

REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
MUNICIPALITÉ RÉGIONALE D'OTTAWA-CARLETON

REPORT
RAPPORT

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DATE	18 August 1998
TO/DEST.	Co-ordinator Transportation Committee
FROM/EXP.	Planning and Development Approvals Commissioner
SUBJECT/OBJET	LIGHT RAIL PILOT PROJECT: RECOMMENDED SERVICE CONCEPT AND COST ANALYSIS

DEPARTMENTAL RECOMMENDATIONS

That the Transportation Committee recommend Council approve:

- 1. The selection of the Canadian Pacific Railway Ellwood Subdivision, from the West Transitway at Bayview to the Southeast Transitway at Greenboro as shown in Annex C, as the preferred route for a light rail pilot project using diesel-powered low-floor light rail vehicles;**
- 2. Timely examination of possible light rail extensions that are not identified in the Official Plan and Transportation Master Plan (e.g., to downtown Hull, downtown Ottawa, Ottawa Macdonald-Cartier International Airport and Barrhaven) so that they may be implemented, if and when they are warranted, subject to availability of funds as well as Official Plan amendment and Environmental Assessment approvals;**
- 3. The negotiation with Canadian Pacific Railway and/or appropriate partners, for approval by Council, of a public-private partnership agreement for light rail pilot project implementation and operation, based on the principles contained in Annex D, with capital costs not exceeding a present value of \$16 million, and with annual operating costs not exceeding system-wide average operating costs for equivalent ridership levels;**
- 4. The *Light Rail Pilot Project Environmental Assessment Terms of Reference*, issued separately as Annex F and as modified by a supplemental Annex G (to be issued separately if required), to be submitted to the Ontario Ministry of the Environment for approval.**

INTRODUCTION

Policy Context of Rail Transit

The Transportation Master Plan approved by Council in July 1997, and the Official Plan adopted at the same time, both recommend the future use of several railway corridors in Ottawa-Carleton for public transit purposes. The introduction of rail transit services in these corridors is intended to help achieve the transit usage targets identified in the plans, and thereby reduce or defer the need for additional infrastructure such as new or widened roads. Annex A illustrates key elements of the Official Plan's transit schedule, showing the complementary relationship among the rail transit, Transitway and transit priority networks to be implemented by RMOC over the Official Plan horizon.

The rail transit corridors are intended to complement the Transitway network, rather than compete with it, and together the two modes will create a more comprehensive rapid transit system. Following are the two key elements of the rationale for use of existing rail lines for public transit purposes, as documented in the Transportation Master Plan background report, *Rapid Transit* (January 1997):

- *Access to key transit markets.* An examination of key transit markets determined that improved transit service to the post-secondary education and business park markets will be a prerequisite to achievement of transit modal share objectives. These markets (with the exception of the University of Ottawa and the Lees and Woodroffe campuses of Algonquin College) are not well served by the existing or future Transitway system, and their lower-density campus-style layouts are typically difficult to serve efficiently with regular bus routes. The railway corridors identified in Annex A provide excellent access to these target markets. Because the use of existing rail infrastructure would be less expensive than the construction of new road infrastructure within the corridors for use by buses, rail transit service was recommended as the preferred means of transit service within the corridors.
- *Transit by-pass of the Central Area.* Our continued ability to provide high-quality rapid transit service at-grade on the Central Area Transitway will require the diversion away from the Central Area of some transit trips which now pass through it. By providing new rapid transit linkages between the West, Southwest, Southeast and East Transitways, the rail corridors can serve as important by-passes to reduce the demand for transit travel through the Central Area.

Policy Context of a Pilot Project

The concept of implementing a pilot project as the first phase of a more comprehensive rail rapid transit system is identified in Section 9.4, Policy 24 of the Official Plan:

"Council shall introduce at minimum cost, a pilot project rapid transit service on a portion of the Rail Rapid Transit Corridor shown on Schedule E, Transit Network, by the turn of the century (i.e. by the year 2000). Based upon sufficient transit

ridership and acceptable cost-effectiveness, incrementally expand service over the remainder of the system shown on Schedule E."

With reference to such a pilot project, the Transportation Master Plan specifies in Section 2.4.5, Policy 2, "Council shall adopt diesel light rail technology for the rail transit service." This policy was based on the desire to achieve a high level of transit service, the desire to avoid the high costs of electrification, and the need for transit operations to share rail lines with freight or intercity passenger trains.

