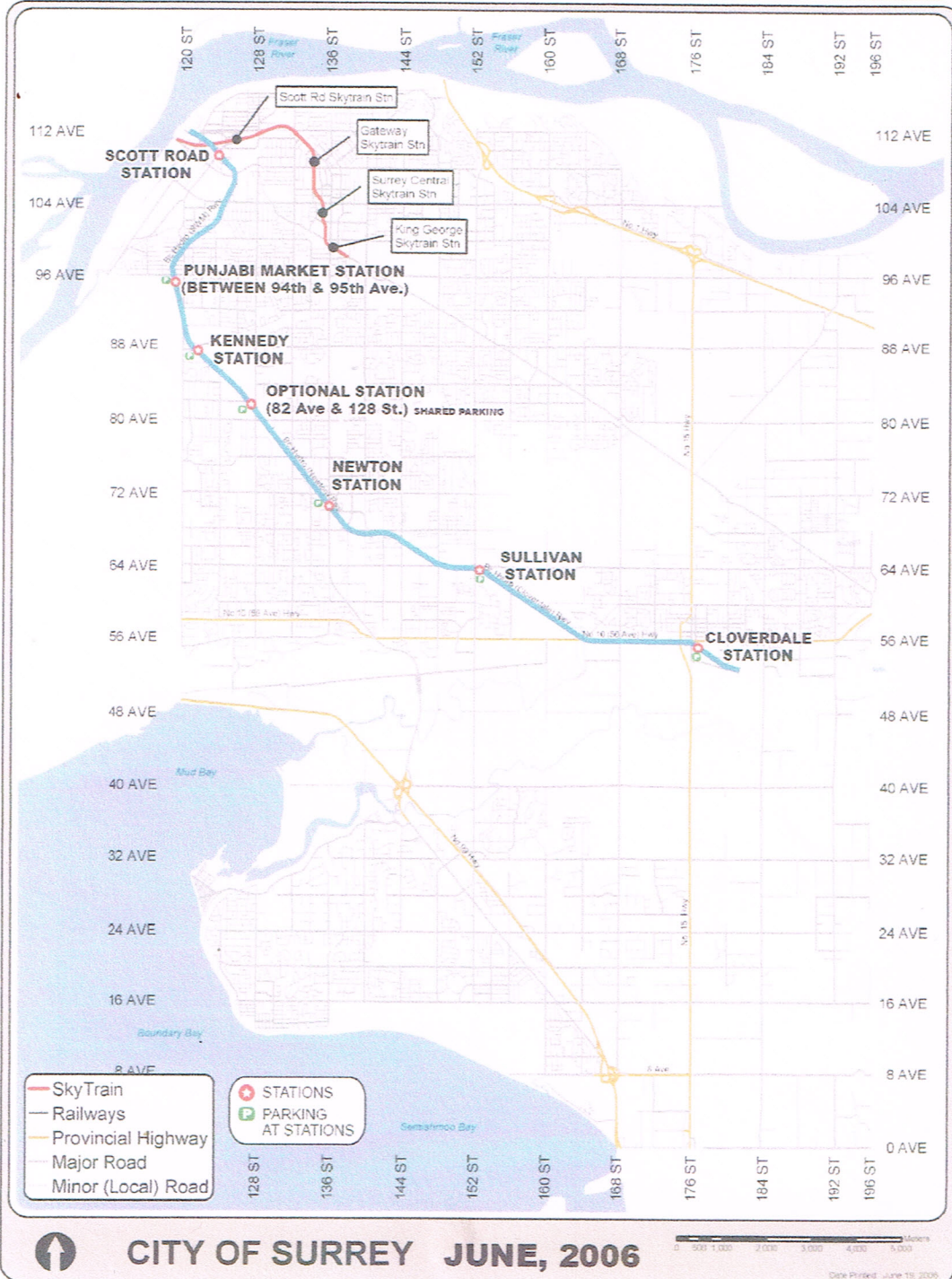


**FIGURE 1 COMMUNITY RAIL PROPOSAL**



The data provided is compiled from various sources and is not warranted as to its accuracy or sufficiency by the City of Surrey. This information is provided for information and advisory purposes only. All users' legal obligations and circumstances must be confirmed at the Land Use Office. Source: © MAPPROG'S Map/City of Surrey, B. Lambert 2004

Figure 2: (scan) – Potential Spur Line Connection between Scott Road Community Rail Station and Scott Road SkyTrain Station

Figure 2-(Scan)-Potential Spur Line Connection between Scott Road Community Rail Station and Scott Road SkyTrain Station



