

Township of Langley

High Level Review of Langley Township Community Rail

Final Report

Prepared by:

**UMA Engineering Ltd.
275 – 3001 Wayburne Drive
Burnaby, BC V5G 4W3**

This Report has been prepared by UMA Engineering Ltd. ("UMA") for the benefit of the client to whom it is addressed. The information and data contained herein represent UMA's best professional judgement in light of the knowledge and information available to UMA at the time of preparation. Except as required by law, this Report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by the client, its officers and employees. UMA denies any liability whatsoever to other parties who may obtain access to this Report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this Report or any of its contents without the express written consent of UMA and the client.

2167-058-00

February 14 2007

Table of Contents

Executive Summary	1
1.0 Introduction	8
2.0 Background	9
2.1 Efforts to Upgrade the Interurban Line for Passenger Service	9
2.2 Use of Interurban Rail Corridor Today by Southern Railway of BC and Canadian Pacific Railway.....	10
3.0 Issues involved in operating a passenger rail service.....	12
4.0 Review of existing bus and rail service in Langley Township	15
4.1 Bus Service.....	15
4.2 Rail Service.....	16
5.0 Improvements to transit service in Langley Township and perspective on community rail proposal.....	17
6.0 Langley Township's vision for transit service and relationship of community rail proposal to vision	18
7.0 Community rail model and strategy	19
8.0 Potential evolution of passenger rail service in the interurban corridor in Langley Township and City	20
8.1 City of Surrey Interurban Community Rail Corridor.....	20
8.2 Interurban Community Rail Corridor in the Langleys	21
9.0 Potential rail stations and land use, employment and population in catchment areas	22
9.1 Proposed Rail Stations	22
9.2 Existing and Future Population and Employment in Station Catchment Areas	22
10.0 Ridership potential of community rail	24
11.0 Accessibility improvements for rail stations	24
12.0 Traffic assessment at rail/road crossings	25
12.1 Traffic Assessment Overview	25
12.2 Road Corridors Impacted by Community Rail	25
12.3 Design Considerations at Railway Crossing Locations	26
12.4 Details of Road Crossings	26
12.5 Railway Crossing Improvements	40
12.6 Level Rail Crossings in Calgary	41

13.0 Potential safety impacts of community rail proposal 41

 13.1 Determining Collision-Prone Locations 42

 13.2 Site Observations 43

 13.3 Recommended Improvements 49

14.0 Potential vehicles for community rail service and linkage to BC hydrogen highway project 50

 14.1 The BC Hydrogen Highway 51

 14.2 Benefits of Community Rail Project 51

15.0 Range of potential capital and operating costs of Community Rail train service 52

16.0 Conclusions and recommendations 53

 16.1 Conclusions: 53

List of Appendices

- Appendix A Related Documents
- Appendix B Potential Vehicles for Future Peak Period Service
- Appendix C Figures Relating to Community Rail Corridor

List of Tables

Table 1: Existing Bus Connections and Travel Times between Potential Community Rail Stations – in the Langleys 58

Table 2: Potential Community Rail Stations – Community Rail Extension from Cloverdale Station in City of Surrey to 264th Street Station in Langley Township 60

Table 3: Current and Projected Freight Trains in the Langleys 61

Table 4: Current and Projected Freight Train Volumes on CP Page Subdivision between Pratt Junction just east of Cloverdale to Livingstone Junction just east of 232nd Street 61

Table 5: Existing Bus Service Frequencies on Langley City and Township Routes (start point in the Langleys) 62

Table 6: Forecast Traffic at Major at- Grade Road Crossings along Canadian Pacific/Southern Page Subdivision Rail Corridor in the Langleys 63

Table 7: Bus Service Hours per Capita by Key Sectors in Greater Vancouver Region - December, 2005 64

Table 8: Population and Employment within Catchment Areas of Community Rail Stations in Langley City and Township 65

Table 9: Means of Accessing Proposed Stations on Community Rail 66

Table 10: High Level Operating and Capital Cost Estimates for Community Rail Service Scenarios - from Cloverdale Station in Surrey to 264th Street Station in Langley Township (only covers the Langleys portion and not section of Community Rail between Scott Road Station and Cloverdale) 67

List of Figures

Figure 13.1 Existing Railway Crossing at 192nd Street 27

Figure 13.2 Existing Railway Crossing at 56th Avenue 28

Figure 13.3 Existing Railway Crossing at 200th Street..... 29

Figure 13.4 Existing Railway Crossing at 200th Street..... 30

Figure 13.5 Existing Railway Crossing on Fraser Highway 31

Figure 13.6 Fraser Highway Railway Crossing 32

Figure 13.7 Worrel Crescent Railway Crossing 33

Figure 13.8 Crush Crescent Railway Crossing 34

Figure 13.9 Crush Crescent Railway Crossing 34

Figure 13.10 Existing Crossing at Smith Crescent 35

Figure 13.11 Existing Crossing at 216th Street 36

Figure 13.12 Existing Railway Crossing at Trinity Western University 37

Figure 13.13 Existing Railway Crossing on 232nd Street 38

Figure 13.14 Existing Railway Crossing on 248th Street..... 39

Figure 13.15 Existing Railway Crossing on 264th Street..... 39

Figure 14.1 Example of a Collision Frequency and Traffic Volume Relationship 42

Figure 14.2 Example of Observed and Actual Mean Collision Frequency 43

Figure 14.5 Accesses to the Railway Tracks through the Trees 48

Appendix C

Figure 1: Community Rail Proposal 90

Figure 2: Conceptual 192nd Street Station Area..... 91

Figure 3: Conceptual Production Way Station Area 91

Figure 4 : Conceptual 204th Street (Duncan Way) Station Area 93

Figure 5: Conceptual Kwantlen University College Station Area 95

Figure 6: Conceptual Milner Station Area 97

Figure 7: Conceptual Trinity Western University Station Area..... 99

Figure 8: Conceptual 232nd Street Station Area..... 101

Figure 9: Conceptual 248th Street Station 103

Figure 10: Conceptual 264th Street Station..... 106

Executive Summary

UMA Engineering Ltd. has completed a high-level analysis and review of the costs, benefits and some of the issues pertaining to re-introducing a passenger rail service for the Township of Langley. This passenger service would operate on the Canadian Pacific Railway /Southern Railway Company Page rail line subdivision and the old interurban line, between the City of Surrey portion of the line (between Scott Road Station and a Cloverdale Station [176th Street and Highway 10]) and an easternmost station located in Langley Township at 264th Street.

This review was conducted with respect to the following service scenario and background and context:

- An initial peak period Community Rail service could operate from Scott Road Station through to a 264th Street Station in Langley Township by 2013, three years following the re-introduction of a peak period Community Rail Service in the City of Surrey between Scott Road Station and Cloverdale Station in late 2009 in time for the 2010 Winter Olympics. However, this date for the operation of a frequent and reliable Community Rail passenger service in the Langleys section of the line is dependent upon on the movement of today's long freight and container train traffic from Roberts Bank and the Vancouver Port on the CP/SR Page Subdivision located between the Pratt Junction just east of Cloverdale and the Livingstone Junction near 232nd Street, to another new or existing rail trackage in the Greater Vancouver Region. Note: Langleys refers to the City of Langley and Langley Township.
- This service could use a Community Rail vehicle similar to the Parry People Mover (PPM100) vehicles used on this type of service in Great Britain, or a more expensive Bombardier Talent LRT-like vehicle used on the City of Ottawa's LRT service, both powered by either hydrogen fuel cell engines or diesel engines.
- The freight and container traffic now moving through the town centre of the Langleys could be moved to another existing or new rail corridor in the Vancouver region or significantly be reduced in the Page Subdivision by the establishment of a new International Container Traffic Centre created at one location in the region to handle all freight and container trains from all the railways in co-ordinated fashion. Alternatively, the freight and container rail traffic could be moved to another corridor or to a separate track in the same Page Subdivision corridor to enable the Community Rail to operate on its own dedicated trackage. As well, the freight traffic in this corridor which operates through the heart of the Langleys (i.e. between the rail crossing at 56th Avenue on the west side and the rail crossing at Glover Road/Langley Bypass on the east side) could be placed in a sub-grade section in this portion of the Page Subdivision, in order to reduce its impact on road crossings and the urban quality of life in the core of the Langleys. **It is acknowledged that this movement of major freight train traffic from the Page Subdivision necessitates a major study to address the many complex issues associated with it.**
- The above-noted options for the movement of freight and container traffic in the region to enable a passenger Community Rail to operate through the core of the Langleys requires some significant investments and critical decisions at the national, regional and local government levels as to how the growing container and freight movement from Deltaport and the other Vancouver ports are going to be transported by rail through the region in the future. **We are now at a critical decision-making junction or time in the Greater Vancouver Region.** There is currently momentum building in the Greater Vancouver region among representatives from Transport Canada, the railway companies, the provincial government and regional officials (e.g. TransLink) to make further investments in upgrading the CP/SR Page Subdivision by adding two or three more overhead road crossings of the freight rail line in the core area of the Langleys (i.e. between 196 Street and Mufford Crescent), closing some other road/ rail crossings along this subdivision, and creating new rail sidings. **If these investments do not proceed and other options for moving freight and container traffic in the Region are not found, other than using the CP/SR Page subdivision, then using this corridor for passenger rail will likely be forever lost.** This will mean that there will be very little likelihood of extending a Community Rail line in the City of Surrey to the Langleys and further east to Abbotsford and Chilliwack.

MASTER AGREEMENT NOT KNOWN AT THIS TIME.

- The peak period Community Rail service could be operated by a hired railway contractor such as the CP Railway or Southern Railway. The passenger service would be proposed to initially operate frequently – every 20 minutes in weekday peak periods (5:30 am to 8:30 am and 3:30 pm to 6:30 pm), using modern, accessible community rail-like vehicles possibly powered by hydrogen fuel cell engines or another power source. A one-way trip time between the 40 kilometre Scott Road SkyTrain Station and the 264th Street Station Community Rail line would be approximately 54 to 56 minutes, with trains operating at 30 mph/48 km per hr, and with 20 to 30 second stops at each of the sixteen stations. The transit trip today from Scott Road SkyTrain Station to Langley City Centre (i.e. 65% of the total distance between Scott Road SkyTrain Station and 264 Street) takes between 47 minutes (peak periods) to 72 minutes (off-peak periods) making perfect transfers, using both the SkyTrain and buses.
- The passenger line service would have a physical and temporal separation from freight traffic, an upgraded communications and signal system installed to enable the trains to operate on this frequency on a single track with sidings in appropriate locations, and double tracking in station areas in order to provide accessible service (i.e. separate track for freight and passenger traffic due to different widths of trains). This service would provide reliable and timely connections between the businesses, residences and educational institutions in the vicinity and catchment areas of the stations. Ultimately, this service could be enhanced to provide service during midday and evening periods and on weekend post-2013 and extended eastward to the cities of Abbotsford and Chilliwack. Appropriate approvals would be required from federal, provincial and regional officials to operate this modern passenger rail service. Safety management systems and other requirements would need to be completed.

In undertaking this review, UMA also examined the following areas:

- Issues involved in obtaining and negotiating rights to use the required rail trackage for the Community Rail service, and obtaining the appropriate federal government approvals to operate a passenger rail service along the interurban rail corridor.
- A brief review of the existing state of bus service in Langley Township and Langley City in comparison to other areas in the Greater Vancouver Regional District, including a review of the bus connections today between the proposed Community Rail stations.
- How an interurban rail service concept plan relates to the current and future potential bus service in Langley Township and the Township's vision for a future transit network in the township.
- An explanation of the Community Rail model and strategy and how it works in Great Britain.
- Potential station locations on this interurban rail service, including issues of land use, required facilities, and population and employment in the station catchment areas.
- Existing and future accessibility to the passenger rail service.
- Traffic and safety impacts of major at-grade road crossings of this interurban line.
- Potential vehicles on this interurban passenger service.
- The range of potential capital and operating costs for a Community Rail passenger rail service.
- Other general costs and benefits of this service.
- Conclusions of this work and recommendations for future directions.

NOT REQUIRED

Conclusions

The major conclusions reached in this strategic examination of Community Rail for Langley Township include the following:

- i) Langley Township and City are not well served today by transit service compared to other areas in the Greater Vancouver Regional District (GVRD). This is illustrated by the following facts:

- Langley Township, as part of the South of Fraser Sector, in 2005, had the lowest per capita bus hours of all the sectors.
 - Some growing residential areas have limited transit service (e.g. Aldergrove residential area every 60 minutes), while business areas (e.g. Gloucester Park) have no bus service.
 - No bus routes have 10 minute or better service in peak periods, a standard that has been shown to be required in order to attract choice riders from travelling by automobile to switch to transit, and highlighted in TransLink's Ten Year Outlook Plan to 2013.
 - Service in the mid-day and evenings is unattractive, with many routes having 30 to 60 minute frequencies and the travel times from key destinations in midday periods being long.
 - Transit travel within Langley Township to key destinations is unreliable and not timely, and usually involves several transfers and waiting between buses.
 - The transit service today between the proposed Community Rail stations is poor or non-existent in terms of frequency of service and connections.
- ii) Despite the South of the Fraser Sector having a large population and employment base, and being the dominant area of growth in the Greater Vancouver Regional District (i.e. over 40% of the Region's growth in the next 25 years) with increased densification planned, there are no current plans, with committed funding, by TransLink to build an additional rail or bus rapid transit system and stations in this sector of the Region. This is in contrast to a \$2.0 billion dollar Canada Line rail transit investment for the Burrard Inlet area to begin operations in late 2009, and the \$1.1 billion investment for the Evergreen LRT Line in the Northeast Sector to also be in operation in 2011. As well, In addition, no funding estimates or commitments have been made by TransLink and/or the provincial government for the following potential Bus Rapid Transit services which have been shown as future service concepts (i.e. with no specific timetables for their development) in the work being prepared as part of the South of Fraser Area Transit Plan:
- Along the King George Highway-104th Avenue corridors linking Guildford Town Center, Surrey City Centre, Newton Town Centre and the South Surrey Centre. This service had a preliminary cost estimate of \$120 million in 1998, but would very likely have a much high cost today.
 - Along the Fraser Highway linking key destinations in Langley Township and Langley City with key destinations along the Fraser Highway corridor.
 - Along the 200th Street corridor linking the urbanized areas of the City of Langley and Langley Township with the growing residential areas such as Brookwood, Willowbrook and Willoughby with the commercial heart of the Langleys (Langley Township and Langley City) and Highway 1, and across the new Golden Ears Bridge to Maple Ridge Town Centre.
 - Along Highway No. 1, starting at Highway 1 and 216 Street and Walnut Grove, and going across the Port Mann Bridge to Coquitlam and Burnaby.

In fact, TransLink indicated in a report to its Board on October 18, 2006 that none of the potential transit service improvements emanating from the South of the Fraser Area Transit Plan would be implemented unless TransLink receives a long-term commitment of sustained operational funding from provincial or federal government sources. At this time, the governance and funding of TransLink are under review by the Ministry of Transportation and no announcements have yet been made.