At its meeting of 28 January 1998, Council approved the following motion:

"Council direct staff to include in the 1998 and 1999 Operating and Capital Budgets to be presented to Committee and Council the necessary funds to permit the commencement of pilot light rail (considering the north south link) by 1 Dec 1999. Council further direct staff to prepare a report, after thorough consultation with the private sector, summarising the feasibility of the light rail pilot project, and to identify the preferred option, route, time frame and costs associated with this pilot project. The report to be submitted to Transportation Committee before 1 June 1998, enabling Council to make an informed decision on light rail and the option to commence a pilot project in 1999."

This report is submitted in response to the latter portion of this motion, and summarises the recommended service concept, implementation and cost-effectiveness analysis of the light rail pilot project.

KMPG and IBI Group, in a consortium with Dillon Consulting and Canarail, were also hired to provide expertise and analysis of the various technical aspects and the procurement process.

The Light Rail Pilot Project Steering Committee, established by Council on 25 February 1998, has been integrally involved in the development of the recommendations and rationale documented in this report. At its most recent meeting of 13 August 1998, the Steering Committee reviewed a draft version of this report and approved the recommendations.

Structure of this Report

The remainder of this report is set out with the following sections and sub-sections:

- Discussion of Alternatives
 - Identification of Route Alternatives
 - Identification of Vehicle Alternatives
 - Ridership Comparison of Route Alternatives
 - Capital Cost Comparison of Route Alternatives
 - Operating Cost Comparison of Route Alternatives
 - Cost-Effectiveness Comparison of Route Alternatives
- Discussion of Recommended Service Concept
 - Route

- Operations
 - Stations
 - Transit Service Integration
 - Safety
- Discussion of Pilot Project Implementation
 - Schedule
 - Public-Private Partnership Creation
 - Environmental Assessment
 - Operating Approvals
 - Discussion of Cost-Effectiveness
 - Comparable Capital Investment
 - Comparable Annual Operating Investment
 - Estimated Capital Costs of Pilot Project
 - Estimated Annual Operating Costs of Pilot Project
 - Conclusions
 - Consultation
 - Conformance with Official Plan and Transportation Master Plan
 - Financial Implications

DISCUSSION OF ALTERNATIVES

Identification of Route Alternatives

The work that has been directed by the Light Rail Pilot Project Steering Committee, beginning in March 1998, has considered a much wider range of pilot project service concepts than specified in the Official Plan and Transportation Master Plan. Annex B illustrates the railway corridors that have been examined in various combinations:

- As identified in the Official Plan:
 - the CPR tracks from Bayview to Greenboro;
 - the CPR and CN tracks from Bayview to Billings Bridge;
 - the CN tracks from Kanata to Greenboro, and from Greenboro to the Ottawa Train Station.
- As identified through consultation with industry and the general public:
 - a conceptual extension of the CPR tracks from Bayview to Hull;
 - a conceptual extension of the CPR tracks from Bayview to the Central Area;
 - a conceptual extension of the CPR tracks from Greenboro to the Ottawa Macdonald-Cartier International Airport;
 - the CN tracks from Barrhaven to the Ottawa Train Station.

It is worth noting that, where necessary, different types of rail transit service have been analyzed within different corridors. For example, on the CN corridor between Barrhaven and the Ottawa Train Station, the potential use of heavy rail vehicles was examined due to possible constraints on the use of light rail vehicles resulting from VIA Rail operations on that track.

Table 1 identifies the approximate length of each alternative route, the number of stations used to compare the projected ridership and cost of each alternative route, and the average speed and travel time expected for light rail operation on each alternative route (note that alternative B-2 assumes the use of Budd cars, as discussed in the next section).

Table 1: Alternative Routes Examined

Route	Route Length (km)	Number of Stations	Average Speed (km/h)*	Travel Time (min)*
CPR Line Alternatives				
CP-1: Bayview to Billings Bridge	6	6	40	9
CP-2: Bayview to Greenboro	8	7	40	11
CN Line Alternatives				
CN-1: Train to Greenboro	11	8	40	17
CN-2: Greenboro to Kanata	22	10	50	27
CN-3: Train to Kanata	33	17	45	44
Barrhaven Line Alternatives				
B-1: Barrhaven to Train	18	11	40	26
B-2: Barrhaven to Train (Budd cars)	18	5	40	26
Extension Alternatives				
CP-3: Downtown to Greenboro	10	9	35	18
CP-4: Bayview to Airport	12	8	45	16
CP-5: Hull to Greenboro	10	8	40	15
CP-6: Downtown to Airport	12	10	35	21
CP-7: Hull to Airport	12	9	40	18

* Time to serve passengers at stations is included in travel time and average speed

Identification of Vehicle Alternatives

Several diesel rail vehicles have been identified as potential technologies for the light rail pilot project. These include:

- the RegioSprinter manufactured by Siemens;
- the Talent manufactured by Bombardier;
- the GTW manufactured by ADtranz;
- refurbished Budd rail diesel cars, rebuilt by Alstom (formerly GEC-Alsthom) in their plant in Montreal.