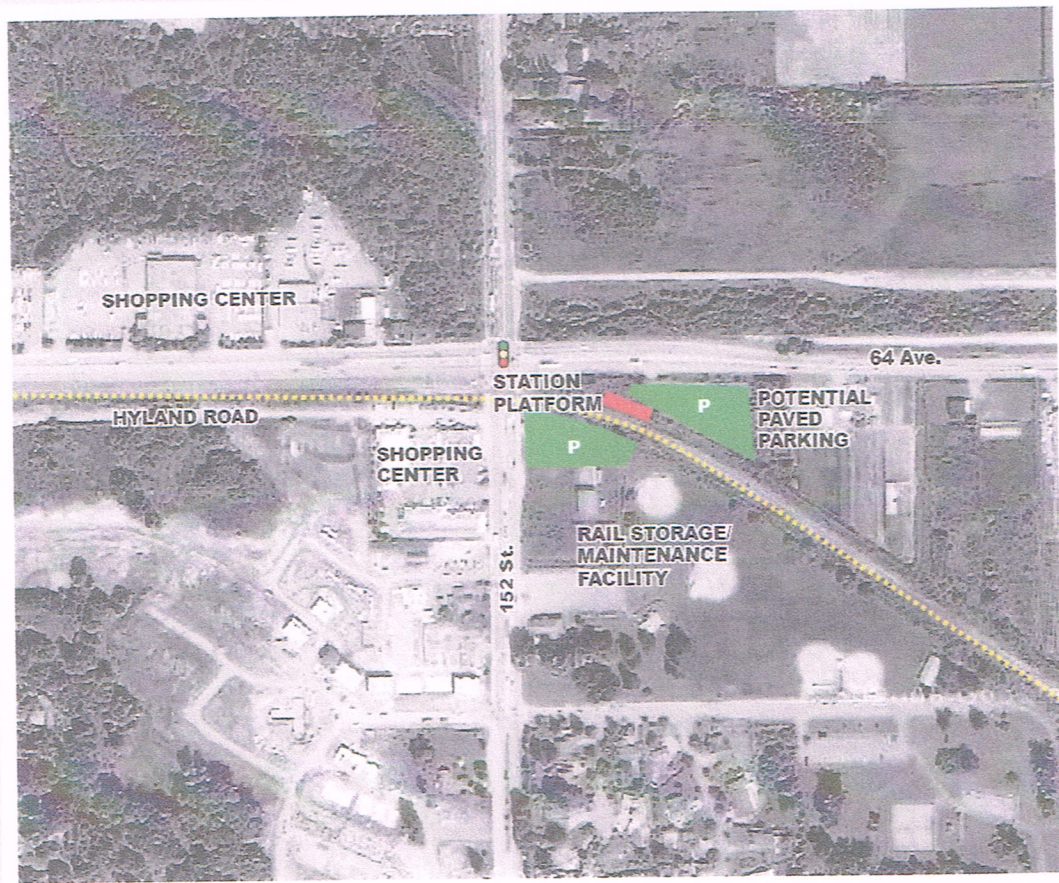
# FIGURE 3

## PROPOSED CLOVERDALE COMMUNITY RAIL STATION



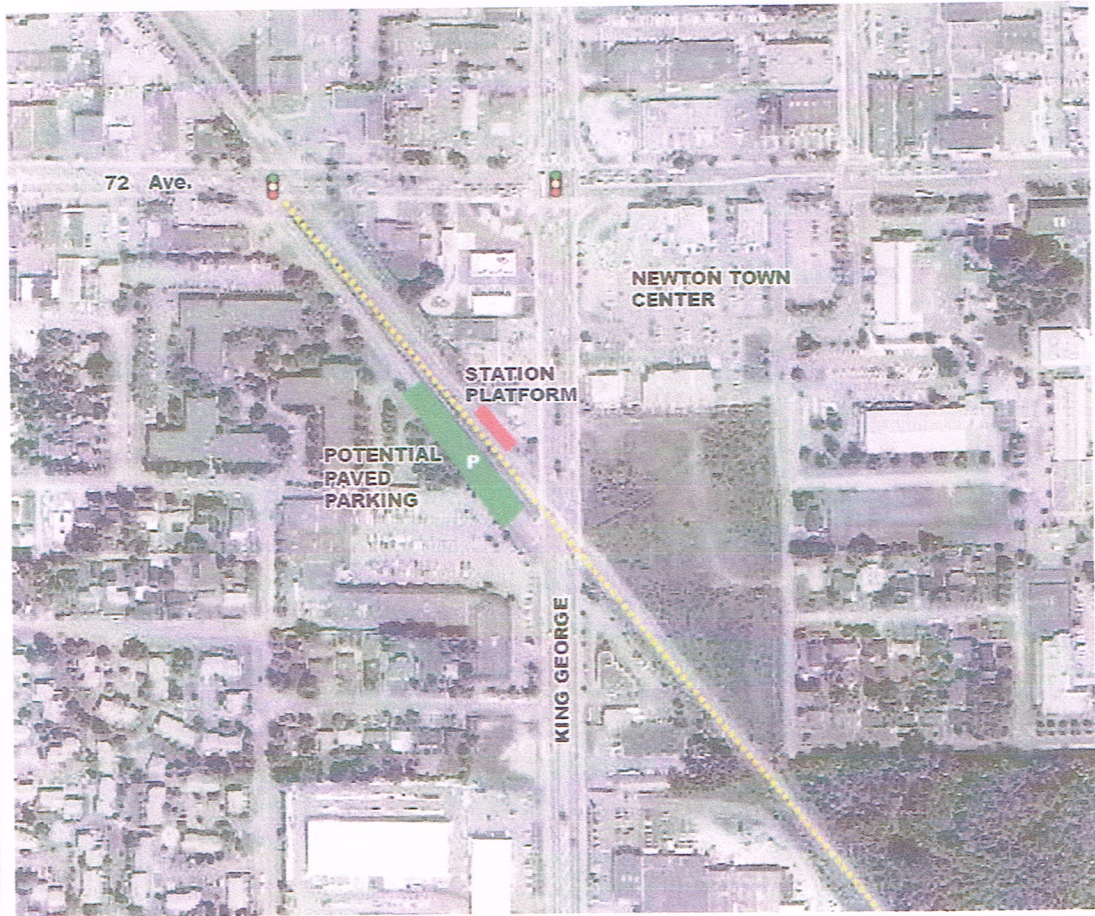
# FIGURE 4

## PROPOSED SULLIVAN COMMUNITY RAIL STATION



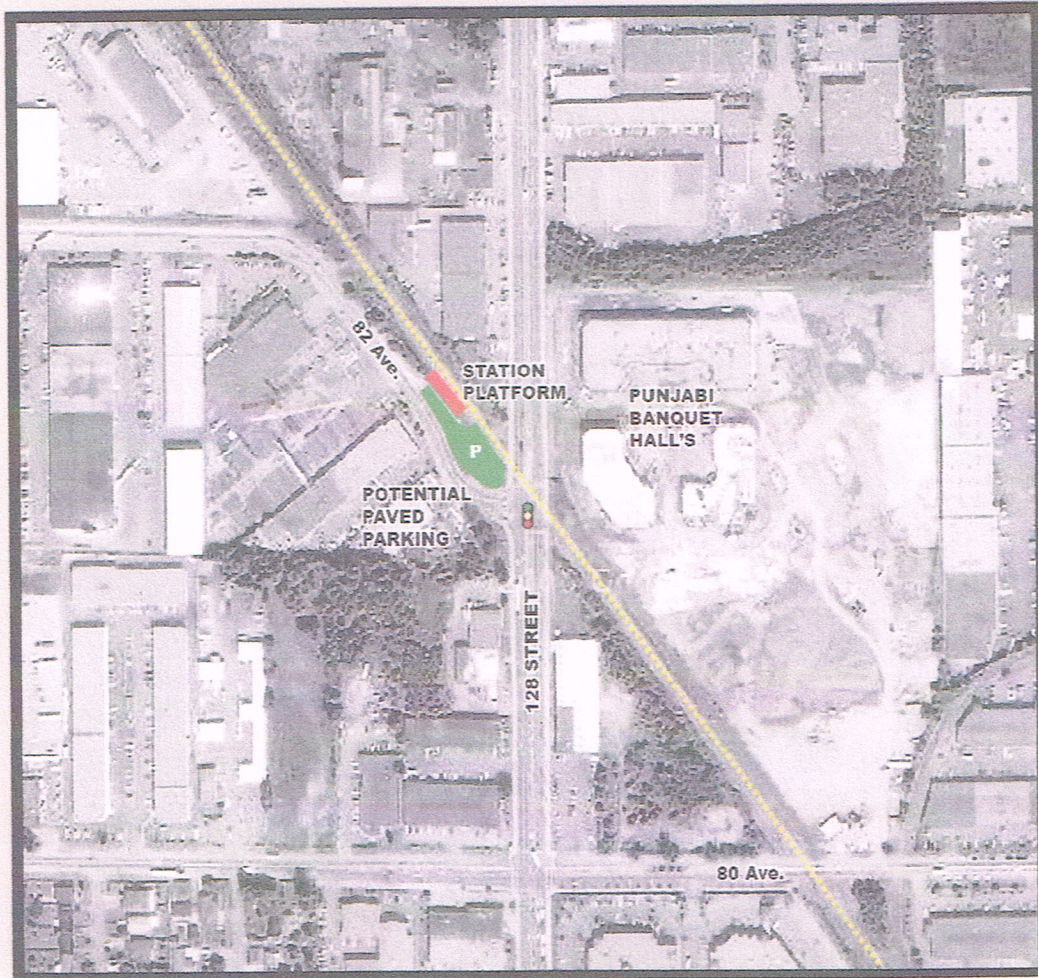
# FIGURE 5

## PROPOSED NEWTON COMMUNITY RAIL STATION



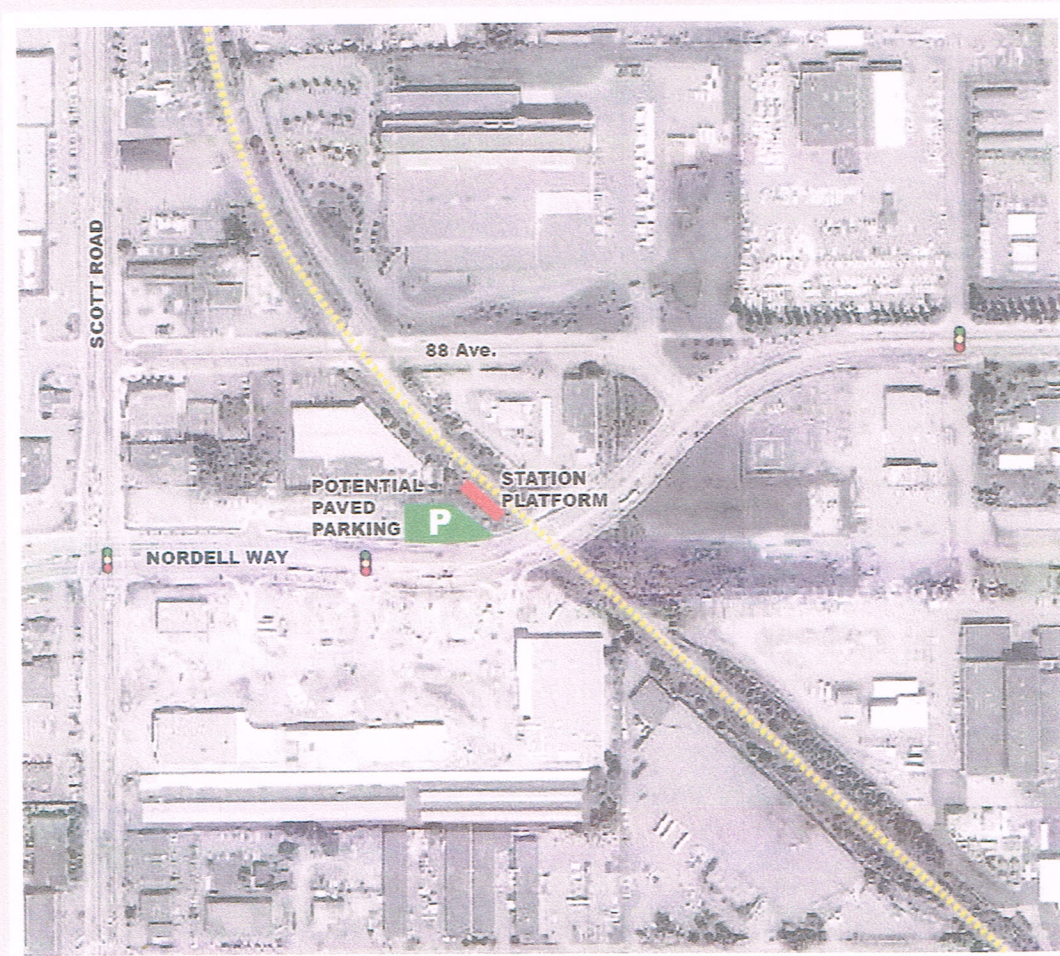
# FIGURE 6

## POTENTIAL COMMUNITY RAIL OPTIONAL STATION (82nd Avenue & 128th Street)



# FIGURE 7

## PROPOSED KENNEDY COMMUNITY RAIL STATION



# FIGURE 8

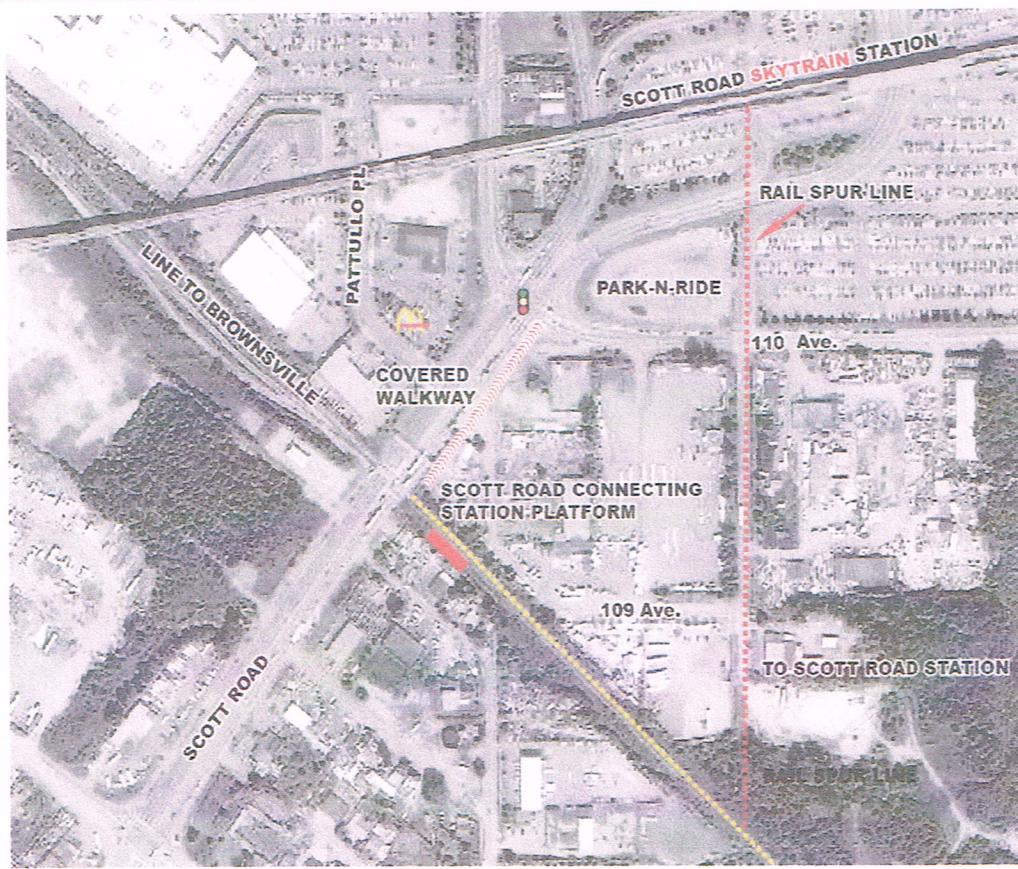
## PROPOSED PUNJABI MARKET COMMUNITY RAIL STATION





# FIGURE 9

## PROPOSED SCOTT ROAD COMMUNITY RAIL STATION



**Appendix A**  
**Background Information**

**1906 relevant excerpts from Surrey Tram Power and Light Bylaw which provide the City of Surrey with control of the road/rail crossings on the interurban rail corridor**

<p>SURREY TRAM POWER AND LIGHT BY-LAW 1906</p>	<p>1906</p>	<ul style="list-style-type: none"> <li>• Agreement between Vancouver Power Company Limited (VPCL) &amp; District of Surrey. -TWL</li> <li>• Required assent of the electors. (Bylaw s3)</li> <li>• Repealed an earlier Bylaw. (Bylaw s5)</li> <li>• Grants VPCL right to build a passenger and freight railway through Surrey connecting New Westminster and Chilliwack. (Agreement s.1)</li> <li>• VPCL has right to build and operate system on public roads but may not occupy more than 24 feet in width without a resolution of Council. (Agreement s.2a) <i>(May affect double tracking. -TWL)</i></li> <li>• The operation of the "said electric tramway" will not unnecessarily interfere with or impede the public right of traveling on public highways nor in any way obstruct or interfere with free access to any buildings or premises. (Agreement s.2c) <i>(Does the current operation "unnecessarily interfere with or impede the public right of traveling"? -TWL)</i></li> <li>• Where so required by a resolution of Council, VPCL shall leave a roadbed clear of the "tram rails" available for vehicular traffic as wide and as convenient as existed prior to the construction of the tram line (Agreement s.2d) <i>(Where the "tram rails" cross a municipal road, does this mean that Council can pass a resolution that a "roadbed" as wide as it was in 1906 be provided by the successor to VPCL? Would such an unencumbered "road bed" involve a