- iii) The Cloverdale Station to 264th Street Station corridor for a passenger rail service in Langley City and Township has significant existing and forecast population and employment base in its catchment area, and links growing residential, educational and commercial/business community areas that are not well linked by transit services today.
- iv) There are significant safety and traffic conflict issues associated with the re-introduction of passenger train service along the Langleys Community Rail corridor in the CP/SR Page Subdivision (i.e. in the Cloverdale Station to the 232nd Station portion of the line). This is due to the significant existing and

growing freight and container traffic operating on a single line track with thirteen major at-grade road crossings. Currently, about 22 freight trains per day use the CP/SR Page Subdivision (see Table 3) and this rail traffic is projected to increase to 27 daily trains by 2002 and 36 daily trains by 2021. These trains are projected to be between one and two miles long and potentially simultaneously block 6-7 road crossings for longer periods than today. It is clear that the re-introduction of reliable and frequent passenger service to serve the Langleys east of the Surrey's Cloverdale area cannot be undertaken, unless the freight trains between Cloverdale and 232nd Street on the Page Subdivision are re-routed in the Vancouver Region. Several options for this re-routing, with significant costs and impacts, include the following:

- Re-routing all the freight and container train traffic to a more northerly corridor along the Fraser River, and examining changes to existing rail junctions and corridors (i.e. building a Y junction between the BC rail line from Deltaport and the Burlington Northern Rail through Delta and Surrey) or examining regional freight rail corridors that could be provided as part of the Gateway Project and, specifically, the South Perimeter Road.
- Creating a regional International Container Traffic Centre, to which all rail freight and container traffic from all the railways companies would be routed to using shorter trains and so that the containers could exit the Region in a co-ordinated fashion.
- Creating a new freight rail corridor route through southern Langley Township, which would parallel the US/Canada border, and be located away from significant development areas but which would traverse and impact agricultural lands.
- Double tracking all along the Page Subdivision, between the Pratt Junction and the Livingstone Junction near 232nd Street and providing individual tracks for the freight/container traffic and the Community Rail, respectively. However, the right-of-way of this corridor is narrow, 50 feet in most places, and this option would require extensive and expensive adjacent property. This option would also not address the safety, urban congestion, and quality of life issues of operating a growing number of long freight trains through the heart of the Langleys, and having a town centre core with a number of long road grade separations over the rail corridor.
- Depressing the freight trackage through the heart of the Langleys (between 56th Avenue and the CP rail intersection and the rail intersection at Langley Bypass/Glover Road area). This option would also have a significant cost and would likely be made difficult by the high water table.

However, considering the factors of the liveability and quality of the community, public safety, traffic congestion, impacts on personal mobility, and rail and business efficiency, it would not seem to be sustainable to continue the operation of long freight and container trains through the heart of the Langleys. Also, the solutions now being studied by TransLink, Transport Canada and the railway companies to mitigate the above-noted impacts of the rail/road crossings by building of two to three more expensive and long overhead rail crossings and closing off other major rail/road crossings do not seem sustainable. These overhead crossings are in addition to the current 204th Street crossing which is being built in the centre of the Langleys commercial core at a cost of \$30 million or more per crossing.

Projected rail volumes and growth in road traffic indicate that nine existing rail/road crossings on the Page Subdivision through the heart of the Langleys have cross products of over 200,000 (i.e. projected daily traffic volumes times the projected daily number of trains at an road/rail intersection). Using the Canada Transport cross product standard for required road/rail grade separations, up to nine crossings in the Langleys on the Page Subdivision of 200,000 would require the construction of expensive rail overhead road crossing structures by 2012.

If more major investments are made along the Page Subdivision in terms of additional overhead road crossings of the rail line, new rail sidings and enhanced communication systems along this trackage to improve the efficiency of freight movements and improve safety, there will be little impetus or momentum for any parties to want to relocate the freight/container traffic to another regional corridor.

- v) Auto and pedestrian signage need to be consistent and clearly understood along the Community Rail corridor for motorists and pedestrians. As well, the frequent peak period passenger train operations, for example, would require coordination with nearby traffic signals. In general, two-vehicle, peak-period passenger trains, operating every 15 to 20 minutes, would disrupt individual road traffic signal cycles for 30 seconds, which is considerably less than the long freight trains using the rail corridor today. In addition, left turn and pedestrian movements would be restricted while passenger trains were moving through traffic intersections. Further, it has been assumed in the costing of the service scenarios for this Community Rail project that at any of the existing road/rail crossings, where there are no gates, bells and signage, that improvements will be made to these crossings according to Transport Canada guidelines or they will be closed. This will include, in many cases, the installation of a full railway crossing with signage, gates and bells. However, even where there are full gates and bells at road/rail crossings today, improved signage should be installed.
- vi) It may be likely that the development of a Scott Road Station-Cloverdale Station to 264th Street Station Community Rail corridor for peak period rail service using modern and accessible vehicles would draw potential ridership away from potential Bus Rapid Transit service and other potential transit service investments in the Langleys. Therefore, it is important that EMME2 modelling and micro-simulation modelling be completed, at the earliest possible time, for the Langleys Community Rail peak-period corridor service scenarios. This modelling should be completed in combination with future employment and population forecasts and potential scenarios for various combinations of bus, bus rapid transit and rail improvements for an area which would include the South of Fraser Area and outside the Region to the east including the Fraser Valley (including Abbotsford and Chilliwack). This work is required to be completed soon, as part of the South of Fraser Area Transit Plan, in order to determine the likely range of ridership and potential fare revenue estimates for the Community Rail project, and its impacts on other potential transit investments, and to assist in preparing a detailed business and work project plan for the development and implementation of the Community Rail project.
- vii) The Langleys Community rail corridor is a valuable community and regional asset for passenger movement. The development and implementation of a Community Rail passenger service in this corridor, using accessible and modern Community Rail vehicles powered by hydrogen fuel cell engines, would be a valuable addition to the BC Hydrogen Highway being proposed for a Scott Road Station to a Cloverdale Station Community Rail corridor.
- viii) The success of a project of this nature would depend upon strong political and financial support from the Langleys - both staff and councils from the Township and City, the Region (TransLink and GVRD) and provincial and federal governments. Also Langley Township would need to have staff and political champions who would maintain a strong driving force and enthusiasm throughout the project from planning and design to implementation and follow-up.
- ix) According to federal regulations, approval of the use of the interurban line for formal peak period commuter service, operating from a Cloverdale Station to a 264th Street Station, would require the preparation of a Safety Management System (SMS) to ensure the safety of employees, contractors, the public and the protection of the environment. Municipal and regional staff would need to work with Transport Canada, Human Resources Development Canada, and the Southern Rail Company of BC in this regard.
- x) A high level estimate of the total cost of constructing and operating an accessible, modern Community Rail service every 20 minutes during peak weekday periods between the Cloverdale and 264th Street Stations is projected to have a total capital cost of approximately \$82.0 to \$112.0 million plus (i.e. with higher quality vehicles) and an annual operating cost of approximately \$6.0 million. The capital cost estimates include the following components: right-of-way and grade crossing improvements; passenger stations; modifying some industrial sidings; double tracking the station

areas to ensure physical separation of freight and passenger services; providing adjacent station parking and pedestrian access improvements; providing new LRT-like vehicles; installing fare revenue collection equipment; and implementing a train communication and signal system to ensure safety. The costs do not include the following cost categories: property costs; utilities relocation; double tracking along the entire corridor and its associated costs; contingencies; engineering and design costs; project management costs during planning and construction; consulting, legal and public consultation fees; environmental impact studies; permits; interest on debt obligations; and payments that might be made to the Southern Railway Company as a business compensation cost.

Recommendations:

- i) The Community Rail corridor should be protected for future transportation options through the Official Plans of both the City and Township of Langley and in TransLink's new Strategic Transportation Plan to be prepared in 2008.
- ii) TransLink, the City of Surrey, the City and Township of Langley, the Corporation of Delta, the provincial government, BC Hydro, GVRD and other agencies should be encouraged to directly support, through financial, manpower and other in-kind contributions, the efforts of the Fraser Valley Heritage Railway Society (FVHRS) to upgrade the entire Community Rail corridor, with a first priority on the Cloverdale Station to Sullivan Station section, to enable a summer weekend heritage/tourism passenger service to be offered on this section in 2008. Work on this portion of the rail corridor would serve as a means of encouraging support for the upgrade of other portions of the line. Concurrently, efforts should be focused on the implementation of a weekday peak period Community Rail service between the Scott Road SkyTrain Station and a Cloverdale Community Rail Station by late 2009, in time for the 2010 Winter Olympics. Note: The City of Surrey Council has recently approved proceeding with the development of a passenger rail service, using the original heritage vehicles, between Cloverdale and Newton Community Rail Stations.
- iii) Between today and 2010, a regional solution should be developed for removing the freight and container traffic in the Cloverdale to 264th Street portion of the Page Subdivision to provide a sustainable quality of life in this core area of the Langleys and to enable the City of Surrey passenger Community Rail line to be extended to 264th Street in the Langleys by 2013, and ultimately, to Abbotsford and Chilliwack. A lead agency (such as Transport Canada, working with TransLink, the City of Surrey, the Langleys, the provincial Transportation Ministry, BC Hydro, Transport Canada, and the railway companies - CN, CP and Southern Railway - and the Gateway Council), with sufficient staff and funding resources, including provincial and federal financial contributions, needs to be the driving force for the effort to find and implement a sustainable solution for the increased and more efficient movement of freight through the Vancouver Region. Unless a sustainable solution is found and implemented, the proposed investments in the Page Subdivision through additional rail/ road grade separations and new sidings along this portion of the line will likely forfeit forever the re-opening of the interurban passenger rail service between Cloverdale in the City of Surrey and Chilliwack in the Fraser Valley.
- iv) Langley City and Township, BC Hydro, TransLink, Terasen Gas, Canadian Pacific Railway and Canadian National Railway, the Gateway Authority, the Vancouver Port Authority, and the Southern Railway Company, should work with the FVHRS, and other community groups and stakeholders along the interurban line to put together a detailed business and financial plan and timetable for the re-introduction of passenger Community Rail line in the Langleys by mid- 2007. This business plan could be undertaken concurrently with the work to be initiated on the City of Surrey Community Rail project in 2007. This plan would be expected to provide the details, processes, stages and resources required for upgrading/improvements for the entire Cloverdale Station to 264th Street Station corridor for the introduction of a peak period Community Rail service by 2013, with a green and environmentally friendly propulsion system (i.e. hydrogen fuel cells) as part of the BC Hydrogen Highway Project, and using modern and accessible Community Rail vehicles. This would provide a

reliable, timely and cost-effective transportation option for the Langleys and the Greater Vancouver Region.

- v) The Langleys should consider appointing a staff member and/or a consultant to assist and work with TransLink, the Corporation of Delta, BC Hydro, City of Surrey, FVHRS, GVRD, Southern Rail Company, Canadian National Railway, Canadian Pacific Railway, Terasen Gas and other key stakeholders on a Community Rail Project Board to fund, plan, design and implement the Langleys portion of a regional Community Rail project.
- vi) This report, as well as additional work currently being completed by TransLink on the Community Rail line and complete transportation modelling on proposed transportation improvements South of the Fraser area, should be completed. This work should be used as the initial basis for this more detailed planning and design work.
- vii) The Langleys actively work with political and staff representatives of TransLink, City of Surrey, City of Abbotsford and the City of Chilliwack to secure support for a regional Community Rail initiative, from Surrey to Chilliwack, in order to organize the planning and fundraising required for its extension to these areas. This group should also attempt to immediately work with TransLink, the Vancouver Gateway Council, provincial and federal government staff and politicians and railway company representatives to resolve the existing freight and container movement issue with a focus on the rail corridor east of Cloverdale on the CP/SR Page Subdivision, between the Pratt and Livingston junctions. The objective of these efforts should be to find another corridor or regional solution for the movement of freight and container traffic in the region which will enable the operation of frequent and reliable passenger Community Rail between the Cloverdale and the 232nd Street stations, and create a much improved quality of life, increased safety and personal mobility for the residents of the Langleys and improved rail and business efficiency.

1.0 Introduction

UMA Engineering Ltd. has been asked by the Langley Township to complete a high level analysis and review of the costs, benefits and some of the issues pertaining to re-introducing passenger rail service to the Township on the portion of the old interurban line on which service was discontinued in 1951. The proposed passenger line would be located between a City of Surrey western station at Cloverdale (176th Street and Highway 10) through the City of Langley and Langley Township to 264 Street (See Figure 1 in Appendix A). Passenger rail service used to be offered on this line, in the 1910 to 1950 period, between Vancouver and Chilliwack. The only variation to this new proposed passenger rail corridor is that the portion of the old interurban line through the Town Center of the Langleys has, since 1951, been developed and transformed to community trails and other recent land development. These changes to this portion of the corridor would make it difficult to be used for a new passenger train service.

Langley is located on the south bank of the Fraser River and extends to the international border with the United States. The City of Langley had a population of 24,000 residents in the 2001 census and the Township of Langley had a population of 87,000 residents, for a combined population of approximately 125,000 residents.

Since the spring of 2006, the City of Surrey has been investigating the re-introduction a peak period operation Community Rail passenger service between the Scott Road SkyTrain Station and the Cloverdale area, using hydrogen fuel cell engines in modern, cost-effective and smaller LRT-like vehicles, with cost-effective and simple stations. This Surrey Community Rail project is proposed to be part of the Hydrogen Highway demonstration project in connection with the 2010 Winter Olympics.

A strategic and high level review of the City of Surrey Community Rail project has been completed by UMA Engineering. The Community Rail concept originates in Great Britain. This concept entails railway companies, governments and community groups working together in partnerships to make more efficient use of rail lines for passenger rail use, and employing cost-effective stations, rail vehicles, other infrastructure and operating models. The primary purpose of these Community Rail lines in Great Britain is to link travel between the community station areas, and not necessarily to serve as a commuter market service whose primary purpose is to serve suburban commuters who want to travel from the end of the line to a central employment centre (i.e. the latter market being the primary function of the West Coast Express train service today).

In subsequent phases, post-2010, the proposed Community Rail service could be extended from the City of Surrey to provide passenger service in the City and Township of Langley, and to the City of Abbotsford (including the soon to be expanded airport) and the City of Chilliwack. However, the extension of a passenger Community Rail service to Langley City and Township and to the communities to the east will require a resolution of the safety, traffic congestion, and urban quality of life issues associated with the growing demand for the trackage to the east (i.e. the Canadian Pacific/Southern Railway Page Subdivision rail line between Cloverdale and 232nd Street) being used extensively today for the movement of long freight trains transporting goods between Vancouver ports and other parts of Canada and United States. The continued heavy and rapidly growing movement of freight along this portion of the single track line-CP/SR Page Subdivision, which is projected to continue to significantly increase in terms of the number and length of trains, would prohibit a frequent and reliable passenger service from operating on the same portion of the rail line. This would require the relocation of freight and container rail line service elsewhere within the Greater Vancouver region.

This high level review of the re-introduction of passenger rail service in the interurban rail corridor, termed the Langley Community Rail Proposal, will examine the following factors and issues in the order shown below:

- A brief review of the background of the interurban rail corridor and efforts to date by the City of Surrey and the Fraser Valley Heritage Rail Society (FVHRS) to restore passenger service to this corridor.
- Issues involved in obtaining and negotiating rights to the required trackage for the Community Rail; completing required studies and plans; and getting federal government approvals in order to operate a passenger rail service along the interurban rail corridor in City and Township of Langley (the Langleys).
- A brief review of the existing state of bus and rail service in the Langleys with a comparison to other areas in the GVRD, including a review of the current level of transit service for bus connections between the proposed Community Rail stations.
- How this interurban rail service concept plan relates to the current and future potential bus service in Langley Township and the Township's vision for a future transit network expressed recently to TransLink as part of the current South of Fraser Area Transit Plan work.
- An explanation of the Community Rail Model and Strategy and how it works in Great Britain.
- Potential station locations on this interurban rail service given the existing and potential land use and population and employment in the station catchment areas.
- The existing and future accessibility to the passenger rail service in terms of bus, pedestrian, cycling and park and ride linkages.
- Traffic and safety impacts of major at-grade road crossings of this interurban line with major roadways in Langley Township.
- The potential vehicles on this service.
- The range of potential capital and operating costs for a Community Rail passenger rail service.
- Other general costs and benefits of this service.
- Conclusions and recommended future directions.

To assist in undertaking this work, UMA has had discussions with appropriate officials and representatives of TransLink, Southern Rail Company, and FVHRS. As well, several site visits were conducted on the interurban rail corridor to examine potential station sites, their access and adjacent land use, and traffic and safety issues near rail /road crossings. Pictures of the rail corridor and station sites and some rail/road crossings are included in Appendix C.