The first three vehicles are modern, low-floor vehicles manufactured in Europe. The low-floor design provides easy boarding and unloading and complete accessibility for disabled persons. The main constraint of these vehicles is that they are designed to meet European crash and safety

standards and they do not meet North American standards, particularly for longitudinal strength. While none of them has been used in a permanent system in North America, an acceptable solution to regulatory safety constraints was found for the recent diesel light rail demonstration project in Calgary – namely, the use of the rail line by freight trains and light rail cars was segregated by time of day. In other words, freight trains were not allowed on the line during the hours of LRT service.

The Budd cars are manufactured to a North American standard, and could be refurbished to provide a more attractive and serviceable vehicle that is appropriate for longer-distance commuter rail service, as in Dallas. One drawback of these vehicles for use in an urban transit situation are their high floors -- to avoid requiring passengers with disabilities to climb stairs, either stations would need to be equipped with high platforms (which can complicate the safe passage of freight trains) or the vehicles themselves would require lifts and consequently longer stopped time at stations. Another drawback of Budd cars is that they require more time for passengers to load and unload than do low-floor vehicles with more doors. As well, they accelerate and decelerate more slowly -- consequently, round-trips would take longer and additional cars may be required to provide the same level of service. While the refurbished Budd cars would be considerably cheaper (from \$600,000 to \$1 million each), they have a lower capacity than the European vehicles, and their slower speeds would require more vehicles and sidings to provide comparable service. Preliminary indications suggest that refurbished Budd cars could be delivered by December 1999. The European light rail vehicles would require eighteen to twenty-four months for delivery, but a faster delivery may be negotiable.

In order to have the pilot project fully reflect the potential benefits of light rail service, it is recommended that the service be provided using European low-floor light rail cars. This is consistent with Council's direction as established in the Transportation Master Plan. However, as noted in the previous section, Budd cars may be the only practical approach to pilot project operation on the Barrhaven line since current safety regulations would not allow light rail vehicles to operate concurrently with VIA trains.

Table 2 identifies the capacity and approximate cost of the light rail vehicles that are suitable for the pilot project.

Table 2: Diesel Light Rail Vehicle Alternatives

Vehicle	Approximate Vehicle Capacity		Approximate Purchase Cost
	Seated	Total	
Siemens RegioSprinter	75	175	\$3 - 3.5 M
Bombardier Talent	80	200	\$3 - 3.5 M
ADtranz GTW	100	200	\$4 - 4.5 M

Ridership Comparison of Route Alternatives

In order to compare the route alternatives in terms of their potential contribution to improved public transit in Ottawa-Carleton, ridership estimates were developed for each. Reflecting the uncertainty involved in any single method of estimating future changes in travel behaviour, three

independent methods have been used to develop ranges of potential light rail pilot project ridership:

- A “direct demand” model, which is a technique often used to forecast ridership of longer-distance commuter rail services.
- The TRANS regional transportation model, managed by RMOC staff, was used in combination with transit travel data from the 1995 TRANS National Capital Origin-Destination Survey.
- A “modal share” model, which relies on the application of analogies and planning judgement to forecast transit use between various parts of the region.

Each method has strengths and weaknesses, but combined they can determine the likely range of demand on a given light rail route. The weekday peak hour and daily ridership estimates for each alternative are summarized in Table 3. In addition, long-range forecasts for the year 2021 are provided for the principal routes identified in the Official Plan.

Table 3: Summary of Weekday Ridership Estimates

Route	Service Frequency	Number of Vehicles*	Total Peak Hour Ridership	Daily New Riders	Daily Ridership (after one year)	2021 Daily Ridership
CPR Line Alternatives						
CP-1: Bayview to Billings Bridge	15 min	3	800 - 900	1,150	5,300 - 6,000	n.e.
CP-2: Bayview to Greenboro	15 min	3 - 4	850 - 1,100	1,250 - 1,400	5,800 - 7,300	14,500
CN Line Alternatives						
CN-1: Train to Greenboro	15 min	4	150 - 250	350 - 450	850 - 1,500	n.e.
CN-2: Greenboro to Kanata	30 min	3 - 4	200 - 400	750 - 1,250	1,500 - 2,500	n.e.
CN-3: Train to Kanata	30 min	5	450 - 550	1,450 - 1,700	3,100 - 3,700	15,900**
Barrhaven Line Alternatives						
B-1: Barrhaven to Train	15 min	5	300 - 550	800 - 1,350	2,100 - 3,900	n.e.
B-2: Barrhaven to Train (Budd cars)	15 min	5	300 - 350	750 - 900	1,500 - 2,300	n.e.
Extension Alternatives						
CP-3: Downtown to Greenboro	15 min	4 - 5	1,250 - 1,500	2,400 - 2,750	8,300 - 10,100	n.e.
CP-4: Bayview to Airport	15 min	4	***			
CP-5: Hull to Greenboro	15 min	4	1,050 - 1,250	1,900 - 1,950	7,000 - 8,300	n.e.
CP-6: Downtown to Airport	15 min	5	***			
CP-7: Hull to Airport	15 min	4 - 5	***			