grade separation? And if not, what would it be? -TWL)</i></li> <li>• VPCL can charge certain fares and "in no other way whatsoever" discriminate against the District of Surrey or any of its residents thereof in the carrying on of its business. (Agreement s.4)</li> <li>• The Company shall run at least one passenger train each way each day (Agreement s.5) <i>(The revocation of passenger service, in accordance with this section required extensive negotiation and payments to the District and its sister communities. The Agreement itself stayed in place and has been identified by the Canadian Transportation Agency as the sole instrument by which the successor of VPCL can confer the right to operate to other rail companies. -TWL)</i></li> <li>• The District will allow no other "Electric Railway" to be built or operated along any public highway occupied by VPCL for 99 years from date of this agreement. (Agreement s.8) <i>(Means the District can grant rights to other "Electric Railways" to use those portions of the rail Right of Way which are on public roads after 2005. -TWL)</i></li> <li>• VPCL vehicles are entitled to uninterrupted Right of Way along or across public highways. However all vehicles may travel across</li> </ul>
--	-------------	---

		<p>said tracks but shall "turn-out" at the approach of any (rail) car so as to leave the track clear for the passing of the (rail) car. (Agreement s.12) (<i>Trains have the right of way over road traffic. - TWL</i>)</p> <ul style="list-style-type: none"><li>• The agreement "enures" for the benefit of the successors and assigns of the District and the VPCL. (Agreement s.14) (<i>Applies to BC Hydro -TWL</i>)</li></ul>
--	--	---

## **City of Surrey Letter to TransLink, March 13, 2006 on Vision for South of Fraser Area Transit Plan**

March 13, 2006

Mr. Graeme Masterton  
Program Manager  
Transit Planning, Planning Division  
TransLink  
1500-4720 Kingsway (MetroTower II)  
Burnaby, BC V5H 4N2

### **Re: Comments on TransLink ATP Vision**

Dear Mr. Masterton:

Further to our letter on the Work Program, we want to highlight some of our perspectives on a transit vision for the City of Surrey.

We look forward to discussing the principles and perspectives on the City of Surrey vision for transit in more detail, as the work for the South of Fraser Area Transit Plan gets underway.

