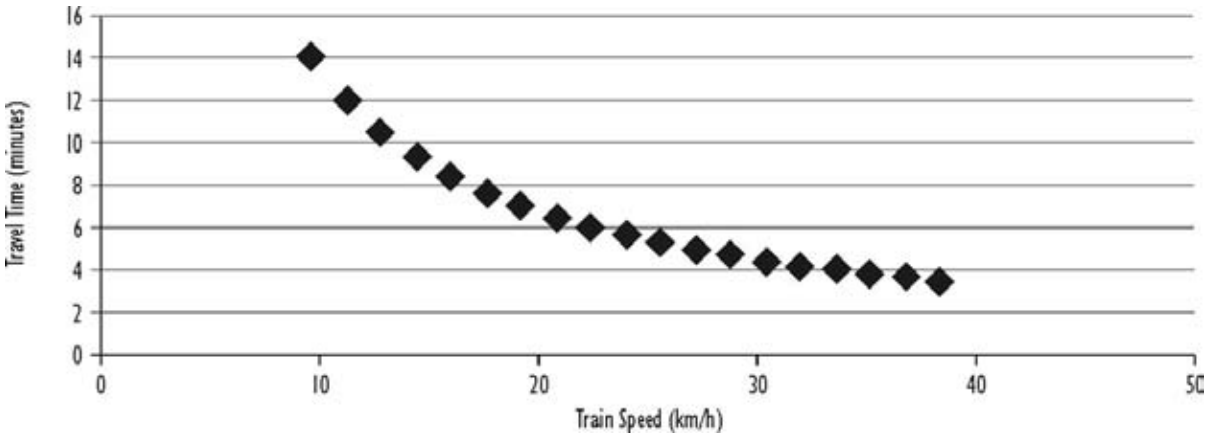
3.0 Burrard Inlet Line Limitations

Current constraints on the BI Line limit the ability of the Flats to efficiently support the rail activities at the port. The constraints can be classified into three categories: travel speeds of trains along the corridor; the disruption to the arterial streets it crosses; and the intersection with the CP mainline at the north end which is referred to as the Heatley Diamond.

3.1 Travel Speeds

The rail line currently has six at grade crossings; two arterial streets (Powell Street, Venables Street), three industrial streets (Raymur Street, Cordova Street and Parker Street) and one major bike route (Union Street). These at grade crossings restrict the travel speed for trains passing through this area to approximately 10km/h. A trip between the rail yards in the Flats and the waterfront takes approximately 12 minutes at these speeds. A grade separated railway line would allow for an increase in travel speeds creating a much shorter time to link between the waterfront and the Flats. Figure 7 illustrates the time savings that could be achieved with an increase in operating speed to 20 or 30km/h

Figure 7: Operating Speed vs Travel Time on BI line



3.2 Arterial Streets

The rail line crosses two major east/west arterial streets, Powell Street (32,000 vehicles per day and 6 bus routes) and Venables (30,000 vehicles per day and 1 bus route). This limits the amount of time that these crossings can be occupied by rail cars. A typical length train at this location would take about three and a half minutes to clear the crossing, if this occurs near the peak hours of road traffic it would take over 30 minutes to return to free flow traffic and over 15 hours of vehicle delay could be caused per train. Prior to co-production, 15-20 trains per day travelled along the BI line to the waterfront. In the future as the need for this line increases further delay would be incurred by busses, trucks and vehicle traffic that travel along these arterials. Figures 8a and 8b displays the relationship between the traffic volume and the time it takes for a queue to clear after a three and a half minute train crossing. If the train is delayed at any of the crossings along the route the time for the queues to clear and vehicle delay would increase significantly.

Figure 8a: Time From Closure to Free Flow following a 3.5 minute closure

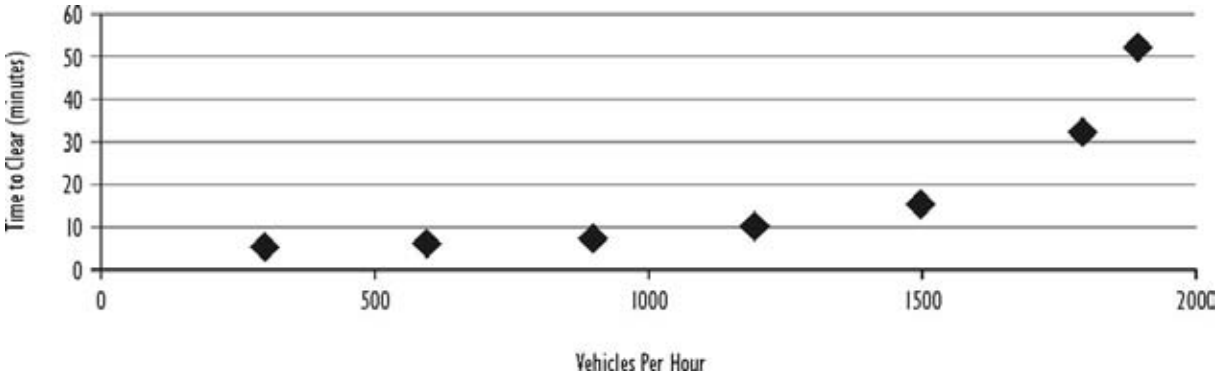
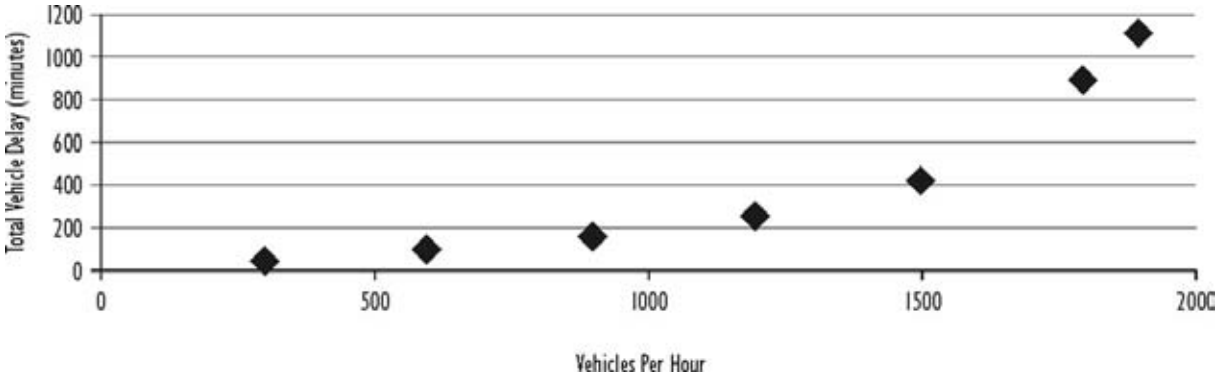