* Vehicle numbers include a spare vehicle for service requirements

** 2021 forecast for the CN line assumes 15-minute service along the entire line

*** Estimates for Airport extensions not provided due to the uncertain potential role of light rail within the Airport’s overall access and parking management plan

n.e. No estimate made

As indicated in Table 3, the CPR route alternatives are expected to generate substantially more ridership than the CN or Barrhaven routes. A higher percentage of CPR riders are expected to be

existing transit users rather than new transit riders, however in absolute terms the new ridership on the CPR route compares well to the CN and Barrhaven alternatives.

While weekend ridership has not been estimated directly, it should be noted that the CPR corridor provides excellent service to Dow's Lake and the neighboring Dominion Arboretum and Experimental Farm. The additional ridership which may be generated by these significant tourism destinations, particularly for special events such as Winterlude and the Tulip Festival, would serve to offset lower summer ridership to and from Carleton University.

The long range forecasts show that the routes identified in the Official Plan each have the potential to serve substantially increased ridership as the region grows.

Capital Cost Comparison of Route Alternatives

Table 4 presents a comparison of approximate capital cost estimates for key pilot project elements (track and signal improvements, stations and vehicles) for the principal route alternatives as described in Table 1 and Table 3. It should be noted that there are other possible capital costs not shown in Table 4; some are excluded (e.g., land acquisition, structural rehabilitation) because insufficient time or information has been available to develop estimates for all alternatives, and others (e.g., maintenance facilities) because they are common to all alternatives.

Table 4: Comparison of Alternative Routes - Selected Capital Costs*

Route	Estimated Capital Cost		
	Tracks and Signals	Stations	Light Rail Vehicles**
CPR Line Alternatives			
CP-2: Bayview to Greenboro	\$3 - 5.5 M	\$4.5 - 8.5 M	\$3 - 8 M
CN Line Alternatives			
CN-1: Train to Greenboro	\$1.5 M	\$3.5 - 5 M	\$4 - 8 M
CN-2: Greenboro to Kanata	\$6 M	\$6 - 10.5 M	\$3 - 8 M
CN-3: Train to Kanata	\$7.5 M	\$9.5 - 15.5 M	\$5 - 10 M
Barrhaven Line Alternatives			
B-1: Barrhaven to Train	\$5 M	\$4 - 4.5 M	\$5 - 10 M

* Excludes costs for land acquisition, structural rehabilitation and maintenance facilities

** A five-year lease cost per vehicle of \$1 to 2 million is assumed; the actual value may be higher or lower depending on pilot project duration and vehicle specifications

The range of station costs shown in Table 4 addresses both "high-end" and "low-end" stations. The former may be described as being fully accessible, constructed with more durable materials, and providing levels of passenger comfort equivalent to Transitway stations. The latter may be described as not fully accessible, constructed with less durable materials, and providing lower levels of passenger comfort while not compromising safety and security.

It is emphasized that the estimates in Table 4 must be confirmed through negotiation after approval of the service concept. The recommended public-private partnership approach provides opportunities to share capital costs between RMOC and a private sector partner, or to have them

financed by a partner and distributed over the life of the assets. By negotiating an agreement that extends over the life of key assets, RMOC could minimize the initial capital requirement and achieve the lowest possible annual cost over the life of the agreement. At the same time, RMOC would retain the right to terminate the contract if the pilot project proved unsuccessful, although termination would carry a penalty in paying the unamortized and unrecoverable value of the assets.

Operating Cost Comparison of Route Alternatives

Table 5 presents a comparison of operating cost estimates for the alternative routes as described in Table 1 and Table 3. While these are based on preliminary estimates of unit costs and are therefore very approximate, the relative magnitudes of costs among route alternatives are reliable since they are directly proportional to the number of stations and vehicles and the length of track assumed for each route.

Cost elements included in these estimates are: vehicle operator salaries and benefits; dispatch services; vehicle fuel; vehicle and track maintenance; station maintenance, security and fare inspection; and OC Transpo marketing, customer relations, planning, management and administration. Ranges in operating costs, where shown, reflect flexibility or uncertainty in the number of vehicles required to service the route. It is emphasized that the estimates in Table 5 must be confirmed through negotiation after approval of the service concept.