### ***Transit Vision for the City of Surrey***

#### **Overall Transit Strategy for the City of Surrey**

i) The City believes that the Transit Vision to be developed for Surrey as part of the ATP process should not be constrained by the current population, employment and densities in the City, nor the existing transit service and preliminary transit service plans which have been developed for the City of Surrey to date by TransLink. This would include preliminary work and staging completed to date on a King George Highway /104 Avenue bus rapid transit line, the initial bus service integration plans developed for the Canada Rapid Transit Line, and the previous plans and policies in the existing Three Year Plan and Ten Year Outlook. We would expect that these plans would be subject to update and possible change in the next year as part of the development of a new Three Year and Ten Year Outlook (i.e. Strategic Transportation Plan) by TransLink.

We see the South of Fraser Area Transit Plan visioning process as a real opportunity to re-think this previous work and its assumptions, and to provide input to the higher level plans.

ii) We believe that the fundamental principles of a transit vision developed for the City of Surrey and as a key input to the Best Use of Investment Policy Paper, should be that the transit service plan developed for Surrey will **“lead” rather than just “follow” the market, and will “influence and shape” land use patterns rather than just “support” land use.** We feel that it is this fundamental shift in terms of the level of transit service that is provided in the City of Surrey and other parts of the South of Fraser sector, that will be required to significantly increase transit as a common means of getting around Surrey and travelling from Surrey to other parts of the region. In other words, using transit for work and other trips in the City of Surrey has to be made a real and automatic choice by being very accessible, convenient, reliable and frequent.

This means that the City of Surrey will be seeking through this ATP process to gain the support and some commitment from TransLink for a significantly higher level of bus and rapid transit service than may be warranted and supported by a strictly investment and business case analysis based on future population, employment growth and density intensification.

iii) These principles are put forward in the recognition that the City and TransLink really want to fundamentally change Surrey from an area of low transit usage to a much higher transit mode share. This vision as well assumes that Surrey and TransLink also want to capture a much higher proportion of “choice” travellers as regular transit users, rather than just serving “captive” riders. To accomplish these objectives then the transit service provided in the City of Surrey will have to continue to expand and develop with improvements in the following areas:

- service frequency in all periods of the day
- service coverage in all parts of the city
- service reliability
- customer amenities (e.g. real time schedule information and improved shelters at many stops on main arterial routes)
- the introduction of a regional transit Smart Card
- greater availability of seats, during all time periods
- easier transit access via the provision of additional park-n-ride opportunities
- more comfortable and accessible buses
- the availability of a city-wide network of rapid transit services on main travel corridors

These levels of improvements are required in order to capture choice riders who have regular access to an automobile. These improvements could be committed to in a phased implementation program, but within a reasonable time period for the City of Surrey, in order to improve their affordability.

## **Transit Service Plans for the City of Surrey**

The City of Surrey vision for the South of Fraser Area Transit Plan includes examining, developing and implementing the following service concepts:

- i) Developing a comprehensive park-n-ride strategy for the South of Fraser area through the ATP process that provides the option for many more customers to access high frequency, limited stop transit services on major arterial and other corridors by auto rather than being forced to use a connecting 40 foot or community shuttle bus, and then transfer. As well, where possible, try to develop park-n-ride locations which jointly share parking facilities with other land uses, and where there is good security via excellent lighting, a high level of nearby pedestrian activity and bicycle patrols. Security is a key issue at existing Skytrain stations/parking lots.
- ii) Providing direct bus services to all Surrey Town Centres for the majority of Surrey residents without having to transfer between buses.
- iii) Providing on all major arterial roadways bus services which are high frequency ideally in extended peak periods (5.30 to 9.30 a.m. and 3.30 to 7.30 pm), with enhancements to service frequency through the day, and in the evening.
- iv) The City would wish to confirm its support of TransLink's 2012 timeline for the implementation of bus rapid transit services on King George Highway and 104 Avenue as well as the examination and implementation of an expanded BRT system including:
- between Scott Road and Guildford,
  - Scott Road between 72 Avenue and 104 Avenue,
  - Fraser Highway between 200 Street and King George Highway.
- v) Guaranteeing seats on all express bus services which access the SkyTrain or Canada Line rapid transit stations.
- vi) Continuing negotiations for a U-Pass agreement for the Kwantlen University campuses with a view to implementation for the September, 2007 semester in order to achieve the significant mode share and ridership gains expected from such a U-Pass fare system. Establish direct new bus services from key centres to the Kwantlen campuses at the same time as the introduction of the U-Pass.
- vii) Ensuring that all urbanized areas of the City of Surrey have transit service coverage (i.e. fill in those areas which now have no service coverage), and these areas should have minimum agreed frequencies to ensure they provide an attractive and convenient alternative to the private car.
- viii) Re-examining the existing premise that all express bus services from South Surrey will have to connect to the Bridgeport Station on the Canada Line and require customers to transfer to the rapid transit line, and that there may be as well an option of taking an express bus service operating directly to downtown Vancouver, using the Highway 99 and Oak Street Bridge transit priority lanes, when the Canada Line opens in late 2009.

ix) Ensuring that all BRT bus services should have all door boarding and real time schedule information at major stops and customers will be able to use a TransLink Smart Card by late 2007/early 2008.

The City would also wish the SoFA TP process to explore:

i) Establishing express bus services operating between appropriate areas in the City of Surrey and the downtown and peninsula locations of the University of British Columbia, and between appropriate areas of the City of Surrey and the Surrey campus of Simon Fraser University.

ii) Implementation of an express bus service operated between South Surrey/White Rock Centre and the Langley Town Centre and Willowbrook Shopping Centre.

iii) Implementation of an express bus service between Surrey City Centre, Guildford and Coquitlam City Centre which has connections to the Evergreen LRT line when the expanded Port Mann Bridge is open, and/or transit priority access is available in both directions across the bridge.

iv) Enabling the work under the Gateway Program to be used as an opportunity to provide frequent and reliable bus or rapid transit services, with extensive transit priority measures, from the City of Surrey to appropriate destinations in the region.

## **Vehicles**

As part of Translink's vehicle replacement within SoFA TP, the City of Surrey would support the following vehicle issues being examined.

i) Any new Highway Express Coach buses providing a premium, quality ride experience and being fully accessible.

ii) New Community Shuttle vehicles being much more customer friendly in terms of seating, comfort of ride and accessibility.

I hope these comments and observations are of help in summarising some of our aspirations with respect to transit in the city, and that they contribute to the ATP visioning process by guiding the best use of investment decisions to follow.

Yours truly,

**Jaime Boan,  
Transportation Manager**



cc: Philip Bellefontaine, City of Surrey,  
Paul Ham, City of Surrey  
Vincent Lalonde, City of Surrey  
Brian Mills, TransLink

## Grade Crossing Regulations under the Railway Safety Act

### *Section 18 - Grade Crossing Warning Systems*

---

18.1 Grade crossing warning signals, gates, or cantilevered light units respectively shall have:

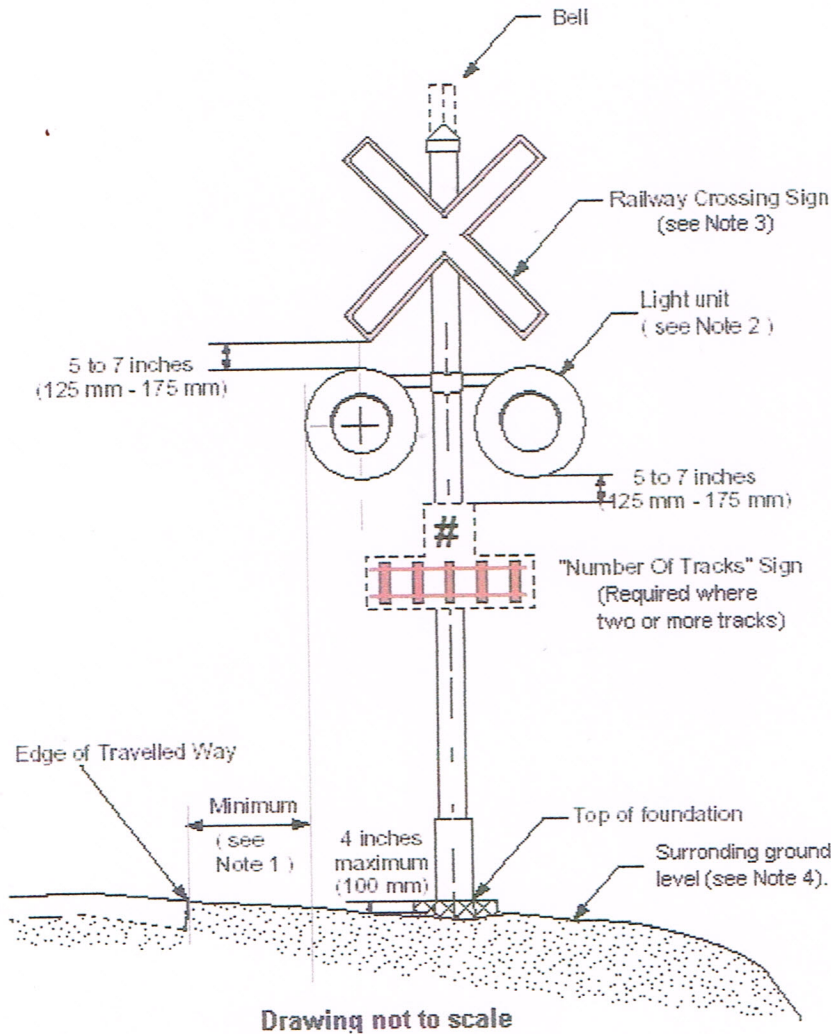
- a. warning signals assemblies in accordance with Figure 18-1;
- b. gates in accordance with Figure 18-2; and
- c. cantilevers in accordance with Figure 18-3.