2.0 Background

2.1 Efforts to Upgrade the Interurban Line for Passenger Service

The Fraser Valley Heritage Railway Society (FVHRS) is a non-profit society which was incorporated in 2001. The FVHRS, together with municipal officials (e.g. local councils such as the City of Surrey Council) and other community stakeholders located along the interurban line, has been actively working in the last six to seven years to restore passenger train service to the 11.4 mile (18.4 km) portion of the interurban rail corridor. This corridor is located in the City of Surrey between the New Westminster Rail Bridge at Brownsville and near the Cloverdale Town Centre at Highway 10 and 176th Street, and extends further east through the Langleys, to Abbotsford and Chilliwack. A portion of the rail line corridor, between 90th and 98th Avenues west of Scott Road, is located within the Corporation of Delta.

This single rail track line has a right-of-way which varies from 50 feet to approximately 100 feet wide between BC Hydro poles. However, in some areas along the corridor, the BC Hydro poles are only 10 feet from the centre line of the track. The land under the tracks is owned by BC Hydro except where the tracks traverse roads which existed prior to 1906 and the portion of the corridor-the CP/SR Page Subdivision between Pratt Junction just west of Cloverdale and the Livingston Junction near 232nd Street. The corridor from New Westminster to Abbotsford is leased to Southern Rail by BC Hydro to operate four daily freight trains.

In most of the corridor, this right-of-way does not have sufficient width to provide tracks in each direction. It will not be possible to double track the line without the purchase of property. As well, double tracking the line may require the relocation of the existing tracks as they are now located in the centre of the right-of-way, as well as the relocation of the BC Hydro poles in some sections of the corridor and the possible relocation of some of the sidings now serving adjacent industries/businesses. These factors, combined with trackage costs, would mean that double tracking for the Community Rail project would have significant costs.

A community rail service, linking the City of Vancouver and Chilliwack and all of the business and residential areas in between, actively operated on this line between 1910 and 1950. The population has significantly increased along the corridor: 18,000 in 1910, 78,000 in 1951, and 850,000 today.

The FVHRS has had a dedicated program, over the last six to seven years, to educate the public about this valuable community transportation resource, and has undertaken other activities, including fundraising to assist in the restoration of this rail line for passenger service. A few years ago the FVRHS built a two-car barn on land leased from the City of Surrey at a location near 152nd Street and 64th Avenue. Also located here is a 600 foot oval Speeder rail track built in 2004/2005 and a replica Sullivan Station building which can be relocated to its original location along the rail line. The FVHRS has a BCER vehicle which is currently being restored, and is attempting to acquire two vehicles - a BCER 1304 car and a 1700 series baggage car with a standard electric diesel generator to initially power this baggage car and one interurban vehicle. The FVHRS prepared a brief business plan for 2006/2007 which calls for the track and corridor to be upgraded from the Cloverdale Station to Scott Road Station in stages between 2006 and 2010 and to operate a two-car tourism/heritage train service during summer weekends from Cloverdale to Scott Road Station by 2009/2010.

Today there are heritage/tourism trains operating in the following areas in North America: New Orleans, Memphis, Philadelphia, Portland, San Francisco, Tampa, Charlotte, Dallas, Galveston, Kenosha, Little Rock, San Jose, Seattle, San Pedro, Lowell, Tacoma, Tucson, Vancouver, Astoria, Denver, Edmonton, Reno, Fort Collins, Fort Smith, Issaquah, Nelson and Whitehorse.

2.2 Use of Interurban Rail Corridor Today by Southern Railway of BC and Canadian Pacific Railway

Southern Railway of BC

The Southern Railway of BC now operates up to four freight trains daily (two in each direction) along the old interurban line between New Westminster and Abbotsford. This line services businesses and industries in Surrey, Langley and Abbotsford. One train usually leaves from their New Westminster yard about 4:00 pm or 5:00 pm going eastward and returns westward to New Westminster between 10:00 pm and 12:00 am. Another train leaves the New Westminster yard between midnight and 1:00 am and returns to their New Westminster yard between 6:00 a.m. and 7:00 a.m., depending upon the level of coal/freight traffic moving on the main freight rail service line out of the region.

The Southern Railway Company of BC has a Master Agreement with BC Hydro to operate freight train service on the line between its New Westminster yard and the businesses and industries that it serves in

the City of Surrey, between the Cloverdale and Scott Road Station and further east in Langley and Abbotsford. There are sidings located along the Southern Rail line which serve various industries and businesses, such as lumber yards, etc.

Canadian Pacific Railway

The Canadian Pacific/Southern Railway line (CP/SR Page Subdivision), using a single rail track that switches to several storage tracks and industrial spurs, extends from just east of Cloverdale in the City of Surrey through to the City and Township of Langley just east of 232nd Street. From the western boundary of the Langleys the railway line cuts diagonally (SW to NE) through the commercial heart of the Langleys, and then follows immediately north of Glover Road, just south of Trinity Western University and then across Highway 1 to 232nd Street. Just east of 232nd Street, the railway line at the Livingston cross junction splits into two rail lines. One rail line, using the CP Rawlison and Yale Subdivisions, travels directly north to just south of the Fraser River and then heads east along the river. The portion of the CP/SR rail line from the Cloverdale through to the Fraser River (12 miles or 20 km) serves as the principal rail line south of the Fraser River for moving freight and container trains from the Deltaport through to eastern Canada and United States.

The other rail line from this junction just east of 232nd Street travels in a south-easterly direction to the eastern boundary of Langley Township, just north of Aldergrove. This line is the former interurban passenger rail line which continues on to Abbotsford and Chilliwack.

Today, up to an average of 22 freight trains, with individual trains up to over a mile long in length, operate on the CP/SR Page Subdivision through the commercial heart of the Langleys and have the following impacts today:

- Generating high levels of noise and vibration for nearby residents, impacting property values and creating health issues.
- Obstructing emergency vehicles for long periods of times and restricting their ability to respond to crises. Each train blockage of at-grade rail/road crossings for four to five minutes, for example, causes road traffic to be disrupted for up to 15 to 20 minutes before traffic flows are normalized.
- Significantly obstructing and delaying the movement of traffic at up to four-five at-grade crossings along the rail line and causing significant traffic congestion and loss of time for residents and businesses. Average road closures range from 1.5 to 5 minutes in length, with longer closures occurring occasionally for up to 5-10 minutes
- Potential for increasing rail derailments and other accidents which could create potential significant environment and safety issues with derailments.

There were 22 daily trains operating from the western Langleys to the eastern boundary just south of the Fraser River 2006; this is expected to increase significantly to 27 daily trains in 2012 and 36 daily trains in 2021 (see Table 3) as freight traffic from Delta and other port sites increases in the next 20 years. As well, it is anticipated that the length of trains is expected to increase from one to two miles in order to gain increased efficiencies in terms of the movement of freight.

Of interest related to the growth of freight traffic through the Langleys is a Langley Township Council meeting in September, 1968 held with railway and BC Hydro officials to discuss the expected growth of rail traffic with the opening of Roberts Bank. A senior representative from BC Hydro indicated that the "trains will be one mile in length and there will be one train each way per day at a maximum speed of 35 miles per hour" (see Appendix A).

It is clear that the re-introduction of reliable and frequent passenger service to serve the Langleys east of the Surrey-Cloverdale area cannot be undertaken unless the freight trains between Cloverdale and 232nd

Street on the CP/SR Page Subdivision are re-routed in the Vancouver region. Several options for this re-routing include the following:

- Re-routing all the freight and container train traffic to a more northerly corridor along the Fraser River, and examining changes to existing rail junctions and corridors (i.e. building a Y junction between BC rail line from Deltaport and the Burlington Northern Rail through Delta and Surrey) or examining rail corridors that could be provided as part of the Gateway Project and, specifically, the South Perimeter Road.
- Creating a regional International Container Traffic Centre, to which all rail freight and container traffic from all the railway companies would be routed using shorter trains and then the containers would go out of the region in a co-ordinated fashion.
- Creating a new freight rail corridor route through southern Langley, which parallels the US/Canada border and is located away from significant development areas.

However, from quality of life, safety and mobility perspectives in the Langleys, the continued operation of a growing number of one to two-mile long freight and container trains through the heart of the Langleys with the building of expensive and large overhead rail crossings, and closing off other major rail/road crossings, is not a long-term sustainable option.

Alternatively, the freight and container traffic could be moved to a second track paralleling the track today on the CP/SR Page Subdivision to enable the passenger Community Rail service to operate frequently and reliably through the Langleys. This option, however, would not remove the quality of life, safety and mobility issues associated with maintaining freight traffic in this corridor through the heart of the Langleys.

The Greater Chicago Region provides an example of what can be accomplished to improve the efficiency and effectiveness of both freight and passenger rail movement. The major railway companies and public entities in the region created a co-ordination and planning group which developed CREATE (Chicago Region Environmental and Transportation Project), a \$1.5 billion freight and passenger railway plan to improve the movement of freight and people in the area (see Appendix A).

3.0 Issues involved in operating a passenger rail service

To operate a passenger service within the interurban rail corridor located in the Langleys, the track must be upgraded from the existing freight standard to Class One passenger standard to meet both the Railway Act and Southern Railway of BC standards. This would require the following:

- Improvements to the track and related costs for the levelling of track, surfacing and re-ballasting, and replacement of defective ties on portions of the corridor between the Cloverdale Station in the City of Surrey and the proposed most easterly station in Langley Township at 264th Street, to enable a passenger service to operate along this corridor with modern LRT- like vehicles.
- Double tracking with the station areas to provide tracks for the wider freight trains and narrower Community Rail trains and to ensure the Community Rail is accessible for handicapped/disabled persons.
- The provision of signalling and communications system along the corridor, and new sidings at key locations to enable the operation of a 20 minute peak period Community Rail service along a single track, with a temporal and physical separation from other trains using the corridor.

- The provision of protection at all road/rail crossing with a combination of full gates, lights, bells and improved and consistent signage depending upon the level of traffic and collision history at the crossing.
- The provision of fencing along key portions of the line for safety and protection of Langley residents with the operation of the Community Rail service every 20 minutes in peak periods.
- Approval of the restrictions/conditions under which the Community Rail passenger service would be able to operate on a single track
- Meeting all other provincial and federal passenger rail transport rules and regulations, and completing any required environmental impact assessments.

In addition, modest quality and cost station platforms and shelters (i.e. lower cost than LRT-like stations) would need to be provided at the station locations. As well, good access to the stations would need to be created with the provision of pedestrian, parking and cycling facilities and improved bus connections. In addition, the vehicles for the service will need to be provided. These items and their range of high level cost estimates are discussed in more detail in Sections 15 and 16 of this report.

BC Hydro, which owns the portion of the interurban rail trackage east of 232nd Street, would need to grant approval for the use of this line in Langley Township for passenger service. They would likely require the conditions which were set out in a letter dated March 29, 2006 to the FVHRS concerning the operation of a heritage/tourism service along the City of Surrey Community Rail line between the Cloverdale and Brownsville Stations (see Appendix A). BC Hydro has agreed in principle to the FVHRS operating a heritage/tourism passenger rail service between Cloverdale and Brownsville Stations using the BC Hydro right-of-way as long as this change does not require an overhead catenary source of power and subject to meeting the following conditions and providing BC Hydro has set the following conditions for its approval:

- Written consent of Southern Railway of BC and Terasen Gas with respect to their installations and interests;
- Consent from all regulatory and governing bodies;
- Detailed drawings of the location and design of platforms and any other installations associated with stations, such as parking;
- A detailed plan for the operation of service including frequency, crowd and passenger control, staff and customer parking and waiting areas.;
- The right of access for BC Hydro for maintenance and construction activities in the rail corridor and even stoppage of service to complete these activities; and
- Indemnification and the release of BC Hydro from all costs and liabilities and carrying of adequate insurance to protect BC Hydro.

The Greater Vancouver Transportation Authority (TransLink), being the regional provider, planning and funding agency of transit service in the Greater Vancouver Regional District, has the right to operate passenger transit service within the Region. Therefore, operation of a daily peak period Community Rail service during the whole year using modern vehicles (i.e. differentiated from a Tourism/Heritage service) between Cloverdale Station and a 264th Street Station by a TransLink subsidiary (e.g. West Coast Express) or another provider would require TransLink's approval.

At this stage of the development of a passenger service in the interurban corridor in the City and Township of Langley, significant negotiations, discussions and planning work are required with BC Hydro, the Southern Rail Company, Canadian Pacific Railway, Canadian National Railway, the Gateway Council, the Vancouver Port Authority and other community stakeholders in order to be able to work out

all the details of resolving the regional freight and container movement issues through the heart of the Langleys and the timing and phasing of the re-introduction of passenger rail service in the Langleys. If the City of Surrey Community Rail service (peak periods) was in operation by early 2010, and the regional freight/container issues on the CP/SR Page Subdivision could be resolved and solutions implemented by 2010, Community Rail service could be re-introduced in the Langleys in the following potential stages:

- In late 2013, operate a full scale peak period (e.g. 5:30 am to 8:30 am and 3:30 pm to 6:30 pm) Community Rail service on weekdays between the Scott Road SkyTrain Station and 264th Street Station using modern and accessible Community Rail vehicles. This service could use a Community Rail vehicle similar to the Parry vehicles used on this type of service in Great Britain or a more expensive Bombardier Talent LRT-like vehicle used on the City of Ottawa's LRT service, both powered by either hydrogen fuel cell engines or diesel engines.
- Ultimately, operate an all day Community Rail service between the Scott Road SkyTrain Station and 264th Street as demand and funding warrants.

The timelines and staging for the project's progression from a peak period to a daily community and regional transit service will require an early and dedicated commitment of funding and project management resources from Langley City and Township, TransLink and provincial and federal representatives to realize the timelines suggested in this report.

Paved parking or shared parking with other adjacent land uses could potentially be provided at most of the stations (see Figures 2, 3, 4, 5, 6, 7, 8, 9, and 10 in Appendix C):

- 192nd Street Station, City of Surrey – adjacent parking
- Production Way Station, City of Langley – limited adjacent parking and shared parking
- 204th Street Station off Duncan Way (near overpass), City of Langley – limited adjacent parking and shared parking
- Kwantlen University College Station, Langley Bypass/Glover Road, City of Langley – adjacent parking
- Milner Station (Crush Crescent and Glover Road), Langley Township – adjacent parking
- Trinity Western University, Langley Township – adjacent parking with student and faculty parking
- 232nd Street Station, Langley Township – adjacent parking and kiss-n-ride facility
- Station at 248th Street Langley Township – adjacent parking and kiss-ride facilities
- Station at 264 Street, Langley Township, limited parking

Good pedestrian access should also be provided to each of the stations from adjacent land uses via sidewalks. In addition, cycling storage facilities, involving bike lockers and bike racks, should be provided at the stations. Modifications should also be made to existing bus services to significantly improve the connections to these stations both in terms of frequency of service and the directness of connections.

The Southern Rail Company of BC or another rail operator such as Canadian Pacific which operates the West Coast Express service could be contracted to operate the Community Rail passenger service. As of July 1, 2006, for example, Southern Railway of BC and the Island Corridor Foundation (ICF) reached an agreement to operate both freight and passenger service on the ICF owned line between Victoria and Courtenay on Vancouver Island. The ICF is a not-for-profit organization incorporated in 2004 as partnership between local government and First Nations along the Island Railway corridor.

According to federal regulations, approval of the use of the interurban line for peak period commuter service, operating from the Scott Road SkyTrain Station to the 264th Street Station, would require the

preparation of a Safety Management System (SMS) to ensure the safety of employees, contractors, the public and the environment. To this end, municipal and regional staff would need to work with Transport Canada, Human Resources Development Canada, and the Southern Rail Company of BC.