Figure 8b: Cumulative Vehicle Delay for a 3.5minute train crossing



3.3 Heatley Diamond

The north end of the BI line crosses the CP mainline just prior to the waterfront (Heatley Diamond). This requires coordination between CP and CN each time a train is headed from the Flats to the waterfront. Due to the constraints with the at grade rail crossings, trains leaving the flats can not proceed until they receive authorisation to cross the CP mainline and due to the speed constraints the journey takes approximately 12 minutes. This means that the CP mainline can not operate for timeframes greater the 30 minutes when trains are travelling from the Flats to the Waterfront.

Port Metro Vancouver has conducted modelling work and found that significant capacity gains have been achieved by reducing traffic entering the south shore terminals via the BI Line. However, as container traffic continues to grow, there will likely not be enough capacity within the Waterfront yards to support the container traffic for the future. In order to understand what would be required to remove the at grade intersection constraint, the City of Vancouver initiated a study of the Burrard Inlet Rail Corridor.

4.0 Study Overview

In June 2006 the City was successful in obtaining federal funding approval as part of the Transportation Planning and Modal Integration (TPMI) Initiative for the False Creek Flats Rail Corridor Strategy. The goal of this study was to develop a preliminary grade separation concept for the BI Line Corridor along with structural cost estimates and an evaluation of potential benefits and impacts on the surrounding area.

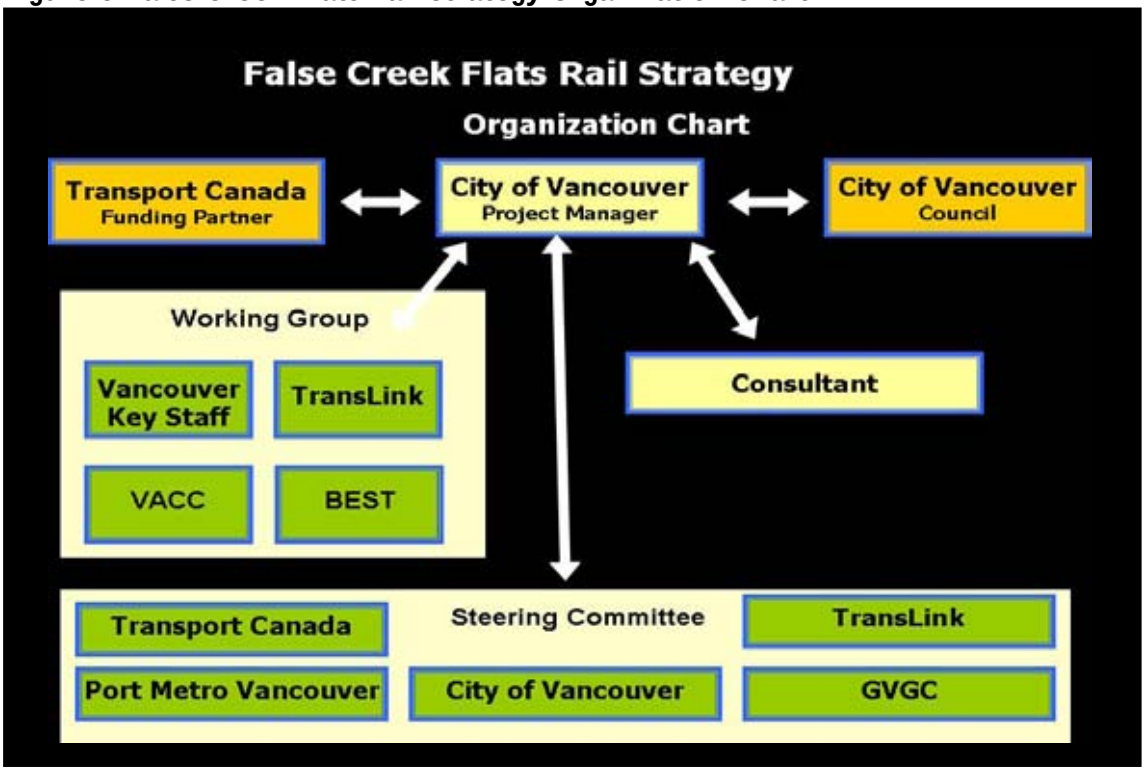
The project team consisted of a Project Manager from the City of Vancouver, a Working Group, a Steering and a consultant team.

The working group met at several points throughout the project to provide technical feedback to the consultant at key project stages. This group was comprised of members from the City of Vancouver (Neighbourhood Transportation, Structures, Central Area Planning), from TransLink (Roads and infrastructure planning branch), Vancouver Area Cycling Coalition (VACC), and Better Environmentally Sound Transportation (BEST).