18.2 Grade crossing warning system instrument housings shall be located:

(a) no closer than 9 m (30 ft.) from the travelled way of the road, and no closer than 8 m (26 ft.) from the nearest rail, unless restricted by the width of the railway right of way, rock cuts, high fills, or water, in which case, they shall be placed as far from the nearest rail as conditions allow; and

(b) on the side of the track to the outside of the curve where there is rail line curvature within the sightline limits, except that where topography such as rock or high fills or the width of the railway right of way prevents such a location, or interconnection of the grade crossing warning system with traffic signals, a Prepare to Stop at Railway Crossing Sign or other equipment of another railway company renders such a location impractical, the housing shall be located as close as possible to these limits.

**Figure 18-1: Warning Signal Assemblies**

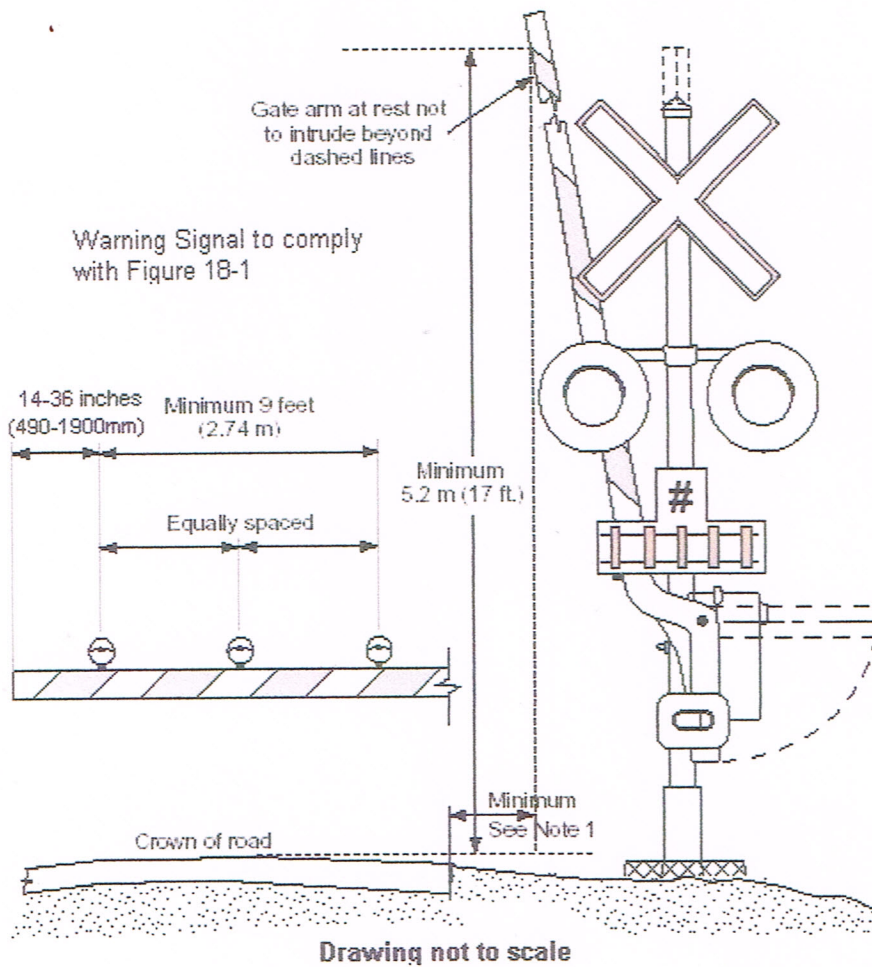


**NOTES:**

1. Minimum of 625 mm (2 ft) from the face of a curb; minimum of 625 mm (2 ft) from the outer edge of a shoulder and a minimum of 1.875 m (6ft) from the edge of the travelled way.
2. Additional light units on the warning signal may be required in accordance with sections 13 and 19.
3. The Railway Crossing Sign must be clearly visible to all approaching drivers.
4. The top of the warning signal foundation shall be not more than 100 mm (4 inches) above the level of the surrounding ground. The slope away from the foundation of the

surrounding ground towards the travelled portion of the road and the road shoulders shall not exceed the ratio of 4:1.

**Figure 18-2: Gates**



**NOTES:**

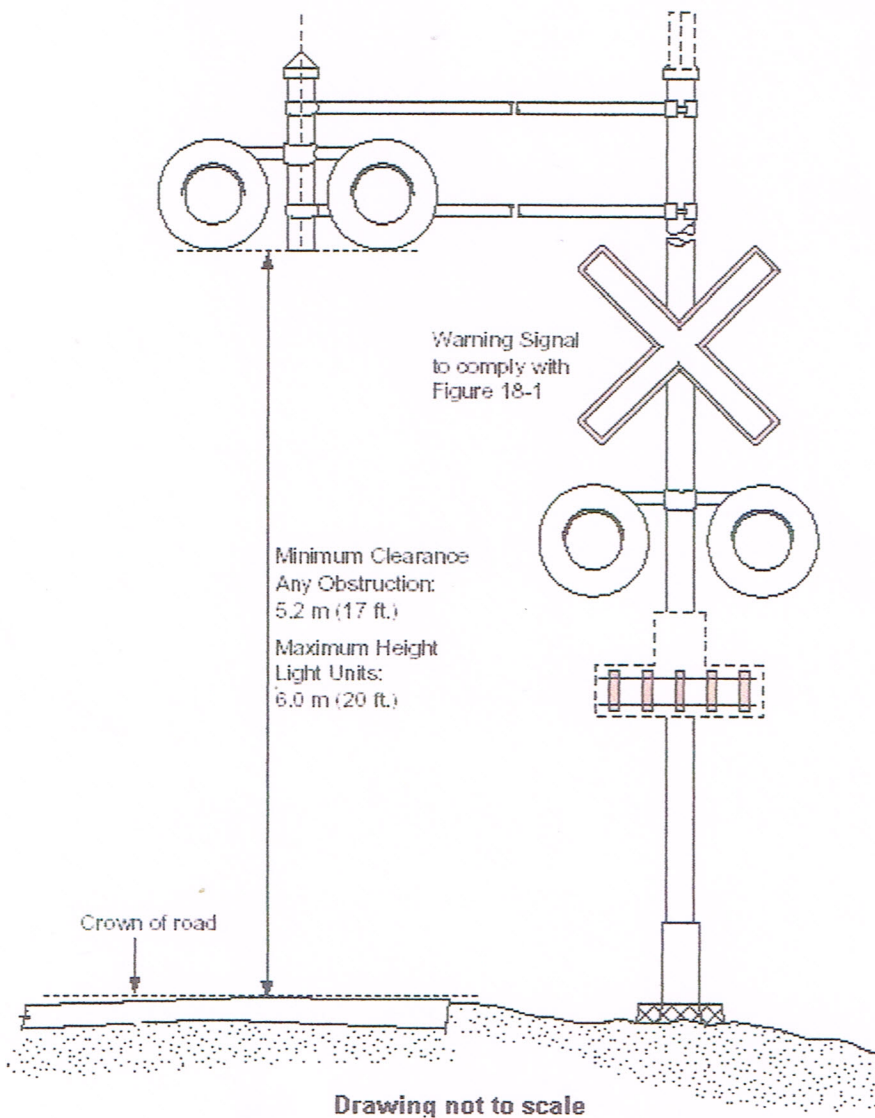
1. Minimum of 625 mm (2 ft.) from the face of a curb; minimum of 625 mm (2 ft.) from the outer edge of a shoulder and a minimum of 1.875 m (6 ft.) from the edge of the travelled way.