4.0 Review of existing bus and rail service in Langley Township

4.1 Bus Service

The transit service operating today in the City and Township of Langley has a dominant orientation to take customers to the SkyTrain stations. Local bus services using 40-foot conventional buses and/or smaller community shuttle vehicles pick up customers in Aldergrove and local suburbs such as Walnut Grove, Willoughby, Murrayville, Brookwood and Fernridge, and link them along major arterial roadways such as the Fraser Highway, 200th Street, Highway 1, 104th Avenue, and Highway 10 to the Cloverdale and Guildford Town Centres, and to the SkyTrain Expo line at Surrey City Centre and King George Stations.

It is generally difficult to travel between eastern and western sections within Langley City and Township using the bus service. For example, there is no transit service taking customers across the following corridors:

- East of 200th Street on Highway 1.
- To Gloucester Industrial/Business Park at 272nd Street.

Transit service between the Langley City Centre and Aldergrove only operates every 60 minutes. Furthermore, as clearly illustrated by Table 1, which describes the current transit linkages between the proposed Community Rail stations, many of the transit connections between these stations can be described as non-existent or being very indirect, inconvenient and infrequent.

As observed in Table 5, many of the current bus services operating in the City and Township of Langley in the peak, midday and evening periods are unattractive, especially in terms of its frequency. Only two of the ten bus routes serving the Langleys have a frequency of 15 minutes or better in peak periods. As well, most services in the Langleys only operate in the midday and evening periods with 30 to 60 minute frequencies. These service frequencies only appeal to "captive riders", those who do not have other travel options either as a driver or passenger. Market research undertaken in Greater Vancouver and other Canadian cities has shown that transit service frequencies must be every 10-15 minutes during peak periods and be in the 15-20 minute frequency range in mid-day and other periods in order to be attractive for "choice" travellers who have regular access to an automobile.

Using the bus hours per capita in the different sectors of the Vancouver Region as a proxy for the level of transit service, the South of Fraser has the lowest per capita bus hours in the entire region (see Table 7) – 0.57 hours per capita compared to 1.31 hours per capita in the Northeast Sector, 2.08 hours per capita on the North Shore, 2.40 hours per capita in Burnaby-New Westminster, and 2.42 hours per capita in Vancouver-Richmond.

The opening of the Golden Ears Bridge in line with 200th Street between the Langleys and Maple Ridge in 2009 will enable direct and frequent bus connections to be established between these growing urban areas.

4.2 Rail Service

The South of Fraser area currently has four SkyTrain Stations on the Expo SkyTrain line located in north Surrey – Scott Road Station, Gateway Station, Surrey City Centre Station and King George Station – to which there is frequent train service all day. Many bus routes interconnect with these SkyTrain stations, bringing customers from all parts of Surrey, Langley City and Township, White Rock and Delta. The Scott Road Station opened in 1991 with the other stations following in 1994. In 2002 the SkyTrain network was expanded with the opening of the Millennium SkyTrain line. This has provided further improved access for Surrey residents to other parts of Greater Vancouver. A major park-n-ride lot, accommodating 1600 vehicles, is located at the Scott Road SkyTrain Station.

The entire Community Rail proposed corridor from Langley Township (at 264th Street) through to the City of Surrey – Cloverdale Station to Scott Road Station – has a total catchment area population of approximately 850,000 in 2006. This includes the population of the City of Surrey, the Corporation of Delta, the City of White Rock, Langley Township and Langley City and the City of Abbotsford. The population of this area is expected to increase to 1,000,000 by 2012. There are no rail investments proposed for the area south of the Fraser in TransLink's current Strategic Transportation Plan.

The number of Langley City and Township residents and employees in the catchment areas along the proposed Community Rail corridor totals 51,000 residents and 24,000 employees in 2003, 82,000 residents and 34,000 employees in 2011, and 106,000 residents and 48,000 employees in 2021 (See Table 8).

In comparison, the population for the entire Northeast Sector catchment area for the proposed \$1.0 billion Evergreen LRT line, to be operational in 2011, is 301,000 in 2006 and is expected to increase to approximately 330,000 by 2009. The population in the catchment area for the \$2.0 billion Canada Line, to be operational in late 2009, is just over 1 million.

The West Coast Express (WCE) peak period train service, built at a total capital cost of approximately \$110 million, began operations between Mission and downtown Vancouver (65 km) in 1995. The WCE train service uses 37 vehicles, operates every 30 minutes and takes 73 minutes to travel from end to end, while stopping at eight stations on the line. This service has an annual operating cost of \$16 million, and serves 9000 daily passenger boardings and 2.3 million annual passenger boardings.

These comparisons are useful to illustrate the validity of significant rail transit investments in the South of the Fraser area for the existing and growing population and employment bases located here, and further to the east, including Abbotsford and further up the valley to the City of Chilliwack.

A significant investment in transit service is required in order to encourage residents and employees in these areas to shift to more sustainable modes of transportation for more of their trips and significantly increase the transit mode share among "choice" travellers (those with access to a car) and to support the densification and mix of land uses in nodes near the rail stations. It is also important to note that rail corridors available today are likely to be the subject of land development in the future.

5.0 Improvements to transit service in Langley Township and perspective on community rail proposal

As of January 2007, TransLink is in the process of working with Langley Township and City and other municipalities located South of the Fraser (City of Surrey, Corporation of Delta and the City of White Rock), in reviewing current transit service as part of preparing an Area Transit Plan (ATP). The objective of the ATP is to develop a vision for transit service in this area over the next 5 to 25 years, and then to develop a detailed plan to improve service in the next five years to realize part of that vision. As well, the ATP will determine how to integrate longer term aspects of the plan with improvements that are implemented earlier. The objective is to have an ATP developed by the fall of 2007 which can then be implemented in stages through TransLink's Annual, Three Year and Strategic Transportation Plans.

In discussions with UMA concerning the South of Fraser Area Transit Plan and transit service within Langley City and Township, TransLink acknowledged that there is a need for significant improvements in the current transit service. These include improved linkages along the key travel corridors, in terms of frequency of service, type of service such as bus rapid transit on specific corridors (e.g. Fraser Highway, 200th Street), and service coverage (i.e. to areas currently without transit service). Dramatic improvements are required to bring the service to a level, which can begin to appeal to choice travellers as a real option, and to respond to the significant growth expected to occur in Langley Township and Langley City in the next 25 years.

As part of the current work being done for the South of Fraser Area Transit Plan a bus rapid transit system is being discussed to operate between Surrey City Centre Station along the Fraser Highway to Langley City Centre, with the following new bus services or enhancements (e.g. frequency and service coverage) to existing bus services linking the following destinations:

- A service from the heart of the Langleys in the town centre and across the new Golden Ears Bridge to the District of Maple Ridge Town Centre.
- A service from northern Langley Township, including the Walnut Grove Community, which would use the proposed HOV lanes on Highway 1 from the Langleys at 216 Street to Coquitlam and Burnaby.
- A service linking the heart of the Langleys along the Fraser Highway corridor to the Surrey City Centre SkyTrain Station.
- A service along the 200th Street corridor linking the expanding communities along this corridor to the heart of the Langleys and further north to Highway 1 and Walnut Grove.

Currently TransLink does not have the funding to build its proposed Evergreen LRT Line in the Northeast Sector (i.e. a shortfall of over \$400 million going forward for the capital funding of this line). As well, TransLink has indicated publicly that it requires a significant amount of additional funding annually (i.e. over \$200 million) to meet its Strategic Transportation Plan annual operating funding needs, which would likely include the capital debt and operating funding required for the above-noted bus rapid transit system in the City of Surrey. TransLink staff indicated to its TransLink Board at its October 18, 2006 meeting that it would not be able to fund any South of Fraser transit service improvements without a significant increase in sustained operating funding from the provincial and/or federal governments.

With these capital, operating and funding constraints, and other transit service needs and demands in the City and Township of Langley, TransLink may not be in a position to financially support the development, implementation and operation of a Community Rail passenger train service as envisioned in the

Community Rail proposal. This would mean that the City and Township of Langley and the City of Surrey, in combination with significant funding from other partners, such as the federal government and provincial government and perhaps private partners involved with the fuel cell engine initiative, may have to bear a major portion of the capital and operating costs for the Community Rail project.

Despite the Community Rail corridor being a valuable longer term transportation asset for the City of Surrey, Langley Township and City, and the Greater Vancouver Region, TransLink feels that the Community Rail orientation and the communities linked by the rail corridor do not correspond to the major travel corridors or areas that South of Fraser residents want improved. TransLink supports this statement with results from its market research survey and focus groups conducted as part of the ATP visioning process, and the existing dominant travel patterns within the South of Fraser. Furthermore, TransLink has stated that funds invested in the Community Rail passenger rail corridor service would likely divert funding from other higher priority transit investments in the region, including the Evergreen LRT line and potential bus rapid transit and express bus services as noted above.

TransLink has expressed a similar policy position in response to the City of Vancouver's interest in developing and operating a city streetcar network. TransLink has indicated that a streetcar network would divert ridership and funding away from other more important service improvements areas in the City of Vancouver. TransLink has also indicated that the capital and operating costs of a streetcar network would have to be funded by the City.

6.0 Langley Township's vision for transit service and relationship of community rail proposal to vision

In their involvement in the South of Fraser Area Transit Plan, Langley City and Township are asking for a significantly higher level of transit services in order to serve future projected population and employment growth, and to increase the transit mode share and to make the service really attractive for "choice" travellers. These services include:

- A Bus Rapid Transit service from the central part of the Langleys along the Fraser Highway to the Surrey City Centre Station on the SkyTrain network.
- A Bus Rapid Transit service from northern Langley Township and Walnut Grove along new proposed HOV lanes on Highway 1 from 216th Street across the Port Mann Bridge to Coquitlam and Burnaby.
- A high frequency bus service along the 200th Street corridor serving growing residential and business areas from southern Langley Township just south of the Langley City Centre to northern Langley Township and Walnut Grove.
- A high frequency bus service along the 200th Street corridor from the Langley City Centre across the Golden Ears Bridge connecting to the West Coast Express service and to the Maple Ridge City Centre.
- A much more frequent and reliable transit service grid on all major north-south and east-west arterial roadways within Langley City and Township during all periods of the day, with many more services operating ten minutes or better during peak periods, 15-20 minutes in the midday and early evenings and on weekends, and never more than 20-30 minutes in the later evenings.
- Transit vehicles which are much more comfortable, accessible and have a greater availability of seats.

The availability of a dedicated interurban passenger rail corridor in Langley Township and City, linking key and growing communities and destinations within this growing area of the region and also to the regional transportation network at the Scott Road SkyTrain Station and ultimately Abbotsford and Chilliwack, is a valuable transportation asset for the Langleys and the Greater Vancouver Region. Other cities around the world have endeavoured to protect such rail corridors for viable transportation options as travel demand grows and traffic congestion increases.

It is forecast that the population and employment will increase significantly in the Langleys in the next 25-30 years; this is one of the dominant areas in the region still available for future development. With these conditions, the traffic congestion, travel times and reliability of travel within the Langleys, both for buses and automobiles, will considerably worsen.

The development and implementation of the Community Rail corridor service will provide:

- A viable option for enabling reliable and timely connections within the Langleys and to key destinations in Surrey, as well as providing excellent linkages to the regional transportation network.
- A likely less costly transportation option, when compared to BRT or light rail transit system options, for other Langley corridors.
- An option that is not reliant on reducing road capacity in order to maintain any reasonable speed, travel times and reliability, unlike BRT or light rail transit options.

Other variables must be considered when making comparisons between rail and BRT or bus improvements in the Langleys:

- Transit market research has found that rail projects are much more successful at capturing the “choice rider”, who has an auto available for trips, in terms of encouraging more transit trips.
- The operating costs per passenger are generally lower for rail than bus. Also, bus operating costs per passenger have been increasing rapidly in recent years with rising energy and operator costs above inflation rates.
- Rail travel times and reliability are generally better than bus, even BRT projects, which can incorporate a lot of transit priority measures.

7.0 Community rail model and strategy

The Fraser Valley Heritage Railway Society wants to pursue the development of passenger service on the existing interurban line in Langley City and Township using a Community Rail Model and Strategy which is new to North America. However, this model and strategy is currently being very actively pursued in many communities in Great Britain, where there are underutilized freight and passenger rail lines in good condition connecting through urban areas. There is a desire to better use these lines in a more efficient manner and closely link communities along the lines using passenger service, in a way which entails community consultation and partnerships.

This Community Rail Model and Strategy in Great Britain involves non-profit and community groups working together in close partnership with the railway companies who own or operate current services on these lines, and also with local municipalities, other community groups and stakeholders and businesses. The objective is to increase the value of the existing railway lines to the communities they serve and to put these lines on a more sustainable footing for the future using the following means:

Increase community involvement - allow the community to improve the railway through locally funded investment and voluntary effort. This can help with regional economic regeneration.

Reduce costs and improving efficiency - ensure that all railway improvements are done efficiently and to an appropriate standard, avoiding over specification.

Increase railway use - develop and implement cost-effective means to use the railway (i.e. rail lines, stations and vehicles) for the increased movement of passengers, as part of the community and broader regional transportation networks, including upgrading the railway stations and infrastructure through partnership arrangements, improved marketing, fare adjustments (both up and down), better revenue protection and cost-effective service enhancements.

Develop opportunities for achieving significant environmental benefits - develop and implement means to use alternative and environmentally friendly fuels and other methods to reduce greenhouse gas emissions.

This Community Rail Model and Strategy could be adapted for use in the development and implementation of the passenger rail service on the interurban line between the City of Surrey and Langley City and Township, and ultimately an attractive passenger service linking the communities to the east in the Fraser Valley including the Cities of Abbotsford and Chilliwack, and other key regional destinations such as the Abbotsford Airport.

8.0 Potential evolution of passenger rail service in the interurban corridor in Langley Township and City

8.1 City of Surrey Interurban Community Rail Corridor

The City of Surrey received a final report from UMA Engineering Ltd. in January 2007 supporting the re-introduction of passenger train service in the 19 kilometre interurban rail corridor in the City of Surrey, between a Community Rail service connecting with the Scott Road SkyTrain and a Cloverdale Station at 176th Street and Highway 10. **Note: As of early February 2007, the City of Surrey is pursuing working with the Fraser Valley Heritage Railway Society to operate a heritage train service between Cloverdale and Newton Stations by 2010, as the forerunner for a more extensive Community Rail passenger system on the interurban line through Surrey.**

UMA has recommended that this Surrey Community Rail service be resumed in the following stages:

Stage One: A summer weekend historic/tourism passenger service, using original high level interurban cars (BCER 1225 and the baggage car) between the Cloverdale Station and Sullivan Station (64th Avenue and 152nd Street). FVHRS volunteers would operate this service during the 2008 summer months, every 30 minutes (between Cloverdale and Sullivan stations) between the hours of 9:00 am and 5:00 pm on Saturday and Sunday. The one-way trip (3.9 miles/6.2 kilometres) would take about 10 minutes. The intention would be for these trains to be powered by a hydrogen fuel cell engine as part of the BC Hydrogen Highway, an integral part of the 2010 Winter Olympics. If the hydrogen fuel cell engines are not ready, the trains could be powered by a diesel-electric generator located in a baggage car as a back-up.

Stage Two: A summer weekend historic/tourism passenger service, using original high level interurban cars between the Cloverdale Station and Scott Road Station. FVHRS volunteers would operate this service during the 2009 summer months, every 90 minutes between the hours of 9:00 am and 5:00 pm. The one-way trip would take about 30 to 35 minutes including one-minute stops at each station, with

trains operating at 25-30 mph/44-48 km per hr. The intention would be for these trains to be powered by a hydrogen fuel cell engine as part of the BC Hydrogen Highway, an integral part of the 2010 Winter Olympics. If the hydrogen fuel cell engines area not ready, the trains could be powered by a diesel-electric generator located in a baggage car as a back-up.