Table 5: Comparison of Alternative Routes - Operating Costs

Route	Estimated Annual Operating Costs
CPR Line Alternatives	
CP-2: Bayview to Greenboro	\$3.1 - 3.6 M
CN Line Alternatives	
CN-1: Train to Greenboro	\$3.6 - 3.7 M
CN-2: Greenboro to Kanata	\$3.4 - 4.0 M
CN-3: Train to Kanata	\$5.1 - 5.2 M
Barrhaven Line Alternatives	
B-1: Barrhaven to Train	\$4.5 - 4.6 M

Cost-effectiveness Comparison of Route Alternatives

Table 6 compares the cost-effectiveness of alternative routes, as expressed by dividing the selected capital cost estimates in Table 4 and the annual operating cost estimates in Table 5 by the ridership estimates in Table 3. The qualifications made in previous sections regarding the cost and ridership estimates should be considered when reviewing Table 6.

Table 6: Comparison of Alternative Routes - Cost-Effectiveness

Route	Selected Capital Costs per Annual Passenger	Operating Cost per Passenger
CPR Line Alternatives		
CP-2: Bayview to Greenboro	\$4.80 - 12.65	\$1.40 - 2.05
CN Line Alternatives		
CN-1: Train to Greenboro	\$20.00 - 56.85	\$8.00 - 14.50
CN-2: Greenboro to Kanata	\$20.00 - 54.45	\$4.55 - 8.90
CN-3: Train to Kanata	\$19.80 - 35.50	\$4.60 - 5.60
Barrhaven Line Alternatives		
B-1: Barrhaven to Train	\$11.95 - 30.95	\$3.85 - 7.30

DISCUSSION OF RECOMMENDED SERVICE CONCEPT

This section discusses in greater detail the nature of, and rationale behind, the recommended pilot project on the CPR route.

Route

Annex C shows the CPR corridor, which is recommended as the preferred pilot project route based on consideration of the following objectives:

- To implement a route that is suitable as the first phase of a more comprehensive long-term rail transit network.
- To achieve a high ratio of ridership to cost (both capital and operating), with the opportunity to attract a significant number of new transit users.
- To maximize community support for the service.
- To minimize possible obstacles to frequent and reliable transit service.
- To confirm the attractiveness of light rail vehicles to Ottawa-Carleton transit users, and their suitability for the local climate.

On balance, the CPR presents greater potential to meet these objectives than do the other route alternatives, for the following reasons:

- The CPR route appears to be more cost-effective in terms of ridership per capital and operating dollar.
- Significant community support for the CPR corridor is evident. The CN Kanata-Train corridor would have much greater potential impact on nearby residents, since it is adjacent to many times the number of homes that are along the CPR corridor.
- The CPR line is identified in the Official Plan as a light rail corridor, allowing implementation without the need for an Official Plan amendment (such as would be required by the Barrhaven line or any of the extensions to the CPR line). As well, Phases 1 and 2 of a provincial

Environmental Assessment for light rail transit use of the CPR line have already been completed.

- The CPR corridor presents the least conflict with VIA Rail trains, and therefore would experience the lowest consequent impact on service reliability.
- An extension from the CPR line to downtown Ottawa would require extensive and time-consuming planning and design work, as well as capital investment greatly in excess of the potential benefit to a pilot project. Insufficient information exists to fully establish the possible long-term benefits of such an extension, and additional work is required.
- An extension from the CPR line to downtown Hull may be less complex and costly than an extension to downtown Ottawa, but would require negotiation of inter-provincial agreements on operations and financial sharing that are more appropriately pursued as a follow-up to the initial implementation of the pilot project.
- An extension from the CPR line to Ottawa Macdonald-Cartier International Airport would best be integrally linked to the implementation of Airport redevelopment, which is not envisaged to occur within the time horizon envisaged for pilot project start-up. Additional work and consultation with the Airport Authority is required to investigate the feasibility and benefits of such an extension.

The long-term projections reported earlier in this document indicate that the CN Kanata-Train corridor identified in the Official Plan will serve an important need, particularly for “suburb-to-suburb” transportation as the region grows. The other route alternatives show varying degrees of promise of contributing to an efficient and effective long-term light rail service.

Operations

A key objective of the pilot project is the provision of 15-minute service frequencies. For the recommended CPR route, there appear to be two different scenarios which enable this.

The first scenario involves three light rail vehicles in operation plus one as a spare, with two locations where vehicles may pass each other in opposite directions. Seven stations could be served in this manner.