The steering committee was primarily comprised of members from transportation agencies and potential funding partners. This group would receive information and provide comments at key stages in the project. The steering committee members were from the City of Vancouver, Port Metro Vancouver (PMV), TransLink, the Greater Vancouver Gateway Council (GVGC), and Transport Canada

Opus International Consultants and EarthTech were selected as the project consultant and were tasked with developing a grade separation concept for the BI line corridor.

Figure 9:False Creek Flats Rail Strategy Organization Chart



5.0 BI Line Grade Separation Concept

The primary focus of this study was to develop a corridor strategy for the BI line that could be used to guide investment in the future. The premise of this study was that although, in recent years, train volumes along the BI line have dropped, future needs for more rail infrastructure could lead to increased use of this corridor and the False Creek Flats to support anticipated growth in goods through the south shore terminals.

This section discusses a corridor concept along with associated potential benefits. It should be noted that at this point consultation with the adjacent industrial areas and neighbourhoods has not taken place. Information from this study can be used with future consultation to gain feedback and develop grade separation options that meet the needs of the nearby residents and businesses as well as providing the necessary capacity to support goods movement by rail.

The corridor concept is comprised of three components including:

- Arterial Road grade separated structures
- Rail/ road intersection closures
- Cycling improvements

Cost estimates have been included for all structural concepts. These cost estimates were generated as part of the Opus International/ EarthTech Consultant report and are considered to be "conceptual structural cost estimates". The actual costs to construct the concepts would include other non structural costs including: realignment of streets, signalization, beautification, etc and could be as much as twice as high. To allow for this uncertainty a cost range has been added with each concept within this summary report.

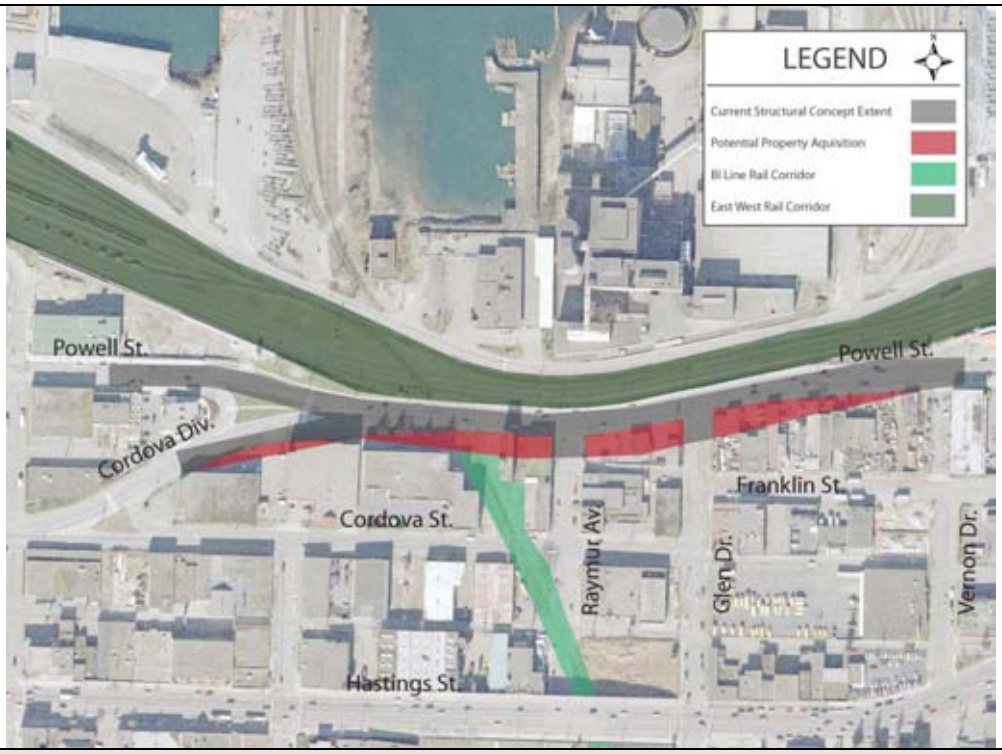
5.1 Arterial Road Grade Separated Structures

There are two locations where arterial road grade separated structures are proposed, including:

- Powell Street- an existing arterial roadway and transit street
- Malkin Avenue- a replacement for Venables Street which is currently the main connection to the Georgia Viaducts.

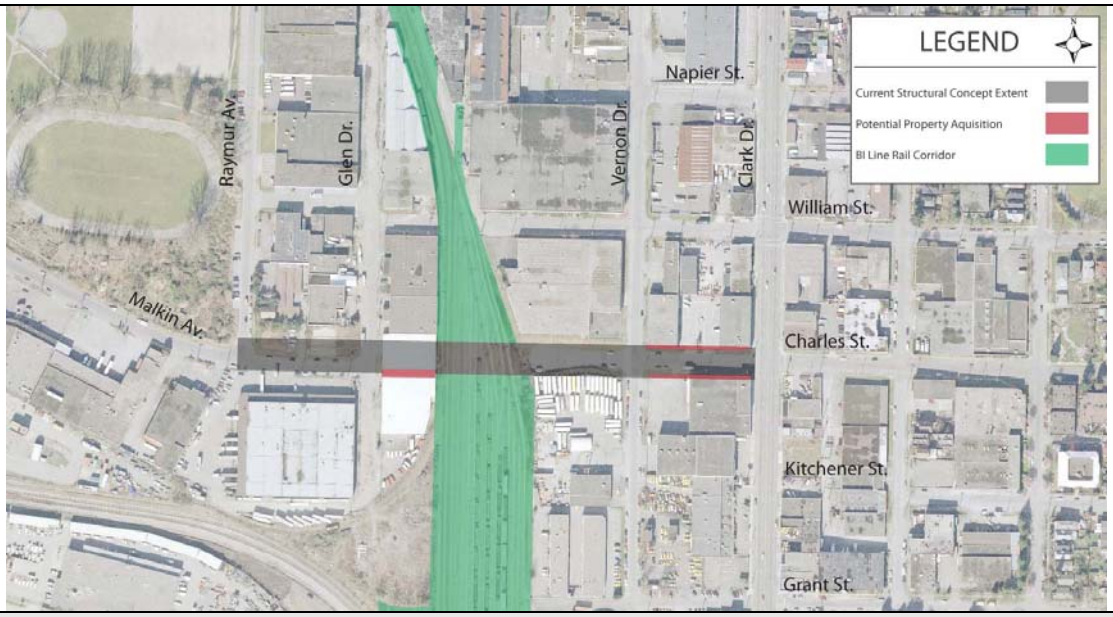
Detailed information on these structures can be found in the Opus International/ EarthTech Consultant report and a summary is provided in this section.