Stage Three: The introduction in late 2009 of a much more extensive and upgraded Community Rail passenger service between the Cloverdale Station and Scott Road Station. The Scott Road Community Rail Station would be linked to the Scott Road SkyTrain Station by a 500-600 metre covered walkway or a short rail spur line from the Community Rail line. This service could use modern and accessible Community Rail LRT-like vehicles approved to operate on a freight line. The plan and design for this service would be undertaken concurrently with Stage One above. This service could be operated by a hired railway contractor such as CPR or Southern Rail of BC.

The service could be operated very frequently, every 20 minutes in weekday peak periods (5:30 am to 8:30 am and 3:30 pm to 6:30 pm) with 30-second stops at each of the 6 stations (a 7th station is optional), and use modern, accessible vehicles, powered by hydrogen fuel cell engines. A one-way trip would take approximately 28 minutes, with trains operating at 30 mph/48 km per hr. The line would have to be double tracked in key portions or along the entire corridor, and a communications and signal system would be installed to enable the trains to operate on this frequency. This service would provide reliable and timely connections between the many businesses, residences and educational institutions in the catchment areas of the stations, compared to the unreliable total travel time of 55 minutes today by transit between Scott Road SkyTrain Station and Cloverdale.

8.2 Interurban Community Rail Corridor in the Langleys

The introduction of first a peak period and later an all day Community Rail service in Langley City and Township could occur by 2013. However, prior to initiating detailed work on the re-introduction of a Community Rail service in the Langleys, it is imperative to develop and implement a regional solution for relocating the operation of two-mile long freight and container trains through the heart of the Langleys in the CP/SR Page Subdivision corridor between the Pratt Junction east of Cloverdale and the Livingston Junction near 232nd Street. The following actions would also need to occur to make the Community Rail operations in the Langleys a reality:

- Make any required upgrades to the rail corridor between the Cloverdale Station and the 264th Street Station in terms of the rail, ballast, surfacing and road/rail crossings safety equipment and signage for passenger service.
- Make any required adjustments to traffic signals for operation of the service.
- Develop a plan for the storage and maintenance of the Community Rail vehicles including their potential storage and maintenance at an expanded maintenance facility which today exists at Sullivan Station (i.e. 152 Street and 64 Avenue).
- Obtain written consent of Canadian Pacific Railway, Canadian National Railway and Southern Railway of BC with respect to their installations and interests.
- Get consent from all regional, provincial and federal regulatory and governing bodies.
- Prepare detailed drawings of the location and design of platforms, shelters and any other facilities associated with stations, such as parking on BC Hydro lands, handling fare payment and facilities such as park-n-ride and bus connections.
- Develop and implement plans for providing on-site or shared parking and improved pedestrian and cycling facilities at all of the stations.
- Undertake detailed planning and design work for Community Rail service.

- Complete the procurement process for the accessible and modern vehicles for the peak period Community Rail service.
- Provide the right of access for BC Hydro for its maintenance and construction activities in the rail corridor.
- Double track key portions of the line, where required, to permit high train frequency and procure a communications and signal system for the service.
- Obtain liability insurance.
- Conduct a risk assessment of the entire corridor.
- Indemnify and release BC Hydro from all costs and liabilities and carry adequate insurance which protects BC Hydro.
- Complete the preparation of a safety management system to ensure the safety of employees, contractors, the public and the environment.

9.0 Potential rail stations and land use, employment and population in catchment areas

9.1 Proposed Rail Stations

The proposed locations for the nine Community Rail stations were determined based on the level of existing and projected population and employment in their vicinity and catchment areas, prominent land uses, and their historical significance to the community. The best proposed locations in the Langleys, going east of the Cloverdale station in the City of Surrey (176th Street and Highway 10) are:

- 192nd Street Station, City of Surrey
- Production Way Station, City of Langley
- 204 Street Station (204 street and Duncan Way - near overpass), City of Langley
- Kwantlen University College Station (Langley Bypass and Glover Road), City of Langley
- Milner Station (Crush Crescent and Glover Road), Langley Township
- Trinity Western University, Langley Township
- 232nd Street Station, Langley Township
- 248th Street Station, Langley Township
- 264th Street Station, Langley Township

The more specific station locations and their potential conceptual layouts in terms of station platforms/shelters and parking areas are shown in Figures 2 through 10 (See Appendix C). As more detailed planning and design work is completed on the corridor and the Community Rail project and the train service operations, the exact station locations and parking areas may be refined, and more stations could be added. There needs to be a balance between the number of stations on the line providing additional community rail access points, and the desired speed and reliability of the service.

9.2 Existing and Future Population and Employment in Station Catchment Areas

The total existing and forecast population and employment within the broader community catchment areas of the proposed Community Rail stations are shown in Table 8. The total population in the

Community Rail catchment area communities is 50,000, with an employment number of 24,000. The population and employment in these catchment areas are expected to increase to 82,000 and 34,000, respectively, in 2011, and 106,000 residents and 48,000 employees in 2021.

The existing and future land use in the potential Community Rail station areas and existing transit access are described below.

192nd Street Station, City of Surrey

A potential rail station at 192nd Street would provide service to residents of nearby Cloverdale and to employees of the adjacent business-industrial park along this portion of the rail line in Surrey and the western Langleys. This station would also provide a link to the employees of the Campbell Heights Industrial Park located south on 192 Street. Route adjustments and frequency enhancements to the existing #320 bus route along Highway 10 could provide a linkage to this rail station.

Production Way Station and 204th Street (Duncan Way) Station, City of Langley

Stations located at Production Way and off Duncan Way (near the new 204 Street railway overhead crossing) could provide close proximity to the residential and industrial/commercial heart of Langley City, Willowbrook shopping centre and the expanding Willoughby area. Significant improvements to the transit services in Langley City in terms of frequency and the quality of service (i.e. introduce bus rapid transit services) along nearby Fraser Highway and the full length of 200th Street from Murrayville and Brookwood to Highway 1, and the provision of connections to the stations by frequent Community Shuttle services would improve the accessibility of these stations. The new Golden Ears Bridge and related roads connecting Langley Township and the District of Maple Ridge could also provide quick access to these stations.

Kwantlen University College Station, Langley Bypass/Glover Road

A station located near the Langley Bypass/Glover Road and the rail line would provide close access for the growing student population at the nearby Kwantlen University College and Langley College of Trade and Commerce as well as employees of adjacent industrial/business areas.

Milner Station at Crush Crescent and Glover Road

A potential Milner Station could be located at Crush Crescent and Glover Road to provide access for Willoughby and Milner residential areas and to connect to the new interchange planned at Highway 1 and 216th Street. This station could also be in close proximity to Fort Langley residents.

Trinity Western University Station - south side of campus near existing pedestrian crossing of rail line

A potential station could be located on the south side of Trinity Western University near the existing pedestrian overpass of this rail line. There are 4000 students and 500 staff at the university. This population is expected to increase to 6000 and 1000, respectively, in the next 5 years. The university owns land across on the other side of Glover Road for expansion. This station could also serve the residents of Forest Knolls and Fort Langley.

232nd Street Station - north of Highway 1

A potential station could be located along the rail line off 232nd Street to serve Hopington residents.

248th Street and 264th Street Stations

Stations located at 248th Street and 264th Street would provide service to eastern Langley Township residents and employees of the Gloucester industrial/business park, Aldergrove, the Canadian Forces base and the Greater Vancouver Zoo.

10.0 Ridership potential of community rail

It was beyond the scope and budget of this report to prepare a ridership and revenue forecast for the Langley Community Rail service. However, it is highly recommended that EMME2 and micro-simulation modeling be completed for these rail service scenarios in combination with future employment and population forecasts and potential scenarios for various combinations of bus, bus rapid transit and rail improvements in the South of Fraser area and outside the region to the Fraser Valley (include Abbotsford and Chilliwack). This work would need to be completed soon in order to determine the following:

- Identify the likely range of ridership for the Community Rail project and potential fare revenue projections.
- Measure the impacts of the Community Rail project on other potential transit investments in terms of their ridership and revenue projections.
- Assist in the preparation of a detailed business and project plan for the Community Rail project.

11.0 Accessibility improvements for rail stations

To significantly improve the accessibility of the proposed Community Rail stations, the following facilities should be provided:

Automobile Parking

Small parking lots (30 - 100 paved spots) with access to adjacent roads and kiss-n-ride facilities should be constructed adjacent to most of the Community Rail stations. More parking should be available at the Trinity Western University, 232nd Street and 248th Street Stations. Shared parking arrangements might also be able to be arranged with nearby shopping areas for some of the stations such as Production Way and Duncan Way.

Improved Bus Connections

Through the development and implementation of the South of Fraser Area Transit Plan, modifications to existing and future bus service could be made in Langley City and Township to achieve the following improvements to bus service interconnecting with the stations:

- Provide increased bus service frequency, especially in peak periods (10-15 minutes), but also in mid-day and evening periods (20 minutes) with conventional bus and new BRT services.
- Make the connections more direct to key destinations (i.e. no transfers).
- Introduce a region-wide Transit Smart Card to facilitate transit usage.
- Introduce new types of service connections to the stations. For example, introduce Community Shuttles services to all the stations which would provide good transit connections from the stations to the surrounding communities and institutions.

Cycling Facilities

Storage bike racks and lockers should be provided at each of the train stations.

12.0 Traffic assessment at rail/road crossings

12.1 Traffic Assessment Overview

Traffic assessment for the Langley Community Rail would require that a range of issues to be reviewed as project decisions move from a conceptual level to detailed design and operation. In this report, traffic considerations will include the impacts on existing traffic control at railway crossing locations and the corridors that are affected by the railway crossings.

The rail line under consideration is located in the Langleys from just east of Cloverdale (Pratt Junction to the Livingston Junction near 232nd Street - the CP/SR Page Subdivision) and is used extensively by Canadian Pacific for freight movements. Today, there are 22 trains daily from Deltaport, which is expected to increase to 36 trains per day by 2021. As well, the lengths of trains are expected to increase and the trains would block the level crossings for longer periods of time.

The Southern Rail Company operates trains daily over the single track Page Subdivision, which then travels east of the Livingston Junction at 232nd Street and operates on the single trackage, which extends south-easterly to Abbotsford over the old interurban passenger line route. Roadways affected by the proposed Community Rail are under the authority of the City of Surrey, Langley City and Township or the British Columbia Ministry of Transportation (MoT).

Typically, passenger trains, operating every 15 to 20 minutes during the peak period, will disrupt individual traffic signal cycles for 30 to 40 seconds, which is considerably less than the disruption caused by long freight trains, which are in use today. Section 13.6 of this report contains a discussion of the impact of road/rail crossings in the City of Calgary, which operates several LRT lines in busy arterial road rights-of-way.

12.2 Road Corridors Impacted by Community Rail

The following list indicates the road corridors and the corresponding road authority affected by the proposed Community Rail Service in the Langleys.

Ministry of Transportation

- Highway 10 Corridor, which includes the Langley By-Pass and Glover Road between the Langley ByPass and 70th Avenue, Langley City and Langley Township

City of Surrey

- 192nd Street

Langley City and Township

- 56th Avenue, Langley City
- 200th Street, Langley City
- Fraser Highway, Langley City
- Worrel Crescent, Langley Township
- Crush Crescent, Langley Township

- Smith Crescent, Langley Township
- 216th Street, Langley Township
- Trinity Western University, Langley Township
- 232nd Street, Langley Township
- 248th Street, Langley Township
- 264th Street, Langley Township

12.3 Design Considerations at Railway Crossing Locations

As the project progresses, the following factors would require review during the design process:

- The exact length of time the Community Rail would take to cross individual roadway crossings compared with the existing freight services.
- The strategy for pre-emption of traffic signals to permit train crossings could be a factor in station location and operation. For example, nearside stations could use in-train pre-emption devices.
- Pre-emption operation should be responsive to all road agency's signal operation and coordination techniques where these operations do not directly conflict with one another.
- Train speed and the prevailing road/rail guidelines as applied to pre-emption bell and gate-down timing.

12.4 Details of Road Crossings

The Community Rail line has the following level road-rail crossings between the Cloverdale Station at 176th Street and Highway 10 and the 264th Street Station in Langley Township:

12.4.1 192nd Street, City of Surrey

This crossing is located immediately south of an industrial development at 52nd Avenue. The crossing is located on a tangent section of road with intersections immediately north and south of the level crossing on the west side of the street. The road crossing has been made of concrete and appears to be in good condition. The railway crossing on 192nd Street is currently gated with lights and bells as shown in Figure 13.1.

The nearest traffic signal is located at the intersection of Highway 10 and 192nd Street, which is approximately 0.8 kilometres from the railway crossing. Since this signalized intersection is not located within this distance, signal pre-emption at this location is likely not required.



Figure 13.1 Existing Railway Crossing at 192nd Street

12.4.2 56th Avenue, Langley City

This crossing is located between Production Boulevard Landmark Way near the Langley/Surrey border on 56th Avenue. The railway crossing is located on a tangent segment of roadway but the railway tracks are at a slightly skewed angle to the roadway. The road crossing has been constructed with concrete and it appears to be in good condition. The railway crossing on 56th Avenue is currently gated with lights and bells as shown in Figure 13.2. Some additional lights are mounted on one of the signal posts.

The nearest traffic signal is located at the intersection of Highway 10 and 192nd Street, which is about 1.0 km from the railway crossing.



Figure 13.2 Existing Railway Crossing at 56th Avenue

12.4.3 200th Street, Langley City

The railway crossing on 200th Street is located in a busy commercial area near the intersection of 200th Street and Production Way/Logan Avenue as shown in Figure 13.3. The crossing is signed and has cantilevered lights and bells in addition to the lights on the side of the road. The road segment of the crossing is made of concrete and appears to be in good condition.

Because of the short distances between the signalized intersection and the railway crossing, there are many signs directing the motorist during train events. Not all of the signs in Figure 13.3 would be readable for motorists located further away from them. Several railway gates and lights are required at this intersection to accommodate turning movements from Production Way/Logan Avenue.

Figure 13.4 shows the right turn signal and gate for westbound to northbound right turns onto 200th Street from Logan Avenue. The traffic signal at the intersection of 200th Street and Production Way/Logan Avenue does not have railway pre-emption for the turning movements. Pre-emption is generally recommended for all traffic signals immediately adjacent to a railway crossing.



Figure 13.3 Existing Railway Crossing at 200th Street



Figure 13.4 Existing Railway Crossing at 200th Street

12.4.4 Fraser Highway, Langley City

The railway crossing of the Fraser Highway is located near the intersection with Production Way. The railway crossing is located on a tangent section of the Fraser Highway but the railway is at a skewed angle to the roadway. One driveway to a commercial property is located north of the railway crossing. The road portion of the crossing is constructed of concrete and appears to be in good condition. Figure 13.5 shows the existing crossing.



Figure 13.5 Existing Railway Crossing on Fraser Highway

The crossing is controlled with gates, cantilevered lights and bells. The nearest traffic signal is located at the intersection of Fraser Highway and Production Way, which is 0.3 kilometres south of the railway crossing. There is no railway signal pre-emption at this intersection for movements turning onto northbound Fraser Way. Signal pre-emption is generally recommended at all traffic signals close to a railway crossing.

12.4.5 204th Street Langley City

There are no railway crossings on 204th Street as a new overpass is currently being constructed over the railway tracks. The main purpose of this overpass was to provide an alternate path for emergency vehicles when the long freight trains block the level crossings in the City of Langley. A Community Rail Station is proposed to be located on Douglas Crescent near the south end of the 204th Street overpass. This area appears to be primarily industrial land uses although there are some commercial land uses that front onto Langley By-Pass.

12.4.6 Langley By-Pass, City of Langley

The Langley By-Pass has a single level railway crossing near west of the intersection of Langley By-Pass and Glover Road. This crossing is on the eastern edge of land that is currently occupied by commercial and industrial land uses. The railway crossing is located on a curved section of roadway and is further complicated by the skew angle of the railway. Roadside barriers are located on either side of the road and median barrier separates the opposing traffic flows. An unsignalized intersection is located west of the railway crossing. Figure 13.6 shows the location of the railway crossing.