The second scenario involves two light rail vehicles in operation plus one as a spare, with one passing location at the Carleton University station (approximately the route’s mid-point). Operational simulations have shown that only five stations, rather than seven, could be reliably served by two vehicles with a 15-minute frequency. While the end-to-end travel time (including stops) would be about 11 minutes, additional time is required for vehicle operators to change ends and have periodic breaks, and to provide some allowance for delays at the CN crossing (i.e., meets with VIA trains), at the Carleton University passing location, and at stations due to passenger activities. Reliable adherence to schedule could be maximized by reducing turn-around time at terminal stations through the use of “step-back” operators, an operating strategy where one operator pulls into a station and switches with a second operator. Occasional service delays

of up to five minutes may occur during the peak periods, but service will be able to recover time and restore the schedule throughout the day.

The second scenario is recommended since it would be significantly less costly for the following reasons:

- It involves three vehicles, rather than four.
- It involves one passing track, rather than two.
- It involves five stations, rather than seven.
- It necessitates simpler signalling and switching systems to control two operating vehicles, rather than three.

Potential delay at the VIA rail crossing can be reduced to acceptable levels. VIA currently has eight to ten trains per day that cross the CPR route south of Confederation Heights, and the VIA trains will have priority through this intersection. The delay that some light rail vehicles may experience can be minimized by having a dedicated dispatch service established in Ottawa with a prime focus on the light rail service, rather than relying on the centralized dispatch available out of Montreal. The approach taken by approval authorities in reducing the clearance times required between VIA trains and light rail vehicles will also influence the extent of the delay.

Stations

Table 7 identifies the possible light rail stations as shown on Annex C, with estimated construction costs and passenger volumes. It should be noted that the costs shown in Table 7 are based on conceptual station designs used to compare alternative routes, and that final station design and costing will occur in the future Environmental Assessment process. Actual station costs may be higher or lower, and will be reflected in the final pilot project agreement to be presented for Council approval.

Table 7: Estimated Station Construction Costs and Passenger Volumes

Station	Construction Cost	Passenger Volume* (weekday peak hour)
Bayview	\$2.55 - 3.00 M	High
Gladstone	\$1.30 - 1.40 M	Low
Carling	\$1.35 - 1.55 M	Medium
Carleton	\$0.45 - 0.65 M	High
Confederation	\$0.40 - 0.50 M	Medium
Walkley	\$0.20 - 0.25 M	Low
Greenboro	\$0.75 - 0.90 M	High
Total (7 stations)	\$7.00 - 8.25 M	
Total (5 stations, without Gladstone and Walkley)	\$5.50 - 6.60 M	

- * Low = less than 150 passengers per hour
 Medium = 150 to 300 passenger per hour
 High = more than 300 passengers per hour

The range of costs shown in Table 7 reflect the potential for flexibility in design and construction standards. “High-end” stations would be designed and constructed with Transitway-style features and standards, with more durable materials and more passenger amenities; “low-end” stations would incorporate less durable materials and fewer passenger amenities beyond those required for basic levels of security and comfort. Notable features specific to “high-end” stations are larger shelters, concrete rather than asphalt platforms, and higher-quality stairway covers. “Low-end” stations, while less costly initially, may lead to higher operating and maintenance costs as well as the eventual need to upgrade facilities. The following features are recommended for inclusion in all stations (i.e., whether “high-end” or “low-end”), although perhaps with varying durability levels or aesthetic qualities:

- accessibility for all users through the provision of ramps and/or elevators;
- safe and secure pedestrian access to sidewalks, pathways and transfer points;
- lighting for safety and security;
- emergency telephones;
- fire protection;
- shelters and benches;
- transit information display cases;
- covered stairs and overpasses; and
- bicycle parking.

It should be emphasized that all costs shown in Table 7 include the provision of elevators, where they are required to provide full station accessibility. The draft principles of the public-private partnership to be negotiated with CPR (as discussed later in this report and as shown in Annex D) explicitly include full station accessibility as a required feature of the pilot project. The provision of elevators represents about \$1.1 million of the capital cost of the Bayview station, \$0.6 million of the Gladstone station cost and \$0.6 million of the Carling station cost.

As discussed in the previous section, pilot project operating constraints may limit the number of stations to five out of the seven identified in Table 7. The two stations which are leading candidates for exclusion under this scenario are Gladstone and Walkley. Because these stations are on different sides of the proposed passing location at Carleton University, their exclusion would leave the Carleton station at the mid-point of the route, thereby preserving optimal operations. They also have the lowest levels of expected use – estimated daily ridership would only be expected to decrease from the 5,800 to 7,300 daily passengers shown in Table 3, to 5,100 to 6,400 daily passengers. The range of capital cost savings (for station construction, passing tracks, signals and vehicles) arising from the exclusion of these two stations would be approximately \$3 to 6 million.