Powell Street



Priority	
This structure has the greatest potential to provide short term rail capacity increases in the east west direction and to protect rail capacity along the Burrard Inlet line.	
Potential Benefits/ Impacts	
Pedestrians **Cyclists**	• Provides an opportunity for a greenway connection along Powell street past a section where Powell street is most constrained by rail tracks, however a solution to reduce grades is needed
Transit	• Removes at grade rail crossing
Rail	• Provides an opportunity to remove pinch point along east/ west rail corridor • Removes at grade rail crossing and combined with other at grade crossing removal would allow trains to stop along the BI line • Provides an opportunity to connect BI line adjacent to the East/ West Mainline
Approximate Structure Characteristics	
Lanes	4 lane cross section with 3.2m lanes to accommodate transit
Pedestrian/ Cyclist accommodation	Sidewalks would be provided along the bridge and there is the potential for a multi-use path. The Structural concept included 8.6m for pedestrians and bikes.
Max Grade	8%
Length	310m
Width	22.6m
Property Requirements	• Some properties on the south side of Powell could be impacted dependent on how far south the roadway alignment needs to be moved to accommodate east/ west rail infrastructure
Roadways/ Accesses Impacted	Raymur Avenue and properties on the south side of Powell Street
Estimated Structural Cost	$15-$30M
Future Considerations	
Investigate whether an overpass structure at this location could be used to address the rail capacity constraints of the Heatley Diamond and improve east/ west operations.	

Malkin Avenue



Priority

This grade separation could provide the most potential for community benefit but to achieve rail benefits it would need to occur with the other grade separations along the corridor.

Potential Benefits/ Impacts	
Pedestrians **Cyclists**	• Provides a link over the rail tracks in the alignment of Charles, which could be a future east/ west bikeway linking through to Burnaby's bike route, however needs a solution to address grades
Transit	• Moves transit routes further away from Strathcona and closer to the industrial area. • Removes at grade rail crossing
Rail	• Combined with the closure of Venables street would remove a roadway intersection and allow trains to queue along the BI Line
Neighbourhood	• With the reclassification of Venables to a local collector would remove roadway barrier between neighbourhood and Strathcona park. • Could help to address shortcutting problems through Grandview Woodlands neighbourhood to the east
Approximate Structure Characteristics	
Lanes	4 lane cross section with 3.2m lanes to accommodate transit
Pedestrian/ Cyclist accommodation	Sidewalks would be provided along the bridge and there is the potential for a multi-use path that could be on the north side of the bridge and continue past Strathcona Park. The Structural concept included 7.6m for pedestrians and bikes.
Max Grade	8%
Length	400m
Width	21.6m
Property Requirements	Property may be required on east side of Vernon Drive and east side of Glen Drive on Malkin Avenue alignment.
Roadways/Access Impacted	Impacts to properties on east side of Vernon Drive and the North side of Malkin West of Glen Drive
Estimated Structural Cost	$21-40M (this overpass would also require roadwork to connect Malkin overpass to the Georgia viaducts it is anticipated that this would be an additional $15-20M)

Future Considerations

This concept would require the use of road right of way along Malkin which is currently used as park space. Consultation with the neighbourhood would be required.

5.2 Rail Road Intersection Closures

There are three locations where industrial roads intersect with the railway line. In order to create a fully grade separated rail corridor these crossings would need to be closed. These closures would be of low priority and would likely only be completed once all of the other grade separations along the line are completed. The purpose of closing these roads would be solely if it was of benefit for rail movements along the BI line corridor or for improved Port Security. These closures would not provide benefits to other modes but the impacts could be mitigated by connecting the closed streets adjacent to the rail corridor. This would allow large trucks to maintain access to the local industrial businesses. Some property acquisition would be necessary to accomplish this and consultation with the adjacent businesses would be required to ensure that this plan is feasible. Streets that would need to be rerouted include:

- Cordova Street East of Raymur Street
- Raymur Street South of Cordova Street
- Parker Street at Glen Drive