Figure 13.6 Fraser Highway Railway Crossing

Currently the railway crossing has gates with cantilevered lights and bells. The nearest signalized intersection is located at Glover Road and Langley By-Pass although future development may necessitate additional signalized intersections closer to the railway crossing. Due to the distance from the signal at Glover Road and the Langley By-Pass to the railway crossing, it is unlikely that a railway pre-emption sign is required.

12.4.7 Worrel Crescent, Langley Township

The unsignalized intersection of Worrel Crescent with Glover Road is located only a few metres west of this railway crossing. Railway gates, lights and bells control this crossing. A stop sign for eastbound traffic is located immediately west of the railway tracks and is used to control eastbound movements across the railway crossing. An additional stop sign is located immediately adjacent to Glover Road. The road portion of the railway crossing is constructed of wood and would be considered to be in poor condition. This railway crossing should be reconstructed using a concrete road crossing. Figure 13.7 shows this railway crossing.

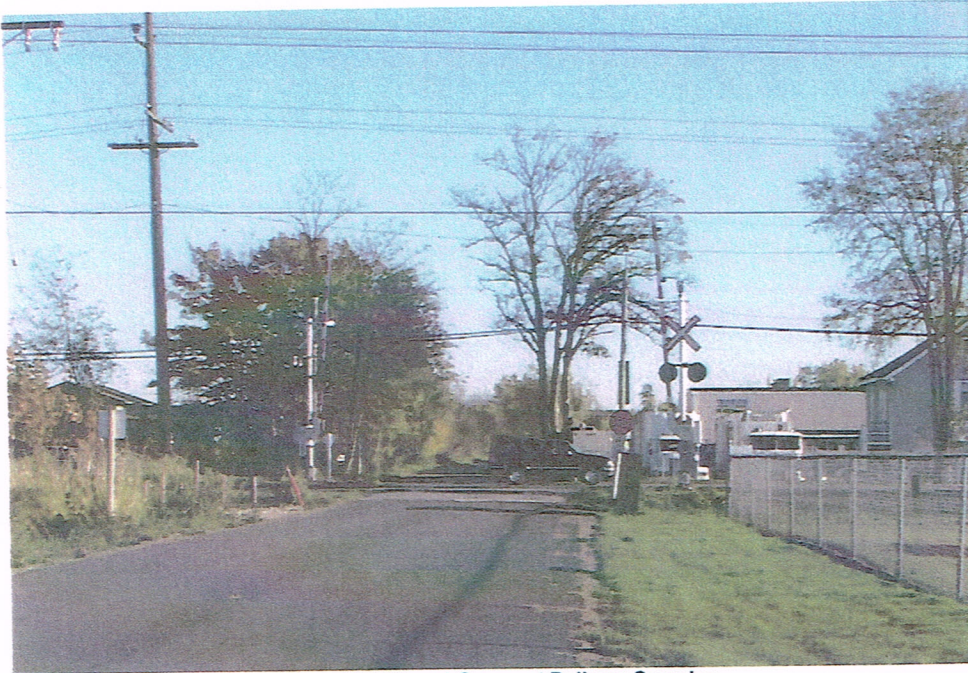


Figure 13.7 Worrel Crescent Railway Crossing

Currently this crossing is located on a road with no exit in an agricultural area. If development adjacent to Worrel Crescent or on the east side of Glover Road occurs in the future, then signalization of this intersection may be necessary. Due to the proximity of the railway crossing to the intersection of Worrel Crescent and Glover Road, railway signal pre-emption is recommended if this intersection is signalized in the future.

12.4.8 Crush Crescent, Langley Township

The signalized intersection of Crush Crescent with Glover Road is located only a few metres east of the double track railway crossing on Crush Crescent. The mainline is located closest to the intersection and is controlled by gates, lights and bells. A railway spur line is located just west of the mainline, which is for a silo structure located on the southwest corner of the intersection. For westbound traffic on Crush Crescent, both railway lines are controlled by the same gated railway signal as shown on Figure 13.8. For eastbound traffic, there is a cross-buck sign at the spur line before crossing the gated mainline railway crossing, shown on Figure 13.9. The road portion of the railway crossing was constructed with concrete and is located on a tangent section of Crush Crescent although there is a horizontal curve located west of the double railway crossing. An additional gate was constructed for the southbound to westbound right turns onto Crush.

The road portion of the mainline railway crossing is constructed of concrete and appears to be in good condition. The road portion of the spur line crossing is constructed of asphalt concrete between the tracks. The crossing appears to be in acceptable condition, but the road portion could be reconstructed using concrete, similar to the mainline.



Figure 13.8 Crush Crescent Railway Crossing



Figure 13.9 Crush Crescent Railway Crossing

Currently, the existing traffic signal at Crush Crescent does not have railway pre-emption for southbound rights and northbound left turning movements. Signal pre-emption is recommended for turning movements at intersections located very close to railway crossings.

12.4.9 Smith Crescent, Langley Township

The railway crossing at Smith Crescent is located a few metres from the unsignalized intersection of Smith and Glover Road. Cross buck signs control this crossing for all traffic on Smith Crescent. For eastbound traffic, a stop sign is located west of the railway crossing as illustrated in Figure 13.10. Westbound traffic does not have a stop sign with the cross buck sign. The road portion of the crossing has been constructed of wood and appears to be in poor condition. Reconstruction of the railway crossing should be completed in concrete similar to the 216th Street railway crossing.



Figure 13.10 Existing Crossing at Smith Crescent

Currently this crossing is located on a road in an agricultural area. The control at this level crossing is appropriate for railway crossings with very low train and traffic volumes and cross products less than a 1000 Township of Langley traffic volume data in 2006 indicate that there are less than 1,000 vehicles/day on this road. However, with 20 daily trains only 50 vehicles/day are required before lights and bells are required at the Smith Crescent railway crossing. If switching operations occur within 60 m of the railway crossing or if the cross product is greater than 50,000, then gates are recommended as part of the control.

If development adjacent to Smith Crescent or on the east side of Glover Road occurs in the future, then signalization of this intersection may be necessary. Due to the proximity of the railway crossing to the intersection of Smith Crescent and Glover Road, railway signal pre-emption and railway gates are recommended if this intersection is signalized in the future.

12.4.10 216th Street, Langley Township

The railway crossing at 216th Street is located a few metres from the unsignalized intersection of 216th Street and Glover Road. Gates, lights and bells control this crossing. For eastbound traffic, a stop sign is located west of the railway crossing as illustrated in Figure 13.11. The road portion of the crossing has been constructed of concrete and appears to be in good condition.



Figure 13.11 Existing Crossing at 216th Street

Currently this crossing is located on a road in an agricultural area. If development adjacent to 216th Street or on the east side of Glover Road occurs in the future, then signalization of this intersection may be necessary. Due to the proximity of the railway crossing to the intersection of 216th Street and Glover Road, railway signal pre-emption is recommended if this intersection is signalized in the future.

12.4.11 Glover Road, Langley Township

This railway crossing is located on Glover Road north of the Highway 10 turn-off at 70th Avenue. The railway crossing is located in the middle of a horizontal curve, which is part of an "S curve" set of horizontal curves. The geometry of this level crossing is considered undesirable, because of the skewed angle of the rail – road intersection but may be difficult to change without significant changes to the road and potentially the rail alignment geometry. Much of the vehicle traffic on Glover Road takes the Highway 10 turn-off to 232nd Street south of the railway crossing. A significant number of vehicles (5,000 to 10,000 vehicles/day) travel through this crossing to Trinity Western University (TWU) and the overpass over the Trans Canada Highway.

12.4.12 Trinity Western University, Langley Township

There is one railway crossing on the TWU campus, which is for pedestrian access to a playing field as shown in Figure 13.12. The railway crossing is currently controlled with gates, lights and bells. While pedestrians are the most likely to use this access, it is possible for vehicles to use the access as well. The volume of pedestrians and vehicles that currently use this crossing is unknown. It is not known if TWU has any plans to expand the campus to the eastern side of the railway tracks beyond the existing playing fields.



Figure 13.12 Existing Railway Crossing at Trinity Western University

12.4.13 232nd Street, Langley Township

This crossing is located near the 232nd Street interchange with Highway 1 on a tangent section of road. At the interchange, there is a small park and ride facility located primarily on the east side of 232nd Street. Figure 13.13 shows the existing crossing. The road portion of the railway crossing has been constructed using concrete and appears to be in good condition. Gates, lights and bells control the railway crossing. A Community Rail Station has been proposed on the southeast side of the level crossing on 232nd Street as shown on Figure 7.

The closest signalized intersection is located at 232nd Street south of the 232nd Street interchange ramps on the south side of the interchange. Several driveways to residential properties are located close to the railway crossing. It is unlikely that signal pre-emption is required at this location due to the distance between the railway crossing and the existing signal.



Figure 13.13 Existing Railway Crossing on 232nd Street

12.4.14 248th Street, Langley Township

This crossing is located on 248th Street south of 72nd Avenue. Currently the adjacent land use is rural-residential, with many houses on large lots and some agricultural land uses. The crossing is located on tangent section of 248th Street and is controlled by stop signs and cross buck signs. The road portion of the railway crossing is constructed of asphalt and is in acceptable condition. A Community Rail Station is proposed at the southeast corner of the railway crossing as shown in Figure 9. Figure 13.14 shows the crossing location.

The control at this level crossing is appropriate for railway crossings with very low train and traffic volumes and a cross product of less than 1,000. Township of Langley traffic volumes in 2006 are between 2,500 and 4,999 vehicles/day at this location. Assuming that there are only four trains per day on this portion of the Southern Railway track, the cross product today would be between 10,000 and 20,000, indicating that the level of control at this level railway crossing is inadequate. Section 1110.10 of the *BC Supplement to TAC Geometric Design Guide 2001 Edition*, indicates that when the cross product is greater than 1,000, a railway signal (lights and bells) is required at a level crossing.

There are no signalized intersections near this railway crossing. If future development warrants the installation of a traffic signal near this railway crossing and proposed Community Rail Station, then signal pre-emption is recommended for the turning movements.



Figure 13.14 Existing Railway Crossing on 248th Street

12.4.15 264th Street, Langley Township

The railway crossing on 264th Street near 64th Avenue is the only crossing that is currently grade separated in the study area. The surrounding land use is currently rural residential, with many houses on large lots and some agricultural land uses. A Community Rail Station has been proposed at the southeast corner of the intersection of 64th Avenue and 264th Street, which is immediately north of the railway as shown in Figure 10 in the Appendix. Figure 13.15 shows the existing grade separated crossing.



Figure 13.15 Existing Railway Crossing on 264th Street

Figure 13.16 shows the intersection of 64th Avenue and 264th Street near the overpass.



Figure 13.16 264th Street Intersection with 64th Avenue

12.5 Railway Crossing Improvements

Most of the existing railway crossings have full gates, lights and bells. However, a small minority of crossings located outside of the urban and industrial areas of Langley require railway signal upgrading. The following list indicates the locations where the existing railway crossing control is considered inadequate for current traffic conditions:

- Railway crossing on 248th Street should be upgraded to a crossing with signals. Gates are required if switching operations occur within 60 m of the crossing. A traffic signal is required at a nearby intersection or if the cross product is forecast to be 50,000 within three years of gate installation.
- Railway crossing on Smith Crescent should be upgraded to a crossing with signals. Gates are required if switching operations occur within 60 m of the crossing; a traffic signal is proposed at the intersection of Glover Road and Smith Crescent or if the cross product is forecast to be 50,000 within three years of gate installation.
- Some railway crossings with gates, lights and bells may require lights to be cantilevered above the travel lanes in addition to the lights on the side of the road. The cantilevered lights over lanes provide greater visibility to the railway crossing during a train event.

Some existing signalized intersections are recommended to have signal pre-emption for turning movements in the commentary in Section 13.4 due to the proximity of the railway line to the signalized intersection. The use of signal pre-emption will need to be coordinated with the railway companies and various road agencies. Other Intelligent Transportation System measures, which may be considered in the future, should be coordinated with a program to implement signal pre-emption. The following list summarizes these locations.

- Intersection of Glover Road and Crush Crescent
- Intersection of 200th Street and Production Way/Logan Avenue

- Intersection of Fraser Highway and Production Way

12.6 Level Rail Crossings in Calgary

To see the potential impact of road/passenger rail crossings, officials from the City of Calgary were contacted, where they have had two LRT lines – the Northeast and Northwest LRT lines, operating since the mid - 1980s with many road/rail crossings on very busy arterial roadways.

In the Northeast Sector of Calgary, for example, there are 10 at-grade crossings along 36th Street, a north-south street with average weekday volumes of 25,000 to 50,000 vehicles. LRT gates, bells, flashing lights, pedestrian crosswalk heads and gates protect grade level road and pedestrian crossings, which are consistent with Canada Transport safety standards. The average gate warning time for individual traffic intersections is 22 seconds, with an additional 10 to 15 seconds for the gates to ascend and the warning lights and bells to turn off. Traffic signals at intersections can be interrupted for up to 60 seconds. The 36th Street LRT corridor was designed so that pre-empted traffic movements (e.g. north and south left turns) are reserviced if the preset time has not been met once the trains clears the intersection. No permissive left turns are permitted in the traffic intersections.

There have been some auto collisions and fatalities at intersections in the history of the LRT lines operating in the Northeast and Northwest corridors in Calgary. Between January 2004 and August 2006, a period of 32 months, there were 37 collisions involving LRT trains and private vehicles and 24 collisions involving pedestrians and LRT trains. However, the LRT trains operate every five minutes during peak periods and every 10 to 15 minutes in off-peak periods, much more frequently than envisioned for the initial operation of the proposed Langley Community Rail line.

13.0 Potential safety impacts of community rail proposal

One important consideration during the planning and design phases of the Community Rail Line through the Langleys would be the safety impacts of the Community Rail, which would include the following factors:

- Road/Rail interactions at level railway crossings;
- Assessment and possible mitigation of existing road safety problems in the vicinity of level railway crossings and Community Rail Stations;
- Assessment and possible mitigation of existing capacity and traffic operation problems in the vicinity of railway crossings and Community Rail Stations; and
- Accommodation of vulnerable road users, including pedestrians and cyclists.

It is important that existing safety and operational problems are not exacerbated by the proposed Community Rail Line. It is equally important that there will be sufficient infrastructure in place for all Community Rail users when the system opens. Insufficient infrastructure such as no sidewalks or poor accommodation of traffic around Community Rail Stations would cause additional operational and safety problems for the transportation network.

This section of the report has been divided into two distinct subsections. The first subsection briefly outlines some background information and the methodology used to determine where existing safety problems are occurring on the road network. It is beyond the scope of this project to determine the hazardous locations within the road network. The second subsection contains the results of a short site

visit to each of the railway crossing locations noted in Section 13 of the report and at each of the proposed Community Rail Stations.

13.1 Determining Collision-Prone Locations

There are several statistical methods to determine whether a location is considered collision-prone or hazardous. The easiest method is to rank collision locations on the basis of collision frequency. This method is easy to use and only requires collision data. It does not however, account for exposure. Locations with high traffic volumes typically have more collisions than locations with low traffic volumes. The use of collision rates, which are the number of collision per million vehicle kilometres traveled on road segments or the number of collisions per million vehicles entering intersections, can account for exposure. The calculation of collision rates requires accurate traffic volumes, often for several years. While collision rates can account for exposure to traffic, they do not always represent an accurate measure of the degree of risk since the relationship between traffic volumes and collisions is not linear. Figure 14.1 illustrates an example relationship between traffic volumes and collisions. It is noteworthy that locations with low traffic volumes tend to have a higher collision rate than locations with high traffic volumes. Thus, when ranking hazardous locations by collision rate there is a tendency for the ranking to be skewed towards locations with low traffic volumes.