Transit Service Integration

To be successful, the light rail pilot project must operate as an integral part of the region’s rapid transit system. This is particularly important since the principal purpose of the light rail transit network identified in the Official Plan is to serve as an efficient collector and distributor of transit trips, rather than as a long-distance line-haul route. Similar to all the alternatives examined, the CPR route would have a majority of users transferring to or from a bus. Success will therefore depend on the effective integration of bus routes with the light rail service, and the ease with which transfers can be made. To this end, the light rail pilot project should have a common fare

structure with the bus system – this will facilitate transfers and encourage customers to think of light rail as an integral part of the transit system. OC Transpo will also need to make adjustments to some base network routes and schedules to allow efficient and effective transfers.

Safety

Discussions to date with Transport Canada have identified the following as likely federal safety requirements:

- Special measures are required to reduce the possibility of conflict where light rail vehicles and heavy rail vehicles either cross or share lines.
- Equipment suppliers must show that their vehicles will successfully operate track signals and grade-crossing protection.
- A trespasser mitigation plan is required to maximize safety, particularly on any portions of the light rail route that are used infrequently by trains today. This requirement will be a focus of the Environmental Assessment.

Continuing discussions with Transport Canada will be required to clarify any restrictions that the use of European-standard equipment will impose. This will be an issue on the CPR line, which crosses two CN lines including the VIA route. However, it would be an even greater issue on the Barrhaven line, which is used in its entirety by VIA trains (as noted previously, the use of Budd cars may be the only practical means of service provision on this route), and on the CN Kanata-Greenboro line which shares a short portion of the VIA route across the Rideau River. On the CPR route, a local train dispatcher dedicated to the light rail service may be required to minimize delays at the junction of the VIA route.

DISCUSSION OF PILOT PROJECT IMPLEMENTATION

Schedule

Annex E illustrates the proposed schedule for light rail pilot project implementation, as divided into two major components: conduct and approval of an Environmental Assessment, and service planning and implementation. The following major milestones define critical points in the schedule:

- September 1998 - Transportation Committee and Council approve the recommended service concept and EA Terms of Reference. RMOC submits the EA Terms of Reference to the Ontario Ministry of the Environment (MOE).
- October 1998 - Corporate Services and Economic Development Committee, the Regional Transit Commission and Council approve a memorandum of understanding with CPR governing the implementation of the light rail pilot project.

- December 1998 - Corporate Services and Economic Development Committee, the Regional Transit Commission and Council approve an agreement with CPR to procure light rail vehicles for the pilot project and begin design work.
- January 1999 - MOE approves the EA Terms of Reference.
- February 1999 - Council approves the EA Report. RMOC submits the report to MOE.
- September 1999 - MOE approves the EA Report.
- October 1999 - Corporate Services and Economic Development Committee, the Regional Transit Commission and Council approve an agreement with CPR to implement and operate the light rail pilot project.
- August 2000 - Pilot project start-up.

There are two fundamental constraints that require deferral of the pilot project start-up past the December 1999 date previously set by Council. First, the earliest possible completion of the Environmental Assessment process would be September 1999, meaning that construction of stations and line improvements could not be completed during the 1999 construction year. Second, Bombardier, Siemens and ADtranz have all indicated that expected delivery for diesel light rail vehicles would be 18 to 24 months from time of order. While attempts could be made to negotiate earlier delivery, it would likely be difficult and costly to achieve a delivery date enabling start-up by December 1999.

Public-Private Partnership Creation

To meet Council's goal of a minimal-cost pilot project, and in view of the fact that RMOC does not have the in-house expertise required to plan and implement a rail system, the pilot project will be most effectively implemented as a turnkey project through a public-private partnership. This approach will interest and create partnering opportunities among large capital and engineering firms, vehicle suppliers and rail or transit operators. In addition to possibly reducing public capital investment, the public-private partnership approach can minimise operating risk to the RMOC and provide greater certainty in terms of cost.

It is recommended that a public-private partnership agreement be achieved through negotiation rather than a proposal call, as had been the expected approach at the outset of the project. The reason for this is that CPR has indicated it will not allow other operators to provide rail transit service on its tracks. As a result, it is not possible to issue a Request for Proposals (RFP) seeking competing proposals to operate on that line. While it would be possible to seek competitive pilot project proposals on other lines as well as the CPR line, the submissions would likely be of marginal comparability due to differences in ridership, operational barriers and vehicle technology limitations on other routes, and inconsistency of some routes with existing Official Plan policy. It is therefore recommended that the significant time and expense required for an RFP process should be avoided, and that the partnership agreement to be negotiated with CPR should be tested against strict cost-effectiveness criteria to ensure that creativity and cost containment remain priorities.