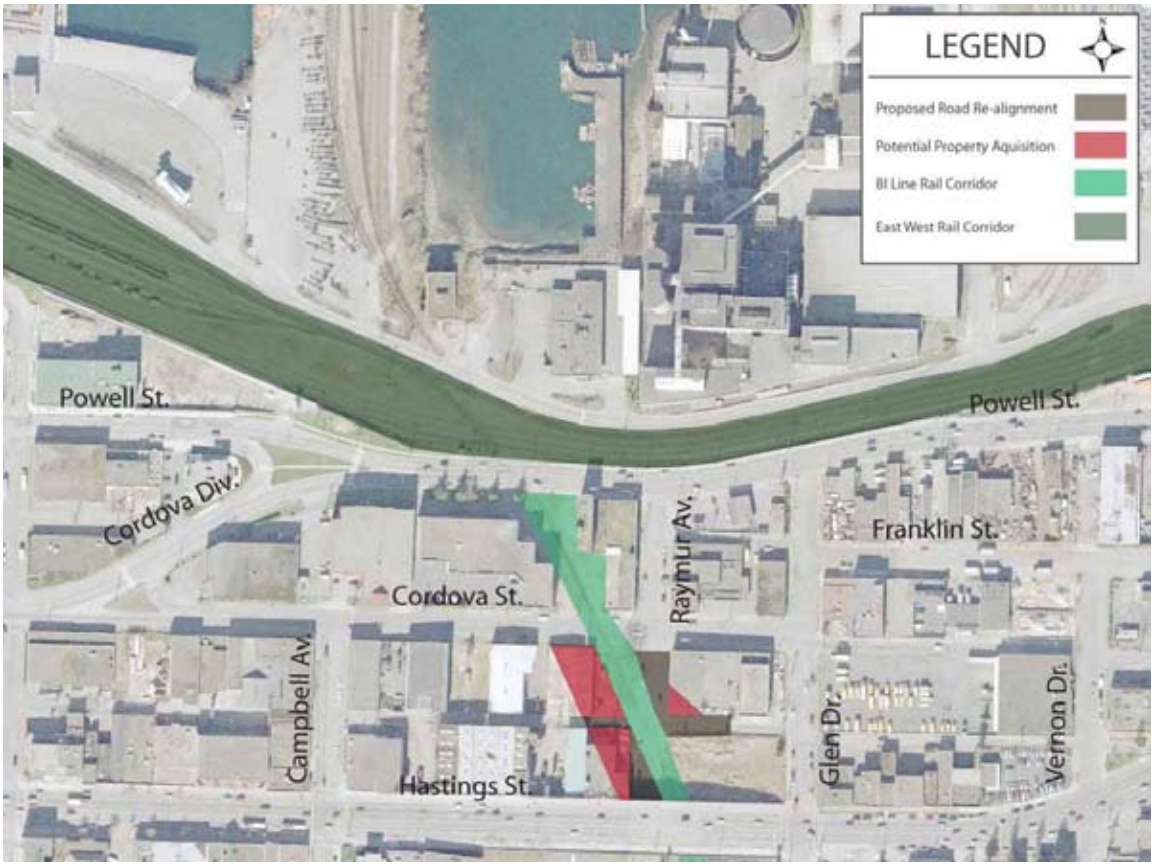
Cost estimates were not developed for these three locations as it will be dependent on property costs and any demolition costs that might be required. At this point information will primarily be used to identify what property would be needed if the intersections were to be closed and strategic property acquisition could occur as opportunities arise.

More detailed information on these road closures can be found in the Opus International/ EarthTech consultant report and a summary is provided in this section. As the impacts are similar for all three locations these are discussed together and the property impacts and new roadway connections are discussed for each location.

Industrial Street Closures	
Priority	
Low priority, would likely follow all other grade separated crossings.	
Potential Benefits/ Impacts	
Pedestrians	• cuts off pedestrian and cyclist connections through the industrial area, however distance between rail crossing opportunities are within 200m north of Venables and 400m south of Venables. This is within the guidelines for cycling route spacing but would be further than desirable for pedestrian connections
Cyclists	
Transit	• does not greatly affect distance to transit stops as you could connect to arterial streets on either side of the rail corridor
Rail	• combined with the other grade separations would provide a grade separated link between the False Creek Flats and the Waterfront.
Neighbourhood	• similar impacts as for pedestrians and cyclists