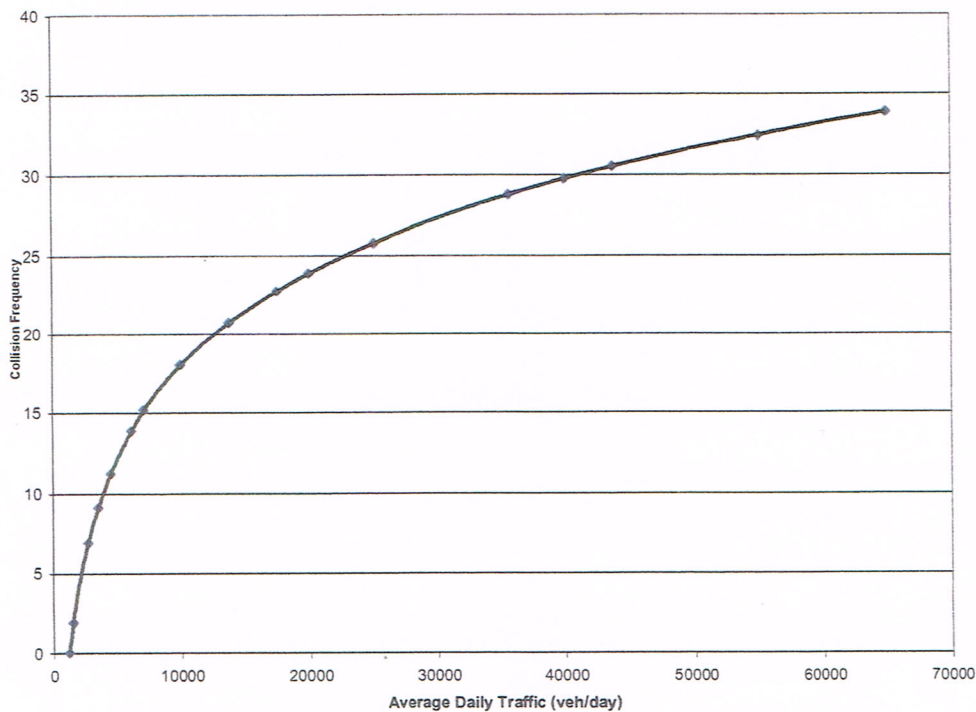


Figure 14.1 Example of a Collision Frequency and Traffic Volume Relationship

Neither collision frequency nor collision rates account for the natural variation in collision frequency over time. For example, a location may have an actual mean collision frequency of five collisions per year. Over time it is observed that collision frequency at that location varies between one and nine collisions per year as shown in Figure 14.2.

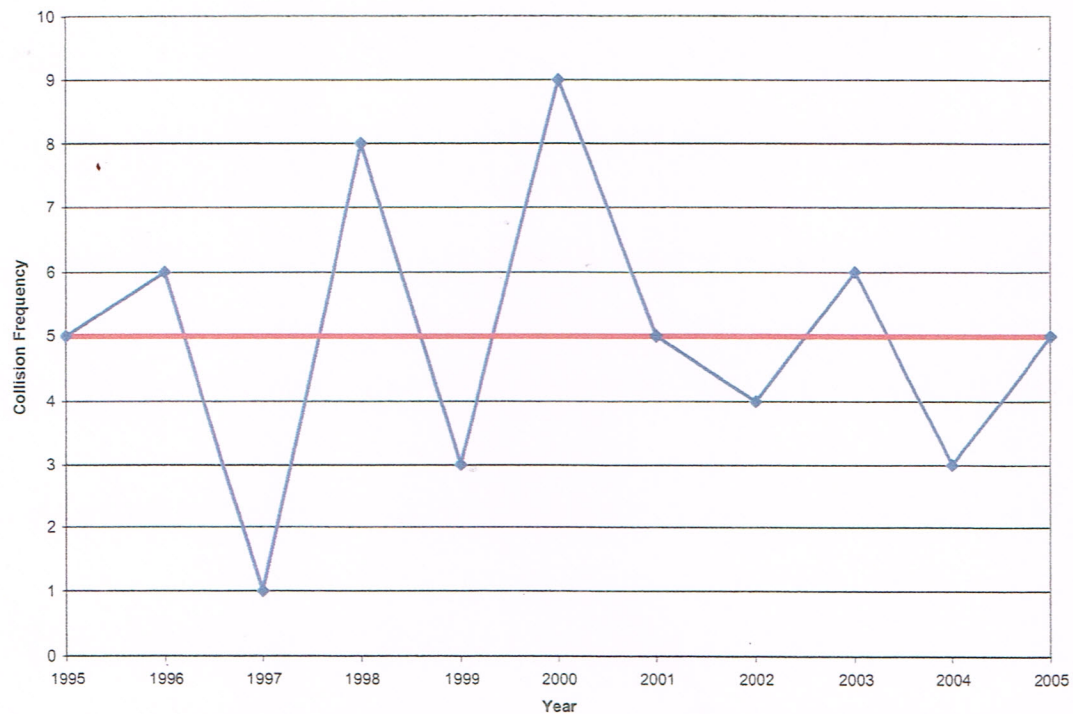


Figure 14.2 Example of Observed and Actual Mean Collision Frequency

During years that the collision frequency is high, it appears that this location is “hazardous” but during years when the collision frequency is low it may appear that this location is “safe”. In actuality, this location is average but appears safer or less safe if collision history is only reviewed for a short period of time. This phenomenon is known as regression to the mean.

The only methodology used to determine collision-prone or hazardous locations that accounts for regression to the mean uses Empirical Bayes methodology. The use of Empirical Bayes requires a large quantity of data including collision and traffic data at the location as well as collision and traffic data at comparable locations or a calibrated collision prediction model (CPM). Once the hazardous locations are determined, they can be ranked for potential for improvement.

Numerous CPMs have been developed for level railway crossings, road segments (with no railway crossings) and intersections. The use of railway CPMs will not predict the number of collisions that are related to vehicle to vehicle or vehicle to pedestrian collisions. Several sets of railway crossing CPMs have been developed. The first set was developed by the US Federal Railway Administration and are included in their GradeDec on-line software package. At least one CPM was developed in Canada using Canadian data. Calibration of these CPMs to local conditions is likely required before they are used. Many intersection and road segment CPMs have been developed for the conditions in the urban areas of the Lower Mainland and rural highways in British Columbia.

13.2 Site Observations

Site visits were made to the general area of each of the proposed station locations and to existing railway crossing locations. The following paragraphs outline safety concerns for each of the station locations during a one-day site visit of the entire study area. The focus of these observations is on the potential

safety impacts of the new Commuter Rail line, specifically with respect to vulnerable road users, i.e. pedestrians, cyclists and the visually and physically challenged.

13.2.1 192nd Street, City of Surrey

Currently there is some development west of 192nd Street and north of 52nd Avenue but little development east of 192nd Street and south of 51B Avenue. 192nd Street has a short segment of sidewalk north of 52nd Avenue and there is one sidewalk on the north side of the road on 52nd Avenue. Pedestrian facilities are limited and there are no marked bicycle facilities nearby. On-street parking spaces are available on 192nd Street and on 52nd Avenue but many of these parking spaces are used by adjacent developments. Street lighting is found on 192nd Street and on 52nd Avenue adjacent to the new industrial / commercial development.

The proposed station is located on the southeast corner of 192nd Street and railway line with a new park-n-ride facility located immediately south of the new station. It is expected that most people will use the park-n-ride facility to access the station. Pedestrian and cyclist facilities should be provided to new developments and to road improvements on 192nd Street as they occur.

13.2.2 56th Avenue, Langley City

This crossing is located on 56th Avenue between Production Boulevard Landmark Way and Production and it is surrounded by primarily commercial and industrial land uses. The crossing is located on a tangent section of 56th Avenue but the railway crosses the road at a skewed angle. Currently, there are no sidewalks on 56th Avenue but a transit route is located on 56th Avenue near the railway crossing. Street lighting is provided. There are shoulders on the roadway but they are not well marked and shoulder material may change from pavement to gravel depending on the location in the 56th Avenue corridor.

Since a Community Rail Station is not proposed to be located close to this railway crossing, no changes are recommended at this time. However, due to the skew angle of the railway crossing, cyclists may have difficulty crossing the railway tracks without dismounting. Figure 3.4.7.9 in the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads, 1999 Edition* shows a detail for bicycle facilities to cross a skewed railway crossing. When changes are proposed to this area, consideration should be given to providing additional space for pedestrians and cyclists on the 56th Avenue corridor.

13.2.3 200th Street, Langley City

This railway crossing is located on 200th Street near the intersection of 200th Street with Production Way/Logan Avenue. The land use surrounding this railway crossing is primarily commercial with some industrial uses. 200th Street has sidewalks and street lighting on both sides of the roadway.

13.2.4 Production Way Station, Langley City

A Community Rail station, shown in Figure 3, is proposed on Production Way on the east side of the Fraser Highway. This station would be located in an area that currently has commercial and industrial land uses. Sidewalks and street lights are provided on Fraser Highway and some sidewalks are located on Production Way east of Fraser Highway. Sidewalks and street lighting should be added as industrial areas on the west side are redeveloped.

safety impacts of the new Commuter Rail line, specifically with respect to vulnerable road users, i.e. pedestrians, cyclists and the visually and physically challenged.

13.2.1 192nd Street, City of Surrey

Currently there is some development west of 192nd Street and north of 52nd Avenue but little development east of 192nd Street and south of 51B Avenue. 192nd Street has a short segment of sidewalk north of 52nd Avenue and there is one sidewalk on the north side of the road on 52nd Avenue. Pedestrian facilities are limited and there are no marked bicycle facilities nearby. On-street parking spaces are available on 192nd Street and on 52nd Avenue but many of these parking spaces are used by adjacent developments. Street lighting is found on 192nd Street and on 52nd Avenue adjacent to the new industrial / commercial development.

The proposed station is located on the southeast corner of 192nd Street and railway line with a new park-n-ride facility located immediately south of the new station. It is expected that most people will use the park-n-ride facility to access the station. Pedestrian and cyclist facilities should be provided to new developments and to road improvements on 192nd Street as they occur.

13.2.2 56th Avenue, Langley City

This crossing is located on 56th Avenue between Production Boulevard Landmark Way and Production and it is surrounded by primarily commercial and industrial land uses. The crossing is located on a tangent section of 56th Avenue but the railway crosses the road at a skewed angle. Currently, there are no sidewalks on 56th Avenue but a transit route is located on 56th Avenue near the railway crossing. Street lighting is provided. There are shoulders on the roadway but they are not well marked and shoulder material may change from pavement to gravel depending on the location in the 56th Avenue corridor.

Since a Community Rail Station is not proposed to be located close to this railway crossing, no changes are recommended at this time. However, due to the skew angle of the railway crossing, cyclists may have difficulty crossing the railway tracks without dismounting. Figure 3.4.7.9 in the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads, 1999 Edition* shows a detail for bicycle facilities to cross a skewed railway crossing. When changes are proposed to this area, consideration should be given to providing additional space for pedestrians and cyclists on the 56th Avenue corridor.

13.2.3 200th Street, Langley City

This railway crossing is located on 200th Street near the intersection of 200th Street with Production Way/Logan Avenue. The land use surrounding this railway crossing is primarily commercial with some industrial uses. 200th Street has sidewalks and street lighting on both sides of the roadway.

13.2.4 Production Way Station, Langley City

A Community Rail station, shown in Figure 3, is proposed on Production Way on the east side of the Fraser Highway. This station would be located in an area that currently has commercial and industrial land uses. Sidewalks and street lights are provided on Fraser Highway and some sidewalks are located on Production Way east of Fraser Highway. Sidewalks and street lighting should be added as industrial areas on the west side are redeveloped.

Many of the people using the Community Rail from this station would do so through the proposed park-n-ride and kiss and ride facilities. This area has a large number of employment trips and some people maybe able to walk to their jobs from the Community Rail Station.

13.2.5 Fraser Highway, Langley City

The Fraser Highway railway crossing is located adjacent to the proposed Production Way Station. Many of the observations noted in Section 2.2.4 can be applied to this location. Due to the skewed angle of the railway crossing, cyclists will have difficulty crossing the railway tracks without dismounting. Figure 3.4.7.9 in the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads, 1999 Edition* provides details for designing bicycle facilities to cross a skewed railway crossing.

13.2.6 204th Street (Duncan Way) Station, Langley City

Figure 4 shows the Community Rail Station proposed on Duncan Way near the south end of the 204th Street overpass, which is under construction. Duncan Way does not appear to have any sidewalks. Sidewalks should be constructed to connect to the 204th Street overpass and other locations that may have a number of pedestrian trip ends as this area has a relatively large number of employment trip ends.

13.2.7 Kwantlen University College Station - Langley Bypass and Glover Road, City of Langley

This station would be located west of Glover Road on the Langley By-Pass as shown on Figure 5. It is intended to serve the students of Kwantlen University College, which is located east of Glover Road. However, the industrial and commercial lands located west of the station on the Langley By-Pass have a large number of employment trip ends. People may elect to use the Community Rail as a means to get to work, thereby increasing the number of pedestrians in this area.

Currently, there are no sidewalks adjacent to the Langley By-Pass but there is a paved shoulder that could be used by cyclists. However, due to the skewed angle of the railway crossing and the horizontal curve of the road, cyclists may have difficulty crossing the railway tracks without dismounting. Figure 3.4.7.9 in the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads, 1999 Edition* shows detail for designing bicycle facilities to cross a skewed railway crossing. There are on-street bicycle lanes on Glover Road south of the Langley By-Pass, which end abruptly at the intersection with Glover Road. Since the proposed station is intended to be used by Kwantlen University College students, sidewalks and bicycle facilities should be constructed on Langley By-Pass from the station to the Kwantlen campus. In addition, sidewalks and bicycle facilities should be provided to the industrial and commercial lands located west of the station.

13.2.8 Worrel Crescent, Langley Township

The intersection of Worrel Crescent with Glover Road is located only a few metres west of the railway crossing on Worrel. The surrounding land use is primarily rural with some industrial land use. A large industrial/agricultural development is located on the southwest corner of the railway crossing. This railway crossing, shown in Figure 14.3, on Worrel Crescent was constructed with wood planks that make it difficult for cyclists to traverse. In addition, there are no sidewalks, shoulders or street lighting on Worrel Crescent. A paved shoulder, which could be used by cyclists, and street lighting are located on Glover Road. There are no sidewalks on Glover Road.



Figure 14.3 Wood Railway Crossing at Worrel Crescent

The nearest Community Rail Station is proposed at Crush Crescent. As Worrel Crescent is not a through street, few trip ends that use the Community Rail line would be expected to be generated from this location. Nonetheless, if development occurs adjacent to Worrel Crescent in the future, then sidewalks, bicycle facilities and street lighting should be provided.

13.2.9 Crush Crescent, Langley Township

Currently there are no sidewalks on either Glover Road or Crush Crescent/216th Street. A paved shoulder, which could be used by cyclists, and street lighting are located on Glover Road. On the west side of Glover Road, most of the adjacent land is used for agricultural purposes; on the east side of Glover Road, there is more development related to commercial, industrial and agricultural land uses.

The Milner Community Rail Station is proposed at the northwest corner of the intersection of Crush Crescent and Glover Road, as shown in Figure 6. A park-n-ride facility is proposed in an existing parking lot on the north side of Crush Crescent. It is likely that most people using the Milner Station would arrive by a vehicle. As this parking lot is located adjacent to a rail spur, the location of the driveway access on to Crush Crescent should be chosen to minimize potential conflicts with the rail spur crossing and queues associated with the traffic signal located at the intersection of Crush Crescent and Glover Road. Figure 14.4 shows the railway mainline and spur line crossing Crush Crescent. The proposed Community Rail station would be located between the mainline and the spur line and the parking lot would be located west of the spur line. Pedestrian access from the parking lot to the Community Rail Station across the spur line needs to be carefully considered to avoid potential pedestrian conflicts with vehicles and trains on the rail spur.