2. Gate arm reflective materials:

- a. Stripes shall be white and red and may be vertical or diagonal.
- b. Sheeting material specification: CGSB 62-GP-11M, Reflectivity Level 1, or better. Red stripes may be red sheeting or transparent red ink, silk screened processed over white sheeting; and

- c. Sheeting shall be replaced before the reflectivity falls below 50 per cent of the reflectivity value of Level 1 material specified in (b).
3. Where gates are installed for grade crossings exclusively for pedestrians, cyclists, or both:
- a. Each gate arm shall extend across the full width of the travelled way.
  - b. When the travelled way is less than 3.5 m (11.5 ft.) wide, two lights are required on each gate arm located so that the lights are over the two points dividing the travelled way into thirds. The two gate arm lights shall flash alternately.

**Figure 18-3: Cantilevers**



**NOTE:**

**Scan of BC Hydro Letter of March 29, 2006 giving the FVHRS approval in principle to operate interurban passenger service from Cloverdale Station to Brownsville Station**



Property Rights Management  
Corporate Substation

Direct Line: (604) 590-7094  
Fax: (604) 590-7681

29 March 2006  
File : 400-151.7(e)  
Assg : 9346  
Cct : 60L73/74; 60L07/08

Mr. Allen Aubert, MAISC  
Secretary  
Fraser Valley Heritage Railway Society  
1045 - 165<sup>th</sup> Street  
Surrey, B.C.  
V4A 9A2

Dear Mr. Aubert:

**RE : Proposed Fraser Valley Heritage Railway Society ("FVHRS") Interurban Operation on B.C. Hydro Owned Fraser Valley Corridor Lands**

Thank you for your letter of 24 February 2006 to Bruce MacFarlane. Mr. MacFarlane has asked me to circulate your request to our internal stakeholders and respond accordingly.

We understand your plans for operation of the interurban no longer involve a catenary system and that the units will be powered by a generator housed in a mobile unit (possibly a baggage car replica) towed by the interurban cars.

We further understand that the interurban will run from the Patullo/Bridgeview area to Cloverdale on tracks owned by Southern Railway of B.C. with five stops in between. Operations and tracks owned by Canadian Pacific Railway are not affected.

Based on our understanding of the information received, B.C. Hydro is pleased to offer consent, in principle, to the FVHRS for the proposed interurban operation under the following conditions:

- FVHRS must obtain the written consent of Southern Railway of B.C. and Terason Gas with respect to their installations and interests.
- FVHRS must obtain the consent of all regulatory or governing jurisdictions.
- FVHRS shall provide detailed location and design drawings of platforms and any installations associated with its stations located on B.C. Hydro lands. Drawings must show the location of property boundaries and the location of any B.C. Hydro poles, anchors and other works.

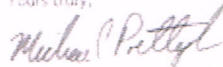
BC Hydro is a Crown Corporation of British Columbia. For more information, visit us at [www.bchydro.com](http://www.bchydro.com).

- FVHRS must provide a detailed plan of operations for the interurban including information on frequency, crowd & passenger control, staff & customer parking, waiting areas etc. which are located on B.C. Hydro lands.
- B.C. Hydro will retain the right and ability to have continued access to its works and installations at any time for maintenance and/or new construction and to disrupt, halt or terminate the operations and activities of the FVHRS if required.
- B.C. Hydro will retain the right and ability to grant rights to third parties for other activities and installations in the future.
- FVHRS will fully indemnify and release B.C. Hydro from all costs and liabilities and will carry adequate insurance specifically naming B.C. Hydro as an insured party.
- FVHRS will enter into an agreement, satisfactory to B.C. Hydro, which will include the above terms and conditions plus any others that B.C. Hydro deems necessary and appropriate.
- Copies of written consents from Southern Railway of B.C., Terasen Gas and any other governing or regulatory jurisdictions must be presented to B.C. Hydro prior to the formal grant of rights by B.C. Hydro and prior to any activities taking place on B.C. Hydro owned lands.

If the above are acceptable, please advise us accordingly and proceed to obtain the consents from Southern Railway of B.C. and Terasen. Once we receive the necessary written consents, I will instruct our solicitors to draft an Agreement for signature by FVHRS.

Please call if you have any questions.

Yours truly,



Michael Pettejohn  
Property Representative

- c. B. MacFarlane
- D. Walsh
- B. Kilvert/L. Hayward
- N. Dharamshi
- D. Dunne/G. Holisko, BCTC

Scan of February 2, 2001 Letter from Southern Railway Company on Role in Interurban  
Tourism/Heritage Service to City of Surrey Councillor Higginbotham





SOUTHERN RAILWAY  
OF BRITISH COLUMBIA LIMITED  
2122 RIVER DRIVE  
NEW WESTMINSTER, B.C.  
V3M 8S2  
(604) 521-1996  
(604) 525-2914 FAX

2 February 2001

Mrs. Judith E. Higginbotham  
Councillor  
City of Surrey  
14245 -- 56th Avenue  
Surrey, B. C. V3X 3A2

Dear Mrs. Higginbotham;

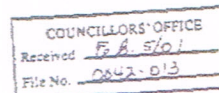
Re: Fraser Valley Heritage Railway

The revitalization of the Interurbans is an exciting and very ambitious undertaking by a very dedicated group of people.

As promised we have reviewed different ways Southern Railway of British Columbia Limited (SRY) could participate in this exciting venture. SRY as a freight railway has a commitment to our customers to provide quality, timely service at competitive rates. SRY can not compromise the integrity of this commitment to our customers nor incur any additional costs. In other words we can not guarantee track time but will undertake to be as consistent as our freight operation will allow. If new freight business is contracted that conflicts with the tourist interurban operation, the freight operation must take precedent.

SRY recognizes the importance to the City of Surrey the revitalization of the Interurban for tourism and wishes to be cooperative in this venture. SRY is prepared to provide it's service on a cost basis for a non profit tourist only operation. If the system is to be operated as commuter rail, the conditions of operation, if agreed to in the future, will have to be negotiated on a commercial basis. Please be advised that this letter in no way commits SRY to future commuter rail.

As we have discussed in the past SRY is very concerned with the safety and liability of the proposed operation of the tourist interurban. These two issues must be addressed to the satisfaction of SRY and all government regulatory agencies. We recommend when the Fraser Valley Heritage Railway Society is in place that meetings take place to develop a thorough understanding of the requirements of operating a tourist railway on an operating freight railway.



A Westington Company

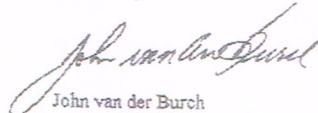
Mrs. Higginbotham  
page 2  
30 January 2001

Further to the discussion on SRY's membership to the society, I believe our membership would be, or could be perceived, as a conflict of interest. Because of this, we must decline the opportunity to become a member in the society. As a tourist railway is a dramatic departure from freight operations our Board of Director's approval will be required for any final agreement to allow passenger operation on SRY.

Before the Interurban project is to proceed much further, I believe it is important that a business plan be developed. With an appropriate business plan, it will ease the approval process and assist in raising the necessary capital. In addition it should state the expected participation of each level of government, government agencies, public and private corporations, business, contributors and society members.

I hope the above will be of some assistance to you in planning and implementation of your vision of Interurban Tourist Railway. Please call if you have any questions or if I can be of any further assistance to you.

Yours truly



John van der Burch  
President

cc: Bill Brodsky  
Don McGregor.