Cordova Street East of Raymur Street and Raymur Street South of Cordova

Roadway Realignment Description



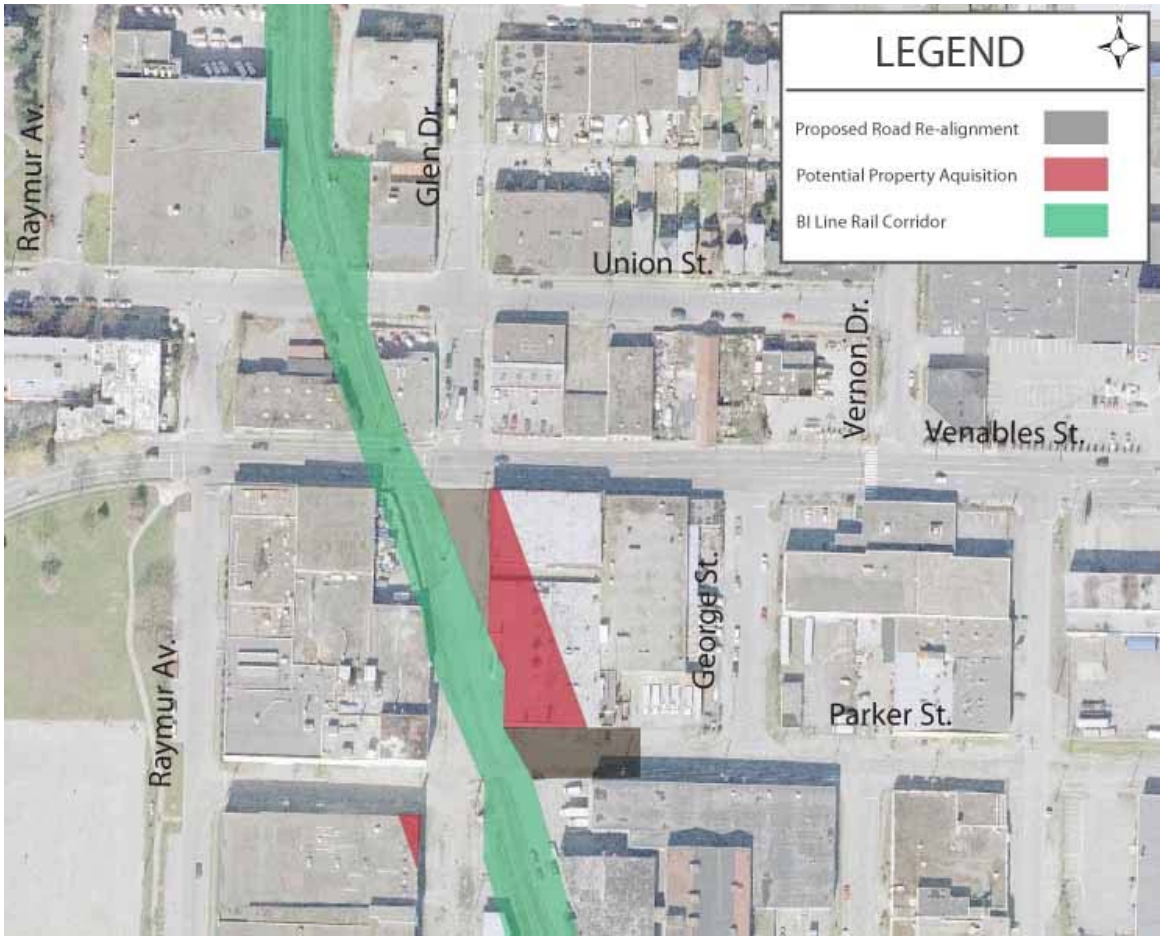
Realigned Streets	• Cordova Street West of BI line Connects to Raymur Street southwest of BI line • Raymur Street North of BI Line connects to alley south of Cordova Street
Properties Required	• West of BI line- Road width adjacent to BI line from Cordova to Raymur • East of BI Line- Corner cut on north side of alley adjacent to Raymur and south of Cordova Street

Future Considerations

Raymur Street south of Cordova Street and north of BI line could be reclassified to a lane or widening lines could be added to lane south of Cordova Street between Raymur Street and Glen Drive to bring to a street standard.

Parker Street at Glen Drive

Roadway Realignment Description



Realigned Streets	• Glen Drive north of BI Line connects with Parker Street
Properties Required	• A portion of the property on the north/ east corner of Glen Drive and Parker to allow a large truck to turn from southbound Glen Drive onto Parker Street and vice versa. • A portion of the property on the south/ west corner of Glen Drive and Parker Street to allow large trucks to turn south on Glen Drive

5.3 Cycling Infrastructure

There are two locations, in addition to cycling and pedestrian facilities on the arterial street structures; where cycling/ pedestrian structures should be created in a grade separation concept including:

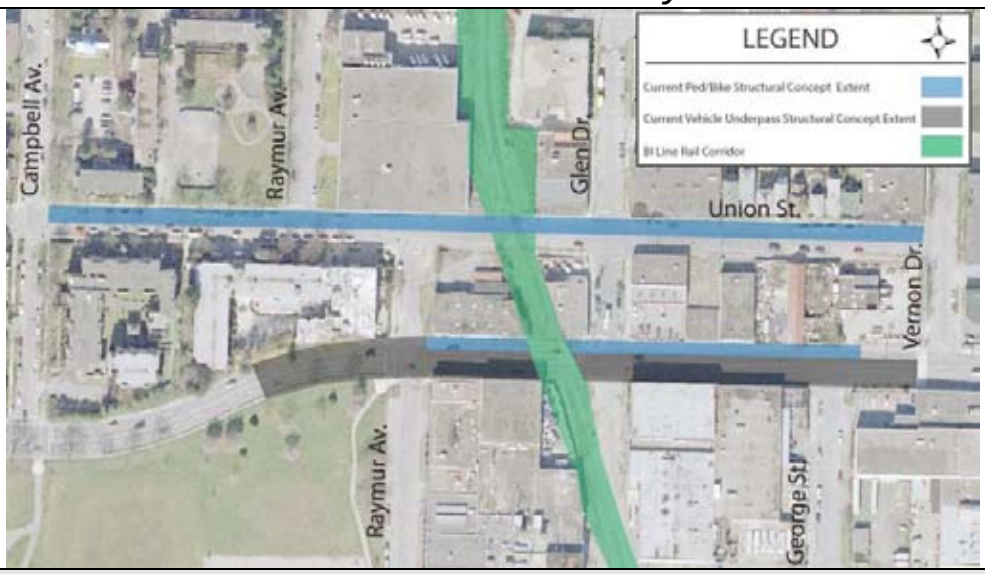
- Adanac Bikeway- A grade separated crossing for bikes and pedestrians on either Union Street or on Venables Street if it is reclassified to a neighbourhood collector as part of the construction of the Malkin Avenue overpass.

- Central Valley Greenway-structure that would lead from Clark Drive/ Grandview Highway North across the rail lines in the Flats to allow for the direct continuation through the False Creek Flats towards False Creek.

There is also an opportunity to create a north south bikeway that parallels the rail corridor and would take advantage of the limited number of east west roadway intersections. Options for a north/ south bikeway have been discussed in the consultant report and have been passed on to the City's Neighbourhoods and Greenways branch for consideration.