Sidewalks, bicycle facilities and street lighting should be constructed on Crush Crescent as part of the Community Rail Station. These facilities should extend to the east side of Glover Road on 216th Street

where there is more development. Future developments in the area should also provide additional sidewalks, bicycle facilities and street lighting.

13.2.10 Smith Crescent, Langley Township

There are no sidewalks, shoulders or street lighting on Smith Crescent. A paved shoulder, which could be used by cyclists, and street lighting are located on Glover Road. There are no sidewalks on Glover Road. The railway crossing on Smith Crescent, similar to the one on Worrel Crescent, was constructed with wood planks that make it difficult for cyclists to traverse. As noted in Section 13 of this report the railway crossing control at this location needs to be upgraded to railway signals from the existing crossbuck and stop signs.

The nearest community Rail Station is proposed at Crush Crescent. As Smith Crescent is a local street, few trip ends that use the Community Rail line would be expected to be generated from this location. Nonetheless, if development occurs adjacent to Smith Crescent in the future, then sidewalks, bicycle facilities and street lighting should be provided.

13.2.11 216th Street, Langley Township

Currently there are no sidewalks, shoulders or street lighting on 216th Street and no sidewalks are provided on Glover Road. There is a paved shoulder and some street lighting on Glover Road. The land near this railway crossing is primarily agricultural on both the east and west sides of Glover Road.

The nearest Community Rail Station is proposed at Crush Crescent. As 216th Street is a local street, few trip ends that use the Community Rail line would be expected to be generated from this location. Nonetheless, if development occurs adjacent to 216th Street in the future, then sidewalks, bicycle facilities and street lighting should be provided.

13.2.12 Glover Road, Langley Township

This railway crossing is located on Glover Road north of the Highway 10 turn-off at 70th Avenue. The railway crossing is located in the middle of one horizontal curve in a set of "S curves". The geometry of this level crossing is considered to be undesirable, because of the skewed angle of the rail-road intersection. This may be difficult to change. Section 1110.10 of the *BC Supplement to TAC Geometric Design Guide 2001 Edition*, indicates that when a road crosses a track where train speeds are in excess of 15 mph (24 km/h), the road approaches shall be straight (i.e. on a tangent) for at least 60 m in advance of the railway crossing.

The closest proposed Community Rail Station would be located at either Crush Crescent or on the TWU campus. It is unlikely that Community Rail users would have a trip end in this area without having access to a vehicle.

13.2.13 Trinity Western University Station, Langley Township

A Community Rail Station is proposed on the west side of the railway tracks south of the existing level railway crossing on the TWU campus as shown on Figure 7. Currently, there are few pedestrian-only facilities on the campus. Typically, pedestrians share the roads and parking areas with vehicles. New pedestrian only facilities and street lighting may be warranted if large numbers of pedestrians are expected to use this Community Rail station.

West of the two playing fields located east of the railway right-of-way is not separated from the campus by a fence. In this area, only trees and bush separate the parking areas from the railway line. Several paths

lead to the railway line as shown in Figure 14.5. If the community rail line is developed, consideration should be given to constructing additional fencing between the parking areas and the railway line.



Figure 14.5 Accesses to the Railway Tracks through the Trees

13.2.14 232nd Street, Langley Township

There are no pedestrian facilities or street lighting on 232nd Street north of the Highway 1 interchange although a paved shoulder is provided, which cyclists could use. Should development occur in the future, then sidewalks, bicycle facilities and street lighting should be provided throughout the development and on the adjacent streets.

A Community Rail Station is proposed at the southeast corner of the intersection of the railway with 232nd Street, as shown on Figure 9. The park-n-ride lot is proposed on the northeast corner of the railway crossing. It is expected that most people will access the station via vehicles. With this layout, careful consideration is required during the design stage for the safety of pedestrians that will cross the railway tracks between the parking lot and station. An alternative layout, with the station and the parking facilities on the northeast corner of the railway crossing would reduce potential train/pedestrian conflicts. While most people would be expected to arrive at this station by vehicle, some consideration should be given to providing pedestrian and cycling facilities in the area of the station.

13.2.15 248th Street, Langley Township

Currently, there are no pedestrian facilities or street lighting on 248th Street. There are some paved shoulders on the roadway, which could be used by cyclists. Should development occur in the future, then sidewalks, bicycle facilities and street lighting should be throughout the development and on the adjacent streets.

A proposed Community Rail Station is proposed on the southeast corner of the 248th Street railway crossing as shown on Figure 9. The proposed driveway access to the park-n-ride facility could be located immediately south of the railway crossing. To help minimize potential conflicts between the railway traffic and the parking lot the driveway access should be located at the south end of the parking lot. It is expected that most people using this station would arrive via a vehicle. However, some consideration should be given to providing pedestrian and cycling facilities in the area of the station.

13.2.16 264th Street, Langley Township

The railway crossing on 264th Street is the only grade separated crossing in the Langley Community Rail study area. As a result, all potential conflicts between road users on 264th Street and the trains are eliminated. 264th Street does not have sidewalks except for a narrow sidewalk on the west side of the 264th railway overpass. Some street lighting is found on 264th Street and a narrow shoulder is available for cyclists to use. It is not known if the overpass structure is sufficiently wide enough for a bicycle lane.

A Community Rail Station is proposed at the southeast corner of the railway and 64th Avenue with a small park and ride lot located immediately south of 64th Avenue. To help reduce conflicts at the intersection of 64th Avenue and 264th Street, the driveway access to the parking lot, shown on Figure 10, should be located at the east side of the parking lot. In addition, since there is a crest vertical curve on the railway overpass, the intersection of 64th Avenue and 264th Street should be reviewed for adequate decision sight distance.

13.3 Recommended Improvements

This section outlines some of the road and railway crossing improvements that would be necessary in the future due to traffic growth and the Community Rail project.

13.3.1 Road Improvements

The recommended road improvements include:

- Many of the railway crossings are located at or near existing intersections, where vehicle-to-vehicle collisions tend to occur more frequently than on road segments. A detailed safety study is recommended at each railway crossing location and Community Rail station. The study should address the implementation of appropriate countermeasures may be desirable to reduce the anticipated number of collisions at certain locations. Due to the close proximity between some of the railway crossings and the intersections, there may be limited opportunities to propose geometric changes that could help prevent some of the existing collisions.
- Construction of sidewalks, street lighting and cycling facilities at each Community Rail Station to locations where trip ends are concentrated.
- Planning and design of the Community Rail Stations should attempt to minimize potential conflicts between vehicles; vehicles and pedestrians; trains and pedestrians and trains and vehicle.
- When developments occur near existing railway crossings and Community Rail Stations, these developers should be responsible for the construction of sidewalks, street lighting and bicycle facilities.

13.3.2 Railway Crossing Improvements

The following railway improvements are recommended:

- Investigate the possibility of changing the realignment of the Glover Road railway crossing.

- Reconstruct the railway crossings at Smith Crescent and Worrel Crescent so that they are made out of concrete or a similar material that would provide a level crossing surface for cyclists.
- Investigate the possibility of providing better railway crossing alignments for cyclists similar to TAC Figure 3.4.7.9 at the railway crossings on 56th Avenue, Fraser Highway, Langley By-Pass and Glover Road.
- In locations where no sidewalks currently exist, modifications may be necessary to the gate arms at railway crossings to help prevent pedestrians from crossing the railway during a rail event.

14.0 Potential vehicles for community rail service and linkage to BC hydrogen highway project

The Community Rail project in the Langleys would entail operating a train service between the Cloverdale Station and the 264th Street Station. In order to be attractive, this service would have to operate every 20 minutes during peak periods and be able to operate on single track with some double track portions in stations to be able to serve physically challenged persons. This corridor would be fully equipped with a communication and signalling system to enable service to operate on a single track. As well, there would have to be a physical and time separation negotiated with the railways companies for the operation of their freight trains on this line.

The objective of this service would be to use modern, comfortable, accessible and preferably service proven vehicles, made by a well-known manufacturer. These vehicles could be powered by hydrogen fuel cell technology currently being developed by a number of prominent companies, such as Nedstack of the Netherlands and Nuvera of the United States.

As well, a company such as Vancouver's Azure Dynamics could be used to assist in this project as the firm's business lies in the development and commercialization of control systems for hybrid electric and electric vehicle powertrains. The Azure Control Systems ("ACS") technology is a real-time management system that adapts the operation of the hybrid electric vehicle to any driving mode. It employs software comprising sophisticated mathematical algorithms and real-time on-board data analysis to continuously manage the complex relationships between the engine, electric motor and battery.

For example, the train service might deploy the Parry People Mover vehicles made in Great Britain, which use a rotating flywheel as a store of kinetic energy combined with an engine fuelled with propane or hydrogen fuel cells. In Great Britain, these vehicles are powered with propane and are operated on Community Rail lines.

Parry People Movers produces two types of vehicles that may be viable for the Langley Community Rail Proposal:

- i) the PPM 80 which has seating for 40 seated passengers and 40 standing passengers ; or
- ii) the PPM 100 which has seating for up to 40 passengers (depending on customer specification) and 60 standing passengers. Modifications can be made to the vehicle size, boarding height, power source, appearance and interior layout. The North American price for the PPM 100 vehicle delivered would be about \$3.0 million powered by a hydrogen fuel cell engine.

Other potential vehicles include LRT vehicles such as the Bombardier Talent, which is used in the Ottawa O-Train corridor, which is an eight kilometre north-south LRT line with five stations which connects two bus rapid transit facilities in Ottawa. This service is operated by CPR. This project incurred \$21 million in capital costs, and that included purchasing the trains, installing the braking system, and constructing a

new station and a maintenance facility. Annual operating costs are \$4.0 million with about a 25% fare cost recovery, and daily ridership ranges from 5,000 to 6500.

With the Community Rail project, this Bombardier Talent vehicle could be powered by a hydrogen fuel cell engine instead of the diesel multiple units used in Ottawa. These vehicles, which seat 135 and can have 150 standing passengers, cost approximately \$6.0 million each. The larger size and higher cost of this vehicle may not be suitable for the Langley Community Rail (see Appendix B).

Assuming a round trip time between the Scott Road and 264th Street Community Rail Stations of approximately 98 to 110 minutes and a peak period frequency of 20 minutes, 16 vehicles would be required including four spares (i.e. seven 2 vehicle trains, plus 4 spare vehicles).

At the time of the writing of this report the City of Surrey Council has approved the use of a portion of the Community Rail track in Surrey to be used to operate the original interurban vehicles as one of its legacy projects for the 2010 Winter Olympics. The Surrey Community Rail project has both the potential to become a legacy and a sustainable transportation project as part of the 2010 Olympic and Paralympic Winter Games, both in terms of the important community linkages it creates and its use of hydrogen fuel engines as its power source. The entire Community Rail project should be developed as part of BC's Hydrogen Highway. The BC Hydrogen Highway project is described below.

14.1 The BC Hydrogen Highway

The BC Hydrogen Highway, launched in 2002, is an integral part of the 2010 Olympic Games and as well is an important component of British Columbia's Fuel Cell Strategy - a strategy aimed at making the province one of the leaders in the hydrogen economy by 2020.

The BC Hydrogen Project is a coordinated, large-scale demonstration and deployment program intended to accelerate the commercialization of hydrogen and fuel-cell technologies. This project will demonstrate a wide variety of transportation, stationary, portable and micropower applications that can utilize the hydrogen fuelling infrastructure. It will also demonstrate the operational, economic, environmental and social feasibility of a hydrogen fuelling infrastructure that utilizes different hydrogen production and delivery pathways.

One main objective of this demonstration and deployment project is to form a consortium of organizations to design, build, operate, test and evaluate a hydrogen fuelling infrastructure or "BC Hydrogen Highway" along a corridor linking the Vancouver International Airport, Powertech Labs in Surrey, the National Research Council's (NRC) Institute for Fuel Cell Innovation, the Finning Lands/Athletics Village, Sacré-Davey in North Vancouver, Whistler Village and the University of Victoria/BC Transit. The Powertech Labs, which have a 10,000-psi (700-bar) hydrogen dispenser, is located along the Surrey Community Rail corridor, just south of the proposed Kennedy Station located north of Nordel Way and east of Scott Road.

14.2 Benefits of Community Rail Project

The Community Rail Model and Strategy could be used by all the stakeholders such as FVRHS, the City of Surrey, Langley Township and City, Corporation of Delta, TransLink, the provincial government, Southern Railway, Canadian National Railway, Canadian Pacific Railway, and BC Hydro to develop and implement a 38 kilometre interurban rail facility with 16 stations, between the Scott Road Station in the City of Surrey and the 264th Street Station in Langley Township. This could provide an opportunity to achieve the following objectives:

- A valuable, environmentally friendly, green legacy in the Greater Vancouver Region through the deployment of passenger rail vehicles powered by hydrogen fuel cells.

- A very cost-effective, reliable and timely commuter transit service, which connects key and growing destinations at the proposed stations in the city of Surrey and in the Langleys, and provides an important and cost-effective linkage to the regional transportation network at the Scott Road Station. This corridor will not be impacted by the growing traffic congestion, which will impact streets South of the Fraser River increasing the travel times and unreliability of automobile and bus traffic.
- Upgrade the condition of the rail, ballast and track along the full corridor between Cloverdale and 264th Street. The safety of the entire rail corridor would be significantly enhanced through the introduction of fencing along portions of the corridor, the installation of rail safety gates and signage at all the rail/road crossings where required, and the introduction of a communications and signalling system.
- Improve the integration between all transit modes in the City of Surrey and the Langleys – SkyTrain, inter-urban rail, bus rapid transit services, conventional bus routes and community shuttles.
- Increased regional tourism-driven activity.
- A large educational benefit for sustainable transportation.
- Reduced congestion and improved air quality and road safety in the City of Surrey and the Langleys.
- Enhanced economic vitality of the communities and businesses in the vicinity of the rail stations.

15.0 Range of potential capital and operating costs of Community Rail train service

Table 10 provides a high level estimate of the capital and operating costs for a full Community Rail peak period service using modern vehicles and contracted out to Southern Rail, CP, etc. These costs are high level estimates based upon estimates from rail companies and other sources such as municipalities for costs such as parking and pedestrian linkages. These estimates would have to be developed in more detail and accuracy for the planning and design of such services and the preparation of a detailed plan for the next phase of this project.

The West Coast Express (WCE) peak period train service provides an example of the cost of a passenger train service on the GVRD, which was developed and implemented in the last ten years. This service, which commenced in 1995, operates 65 kilometres between the City of Mission and downtown Vancouver, with eight stations and 37 cars, and passenger rail service about every 30 minutes in the morning and afternoon peak periods. The upgrade of the freight line corridor for passenger service cost \$73.0 million (1995) and the total capital cost for the project was approximately \$110 million. The WCE's annual operating cost in 2006 was approximately \$16.0 million but this cost excludes rolling stock leasing costs, insurance and property taxes.

The Community Rail plan – an accessible, modern transit service operating every 20 minutes during peak weekday periods (5:30 am to 8:30 am and 3:30 pm to 6:30 pm) between the Scott Road SkyTrain Station and 192nd Street in the City of Surrey and extending the service out to 264th Street in Langley Township in a corridor with portions of the line double tracked – is projected to have a total capital cost of approximately \$82.0 to \$112.0 million plus (with higher quality vehicles), and an annual operating cost of approximately \$6.0 million. The capital costs include the following components: right-of-way and grade crossing improvements; passenger stations; modifying some industrial sidings; double tracking the station areas to ensure physical separation of freight and passenger services; adjacent station parking and pedestrian access improvements; new LRT-like vehicles; installing fare revenue collection equipment; and implementing a train communication and signal system to ensure safety of the system. The costs do not include the following cost categories: property costs; utilities relocation; double tracking along the entire corridor and its associated costs; contingencies; engineering and design costs; project