**Appendix B**  
**Potential Vehicles for Future Peak Period Service**

## Parry People Movers Ltd

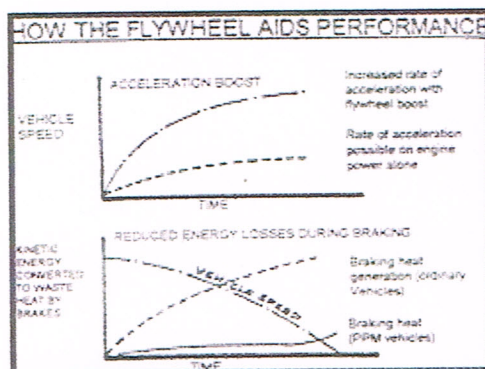
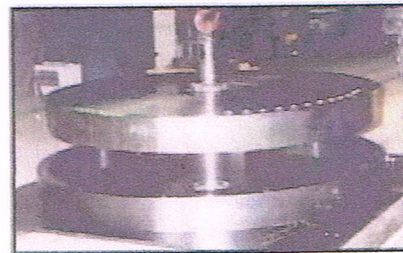
Parry People Movers Ltd., located in Great Britain produces light trams and streetcars for town systems, and light railcars and semi-metro for longer routes, are comprehensively tested and vetted. Their vehicles provide all of the environmental and user benefits of electrified tramways and suburban railways without the excessive vehicle weight and high cost of full system electrification.

All PPM vehicles use flywheel energy storage giving regenerative braking and high energy efficiency (see below). Options available include variable passenger capacity, passenger access height, track gauge, external appearance and power source.

The Parry People Mover PPM light rail car is currently being used to operate by Pre Metro Operations to run a Sunday service between Stourbridge Junction and Stourbridge Town in Great Britain, while engineering work is being undertaken on the Central Trains' Birmingham-Stourbridge Junction-Worcester route.

## PPM Technology

PPM technology rests on a simple but effective engineering device: the flywheel. The rotating flywheel is a store of kinetic energy that is used to power the vehicle. A typical PPM flywheel is made from steel laminates, 1m in diameter and 500kg mass, rotating at a maximum speed of 2,500rpm - simple, reliable and easily maintainable.



The flywheel allows the direct capture of brake energy (when slowing down or descending gradients) and its re-use for acceleration. Since the short-term power demand for acceleration is provided by the energy stored in the flywheel, there is no need a large engine or heavy-duty electrical supply along the whole length of the route.

The PPM concept allows maximum variability in the way the flywheel is 'charged':

- For zero emission operation with closely-spaced stops, the flywheel can be charged (in approx. 30 seconds) from an intermittent electrical supply at the stations only. The flywheel stores sufficient energy for the vehicle to reach the next stop in normal operation, and a battery is also provided for emergency use.
- For low-emission, high fuel efficiency and quiet self-powered operation, an on board LPG-fuelled automotive engine is used.

- Alternative possibilities include diesel- or hydrogen-fuelled internal combustion engines, or hydrogen fuel cells, while the intermittent electric version can be powered from solar cells or other renewable sources of electricity.

PPM Technology Allows:

- A two-litre engine to transport fifty passengers.
- Zero-emission street tramways without any electrification.
- Variable vehicle size, boarding height, power source, appearance, interior layout...

Specifications of 2 types of vehicles that the produce that may be viable for the Surrey Community Rail Proposal include the following:

### ***PPM 50 Specifications***

**Dimensions:**

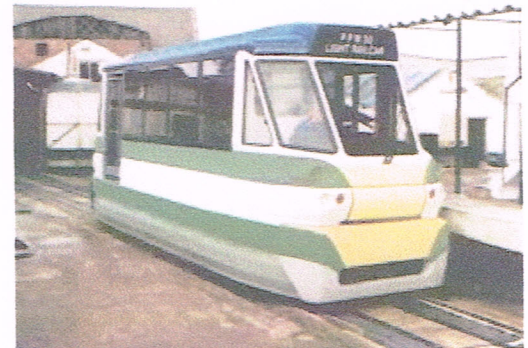
8.7m long  
2.4m wide  
3.2m high

**Floor Height:**

Low 0.45m  
High 0.95m

**Tare (weight):**

9.1 tonnes



[Click for printable specification](#)  
(.pdf format 327KB)

**Seating:**

20 without wheelchair  
18 with wheelchair  
1 wheelchair position  
30 standing passengers (total 50 passengers)

**Primary Drive Line:**

Ford Focus 2L. LPG  
1x 12v battery for LPG unit  
Through Newage marine gearbox-Tandler bevel box and 4 'V' belt drive to flywheel  
2x 12v battery supply for ancillary power  
2 LPG bottles with electric change over  
Alternative fuel tank with track side supply point optional

**Flywheel & Energy Store:**

500kg 1m diam normal effective speed range 1000-2600 rpm

**Transmission:**

Linde hydrostatics through spiral bevel gearbox single axle drive  
Second drive axle optional extra

**Braking:**

Normal braking through transmission (i.e. regenerative) 1m/s<sup>2</sup> (2.3mph/sec)  
Emergency braking through sprung on, air off discs at 3m/s<sup>2</sup> with normal adhesion  
(Tread and or track brakes available if required)  
Air operated sanding gear to the driven wheels

**Running Gear:**

Solid axle with wheels 610mm diam to tram or railway profiles to suit application  
Suspension is of chevron type with coil spring optional

**Heating:**

2x Water heated air blown

**Speed:**

15-40mph through normal operating range of flywheel

**Curves:**

15m-radius minimum for standard gauge, smaller radii possible with narrow gauge vehicle

## *PPM 80 Specifications*

**Dimensions:**

13.7m long  
2.4m wide  
3.4m high

**Boarding Height:**

Minimum 0.3m  
Maximum 0.95m

**Weight (tare):**

14 tonnes

**Seating:**

Up to 41 (depending on customer specification)  
1 wheelchair position  
Maximum capacity 80 (including standing passengers)

**Primary Drive Line:**

Two powered bogies each featuring  
- Ford 2 litre LPG engine  
- 1 x 12V battery for LPG unit  
- Transmission through Newage marine gearbox, Tandler bevel box and 4 'V' belt drive to



[Click for printable specification](#)  
(.pdf format 379KB)

flywheel

- 2 x 12V battery supply for ancillary power
- 2 LPG bottles with electric change-over

Alternatives

- fuel tank
- track side intermittent electrical supply point
- green diesel or hydrogen fuel

**Flywheel & Energy Store:**

2x 500kg 1m dia

Normal effective speed range 1000-2600rpm

**Transmission:**

Linde hydrostatics through spiral bevel gearbox, all axle drive

**Braking:**

Normal braking through transmission (i.e. regenerative) 1m/s<sup>2</sup>

Emergency braking through sprung on, air off discs at 3m/s<sup>2</sup> with normal adhesion

Tread and/or track brakes available if required

Air operated sanding gear

**Running Gear:**

Solid axle with wheels 610mm dia to tram or railway profiles to suit application

Primary suspension of chevron type (coil spring optional)

**Heating:**

4 x Water heated air blown

Separate cab heating and ventilation

**Maximum Speed:**

80km/h (50mph)

**Curves:**

20m radius minimum

Ottawa O-Trains

Commuters in the City of Ottawa can travel the O-Train's light rail route in three state-of-the-art Talent BR643 trains, made by Bombardier. The powered front and back units allow the train to travel in either direction without having to turn around. Each Talent train is made up of three cars that will accommodate 135 seated and 150 standing passengers, for a 285 total. The low-floor design of the cars ensures easy access for everyone as well as a quiet comfortable ride.

The LRT route has 5 stations and uses the double tracked CN trains CPR Ellwood Line-Greenboro to Bayview. The trains operate every 15 minutes taking 12 minutes to travel the route. The vehicles seat 135 passengers and 150 standing, are 48 metres long, 2.8 metres wide, weight 72,000 kilograms and have a top speed of 120 km/hr. Ridership is

approximately 6400 rider daily. They are priced at \$17.6 million for 3 vehicles in Ottawa. (\$5.85 million each)/

These vehicles are powered by diesel engines in Ottawa could be powered with hydrogen fuel engines.

Ottawa O-Train



A comfortable and spacious seating arrangement inside the Bombardier Train Set



### **East Japan Railway Fuel Cell Hybrid Railcar**

Japan's biggest rail company will soon test using fuel cells to help power a train, following the lead of automakers in rolling out cleaner, more efficient transportation.