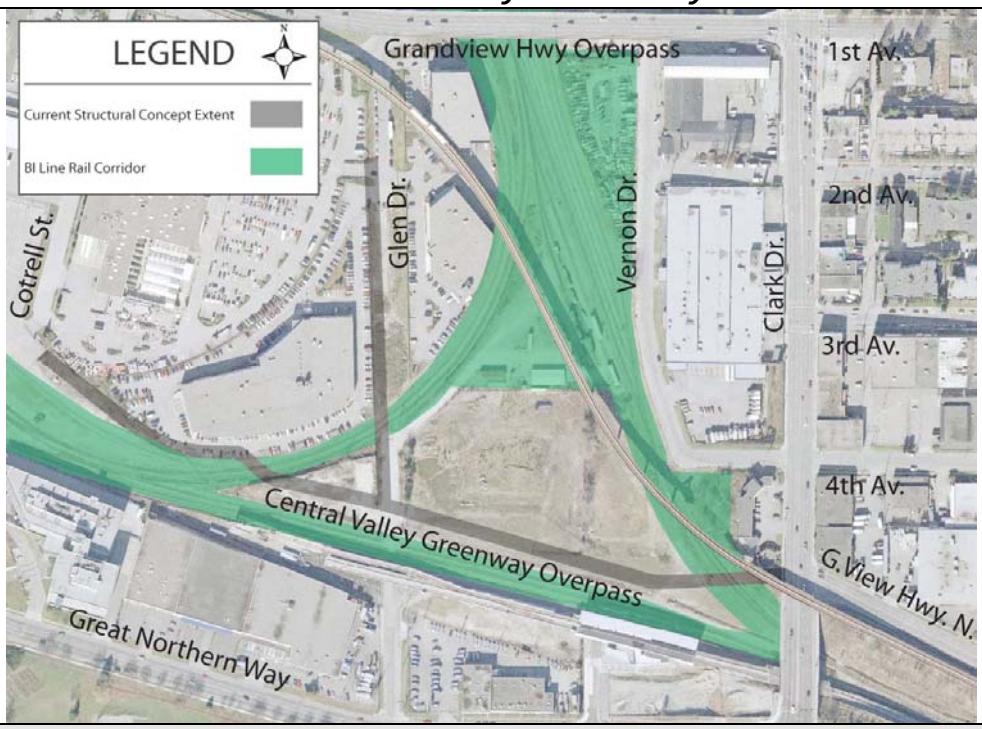
More detailed information on the cycling and pedestrian structure options can be found in the Opus International/ EarthTech consultant report and a summary is provided in this section.

Adanac Bikeway



Priority	
Under current conditions with reduced rail traffic, the at grade crossing provides better service and a grade separation would be low priority. If rail volumes increase so that the bike route is blocked by trains more frequently, or if other crossings are grade separated the priority would increase.	
Potential Benefits/ Impacts (Union or Venables Streets)	
Note: The potential benefits / Impacts are similar if the bike route is on Union Street or on Venables Street. Consultation would be required to determine what grade separations would best suit the needs of the area.	
Pedestrians **Cyclists**	• would increase the grades and travel distance for pedestrians and cyclists, however if train volumes increase along the corridor it would avoid lengthy delays from train blockages
Transit	• No impacts to transit
Rail	• This would only provide benefits to rail if the at grade crossings at Venables and the Industrial Streets are removed.
Neighbourhood	• Could reduce connectivity to the adjacent neighbourhood if it is a cyclist/ pedestrian only structure. This would require consultation with adjacent neighbourhood to determine if this is acceptable.
Approximate Structure Characteristics (Union Street)	
Lanes	Shared pedestrian/ cyclist only overpass
Max Grade	6%
Length	400m
Width	4.88m travel width
Property Requirements	None
Roadways/Access Impacted	Property access would be affected at both ends of the structure
Estimated Structural Cost	$5-10M
Approximate Structure Characteristics (Venables Street)	
Lanes	Shared pedestrian/ cyclist only underpass or including 2 lane vehicle underpass
Max Grade	6%
Length	275m
Width	15.5m cyclist/ vehicle underpass
Property Requirements	None
Roadways/Access Impacted	Raymur Street and George Street would be affected and several accesses to properties on Venables Street. Glen Drive would overpass Venables Street
Estimated Structural Cost	Cyclist/ Pedestrian underpass $4-8M, Vehicle underpass $12-24M
Future Considerations	
Consultation would be required to determine if Union Street could be a pedestrian/ cyclist only bridge or if a downgraded Venables Street would be better.	

Central Valley Greenway



Priority	
Construction of an interim Central Valley Greenway is underway. The location of the final alignment of this structure should be determined as part of the False Creek Flats Long Range Land Use and Transportation Study. This study should begin in fall of 2009.	
Potential Benefits/ Impacts	
Pedestrians **Cyclists**	• Provides a direct connection from Grandview Highway North at Clark drive across the rail tracks of the Flats • This would remove the requirement to cross the intersection of Clark Drive and Great Northern Way 3 times and provide a north south connection across the flats which does not currently exist.
Transit	• Could provide a connection to the VCC skytrain station from Clark Drive
Rail	• No direct rail benefits
Neighbourhood	• Provides an opportunity for a north/ south connection across the Flats across the rail yards and connects the Central Valley Greenway across the Flats
Approximate Structure Characteristics	
Lanes	
Max Grade	5.3% to Cottrell, 5.2% to Glen Drive
Length	550m to Cottrell, 260m to Glen Drive
Width	4.88m travel width
Property Requirements	City property or established right of ways would provide opportunities for column placement. There could be impacts on the sculpture across for Grandview Highway North at Clark Drive.
Roadways/Access Impacted	None
Estimated Structural Cost	$11-24M
Future Considerations	
Final alignment should be confirmed through False Creek Flats Planning study.	

6.0 Project Evaluation

There have been some significant changes in the rail operations, to service the south shore port terminals, since the initial funding application for this project. As a result some aspects of the False Creek Flats Rail Corridor Strategy (FCFRCS) were changed to better reflect the current operating environment and to coordinate with other studies that are being undertaken by Port Metro Vancouver (PMV) and Transport Canada.

The scope of the FCFRCS was revised to focus on the grade separation concepts and potential impacts on the surrounding neighbourhoods, industrial area and roadways. The sections associated with rail capacity and future forecasted rail network needs have been removed from the scope and will be addressed in the PMV and Transport Canada South Shore Rail Network Study. The City project manager for the FCFRCS has been coordinating with PMV and Transport Canada.

The City of Vancouver and its project stakeholders have found this project to be very valuable in identifying potential costs of the grade separated structures along the corridor and identifying potential property requirements for a fully grade separated corridor.

The tables below provide a summary of the performance indicators outlined in the City's initial proposal and if they were achieved. Some Indicators were adjusted to remove overlap with other ongoing studies and to reflect the changes in rail operations due to the co-production agreement.

Establish Technical Steering Committee			
Performance Indicator	**Achieved**	**Adjusted**	**Comment**
Minimum of 5 staff and 5 stakeholders as members on Steering committee	✓		Created technical working group and steering committee with involvement from 6 City staff and up to 8 stakeholder members from other agencies
100% of transportation modes represented	✓		Representation for Pedestrians, Cyclists, Transit, Rail and general traffic.
Assess Existing and Future Conditions			
Performance Indicator	**Achieved**	**Adjusted**	**Comment**
Existing Data analyzed for a minimum of 5 previous years	✓		ICBC collision data reviewed for surrounding area
Perform a minimum of 3 operational and safety audits of grade crossings	✓		Safety audit conducted for 5 existing at grade crossings and provided to City of Vancouver Traffic Management group
Future demand data forecasted for a minimum of 5 future horizon years and benchmarked against other transportation and land use projects		✓	Coordination with future work and outcome of South Shore rail study

Perform Multimodal Impact Assessment			
Performance Indicator	**Achieved**	**Adjusted**	**Comment**
Capacity Safety and operation of rail corridor determined for base case and various future year conditions with and without improvements		✓	Coordination with future work and outcome of South Shore rail study
Minimum of 5 preliminary design concepts including 3 grade separated crossings	✓		Grade separation concepts created for Powell Street, Unions Street, Venables Street, Malkin Avenue, and Central Valley Greenway. Requirements for closure of 3 add grade crossings at Cordova Street, Raymur Street and Parker Street/ Glen Drive were developed.
Finalise Rail Corridor Strategy			
Performance Indicator	**Achieved**	**Changed**	**Comment**
% of sustainable transportation surface modes that can grow without constraint		✓	Due to the potential grades associated with the structures and minimising impacts on adjacent properties and roadways this has been changed to a discussion on the potential impacts to pedestrians and cyclists.
% increase in Rail Traffic Growth		✓	Coordination with future work and outcome of South Shore rail study
% increase in safety at crossings		✓	Coordination with future work and outcome of South Shore rail study
Engage Stakeholders and Public			
Performance Indicator	**Achieved**	**Adjusted**	**Comment**
Minimum of 3 public open houses and 5 stakeholder presentations		✓	Five meetings were held with the steering committee and the working group but no public meetings were held. With the reduction in train volumes along the BI line due to co-production it was decided that this study would provide technical background that could be used in future consultation with the industrial area and the neighbourhood once a better understanding of the benefits for rail and the timing was known.
Staff report to Council on final recommended long range False Creek Flats Rail Corridor Strategy		✓	Council Report will be presented with new Council in February/ March 2009.

7.0 Lessons Learned

During the course of this project there have been several lessons learned that can be useful to note for future studies in this area. These include:

7.1 Constrained Urban Environment

The Burrard inlet line runs through the middle of an industrial area and is in close proximity to a residential neighbourhood. The railway line can create a barrier to east/ west movements through the area and it is desired that any future structures in this area help to remove this barrier. Ideally structures would have grades of less than 5% which is the building code's standard for accessibility. However, as this area is already built up with industrial properties and roadways adjacent to the rail corridor, the longer the structure the more impact on surrounding businesses and residents. In order to minimise impacts to properties many of the structures would have grades of 6-8%. Reduction in the grades would result in significant increases in structure costs, property impacts and roadway impacts. If the project proceeds to the next stage, public consultation would be required to determine what the acceptable impacts to the surrounding area would be and a balance between cost and grade reduction would need to be created.

7.2 Changes in operations

Changes in rail operations can have a significant impact on traffic along a corridor. Therefore, planning for structures and rail corridors should not just examine the current operating conditions. Any changes that may involve structures that could be present for the long term should preserve rail movements and connections in as many directions as possible. Also rail corridors that currently seem to have low volumes of train traffic should still be preserved for potential increases in traffic in that could be caused by growth or changes in rail operations.

7.3 Creating roadway overpasses can create opportunities for redevelopment

Grade separated overpasses in an urban setting can be designed so that the surrounding buildings front to the new grade level. This can facilitate redevelopment as new buildings can be constructed with their parking a loading at a lower level without the requirement for excavation. This redevelopment is currently occurring at the Hastings Street overpass of the Burrard inlet line. However, design of the building should address how the lower levels will be treated to avoid crime areas and rubbish pile up.

8.0 Next Steps

- The City will continue to coordinate with Transport Canada and Port Metro Vancouver on their South Shore Rail Study. There may be opportunity to refine the Powell Street concept in order to facilitate rail capacity increases for east/ west rail traffic.

- If there is a desire to further refine the grade separation concepts, consultation would be required with the adjacent industrial and residential areas.

- As opportunities arise, the City will continue to acquire right of ways and properties needed to remove the at grade crossings along the corridor.