*In this illustration released by Tokyo-based East Japan Railways Co., Friday, April 14, 2006, the NE Train, or New Energy Train, that the Japan's biggest rail company will*



*soon test is shown. East Japan Railways plans to start test runs of the NE train, claimed to be the world's first fuel cell-powered train, in July, 2006 with the aim of operating it on regular tracks by the middle of next year. The initial train will consist of a single car powered by electric batteries and capable of traveling at up to 100 kph (62 mph). A diesel-run generator will provide most of the electricity, with two 65-kilowatt hydrogen fuel cells chipping in about a third. (AP Photo/East Japan Railways Co., HO)*

East Japan Railways Co., which serves the congested Tokyo area and carries 16 million passengers a day, will start test runs of the NE Train, or New Energy Train, in July with the aim of operating it on regular tracks by the middle of next year.

The initial train will consist of a single car powered by electric batteries and capable of traveling at up to 62 miles per hour. A diesel-run generator will provide most of the electricity, with two 65-kilowatt hydrogen fuel cells chipping in about a third.

It is estimated that the NE Train will consume about 20 percent less energy than traditional trains. The company has cut overall energy consumption by 13 percent since 1990, despite rising traffic volumes. The NE Train's fuel efficiency will be aided by batteries that recharge every time the train brakes.

JR East's new trains are envisioned for use in remote areas where there are no overhead power lines. They could replace older battery-driven trains, or those running solely on diesel.

## **Development of the World's First Fuel Cell Hybrid Railcar**

East Japan Railway Company has researched and developed a fuel cell system for railcars as an independent type motive power system that reduces the burden on the global environment and can also overcome the problem of exhaustion of fossil fuels. Based on these results, the company is proceeding with development of the world's first fuel cell hybrid railcar.

This fuel cell hybrid railcar will be realized by modifying the New Energy train (NE train) used for development of a diesel engine-based hybrid system. Testing is scheduled to start from July 2006, and various tests will be performed to confirm the fuel cell performance, environmental burden reduction effects, hydrogen supply system and other aspects. Development of railcar system technology that uses fuel cells is also being promoted to utilize future breakthroughs in fuel cell technology.

### **1. Aim of fuel cell system development**

Fuel cells that use hydrogen as fuel make it possible to:

- Further reduce the burden on the environment.
- Provide new motive power systems that overcome the problem of exhaustion of fossil fuels.

### **2. In addition, the generation of power using fuel cells mounted on each railcar can also be expected to reduce the scale of wayside facilities and improve railway appearance.**

### **3. Goals of this development**

In order to realize a fuel cell system capable of providing the above effects, the development for this fiscal

year aims to:

- Develop railcar system technology using fuel cells that can utilize future breakthroughs in fuel cell technology.
- Understand issues when using fuel cell systems with railways.

For this purpose, JR East is promoting development of the following test railcar.

#### 4. Development outline

##### (1) Test railcar configuration

The engine and generator of the current NE train will be replaced with fuel cells. The control system will be a hybrid system that uses a combination of the fuel cells and the energy from storage batteries to drive the motors.

##### (2) Fuel cell specifications

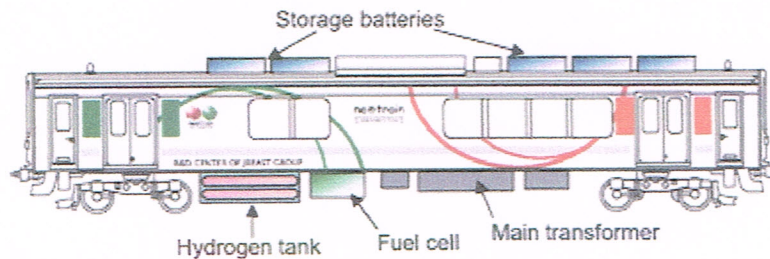
The test railcar will be equipped with solid polymer type fuel cells that use hydrogen as fuel.

Fuel cells with high power output and high reliability that can support a railcar system have been selected, and two 65 kW output fuel cells will be mounted on the test railcar.

##### (3) Railcar outline, main features and schedule

#### 1. Fuel cell hybrid railcar

This development is a modification of the NE train. From the beginning of its development, the NE train has been designed for modification to a fuel cell railcar. Now that prospects have been reached for practical application of a diesel hybrid system, development of a fuel cell railcar is the next step. The figure below shows an image of the railcar.



#### 2. Fuel cell hybrid railcar

The test railcar uses the NE train car body and running equipment as is, and aims for performance equivalent to the current NE train.



NE train

##### Main features of the test railcar

Railcar	Single-car configuration
Railcar dimensions (L x W x H)	20,000 x 2,800 x 4,052 mm
Maximum speed	100 km/h
Main motor type and output	Induction motor, 95 kW x 2 units
Fuel cell type and output	Solid polymer type, 65 kW x 2 units
Storage battery type and capacity	Lithium-ion type, 19 kWh
Hydrogen tank capacity and pressure	Approximately 270 liters, 35 MPa (*)

\* Values when using a hydrogen tank of the type that can currently be used with railcars.

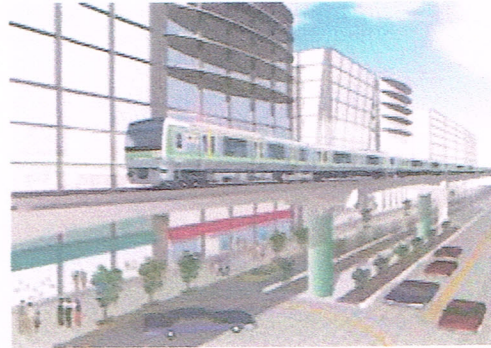
##### Schedule

- From July 2006: In-yard checking of basic performance  
Checking of safety

- From April 2007: Planned running tests on an actual service line

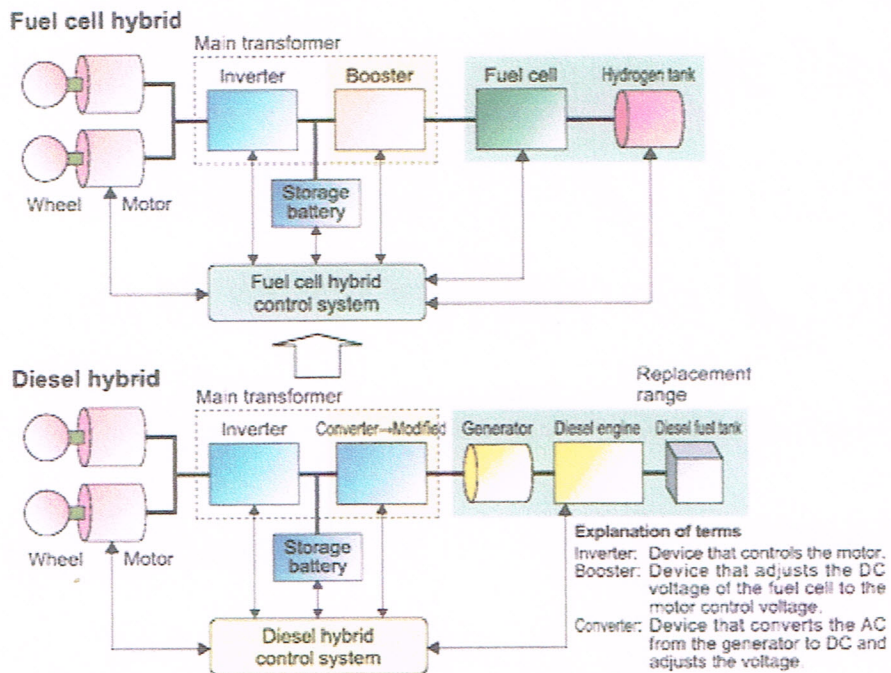
### 3. Image of a future railway that uses a fuel cell system

The future introduction of fuel cell railcars will make it possible to eliminate catenary facilities, allowing effective use of the space above tracks. In addition, it will also improve the railway's appearance.



### 4. Control system for fuel cell hybrid railcar

The control system for the fuel cell railcar is based on the diesel hybrid system, but replaces the diesel generator with a fuel cell. This efficient system supplies the necessary electric power from both the fuel cell and the storage battery when accelerating, and saves the electric power produced by the regenerative brakes in the storage battery when braking.



## 5. Fuel cell system