The first major step toward development of a formal partnership with CPR will be the mutual approval of a memorandum of understanding (MOU). Annex D identifies the principles which are proposed by staff, based on preliminary discussions with CPR, as the basis for an MOU which would be brought to Council for approval. The approved MOU would then guide the final pilot project design and the development of formal business arrangements.

Following agreement on the MOU, an agreement covering vehicle procurement and project design will be negotiated with CPR. The design stage would take approximately six months following approval of this agreement, and will allow CPR to complete the design and costing of infrastructure and initiate the applications for regulatory approval. Final approval of station designs will rest with RMOC and OC Transpo. The outcome of the design stage will be a negotiated agreement to implement and operate the service, including commitments to specific deliverables and pricing. RMOC and OC Transpo will have a final opportunity at this stage to proceed with, or terminate the pilot project.

Environmental Assessment

The light rail pilot project must meet the requirements of the federal and provincial Environmental Assessment (EA) Acts, which require the examination, documentation and mitigation of effects on both the social and natural environments. The EA process is a major factor in determining the pilot project schedule – the requirements of the EA process are extensive and the time needed for investigation, analysis, report development, submittal, public consultation, necessary reviews and approval is lengthy. These requirements are discussed in greater detail in the draft *Environmental Assessment Terms of Reference*, issued separately as Annex F.

The *Environmental Assessment Terms of Reference* has been prepared according to the requirements of the Ontario Ministry of the Environment (no similar requirement exists for the federal EA process), and was released for a 30-day public review period on 28 July 1998. Any proposed modifications to Annex F resulting from comments received by the consultation deadline of 28 August 1998 will be provided separately to Committee and Council before 2 September 1998 in the form of a supplemental Annex G.

While Council has previously expressed a desire to see the pilot project implemented by December 1999, the Province is not expected to approve the EA Report until September 1999. Because construction of new infrastructure may not begin until EA approval is received, there is insufficient time to complete required work by December of that year. It is therefore proposed that construction start in late 1999 or early 2000, either of which could be compatible with a summer 2000 start-up date.

Operating Approvals

The arrangement of operating approvals would be the responsibility of CPR. The operation of light rail vehicles in the corridor would require approval by Transport Canada, including certain exemptions from standard operating procedures. Under federal charter, CPR currently has a Certificate of Compliance which enables it to operate rail vehicles; since CPR has expressed a

willingness to operate the light rail pilot project, the easiest path to gain necessary approvals would be to proceed under an amended version of CPR's current Certificate of Compliance. Transport Canada will determine if the service will be fully compliant with its regulations as well as that of other agencies such as the American Association of Railroads, based on evidence provided by the applicant. The main issues that Transport Canada will want to examine are vehicle standards, training of operating personnel, infrastructure, operating procedures and crossings. A trespasser mitigation plan will have to be developed for the Environmental Assessment and meet the requirements of Transport Canada.

Consultation with CN will be required to allow the service to cross the CNR track used by VIA Rail, as well as a second CN freight track just west of the Walkley yards. A Certificate of Fitness is also required from the Canadian Transportation Agency (CTA); again, a modification of the Certificate currently held by CPR may be sufficient. The likely key issues for the CTA are insurance and liability.

Consultation with CPR on how best to proceed with compliance issues related to operating certificates and the expected timeframe is very important, and would be pursued during the MOU negotiations.

DISCUSSION OF COST-EFFECTIVENESS

It is important for the light rail pilot project to represent an acceptable cost-effective improvement to transit service in Ottawa-Carleton, with the objective of increasing transit ridership and reducing or deferring the need for additional road infrastructure. It should deliver service to transit users at a cost that is comparable to, if not less than, OC Transpo's existing operations.

This section illustrates the light rail pilot project's level of cost-effectiveness, in two steps:

1. The "comparable capital investment" and "comparable annual operating investment" of the light rail pilot project are identified. These are the hypothetical costs, based on system averages, of expanding OC Transpo bus operations to provide new transit service equivalent to the light rail pilot project.
2. The actual estimated capital and operating costs of the light rail pilot project are evaluated relative to these comparable investments.

It should be noted that actual operating and capital costs can only be confirmed through negotiations with CPR. Some of the costs discussed below may be shared by CPR or other users of its rail line, and it is also possible that through innovation more cost-effective approaches to implementing and operating the pilot project may be developed.

Comparable Capital Investment

OC Transpo's system-wide average capital cost (considering the present value of buses, garages and the Transitway) is approximately \$8.20 for each annual passenger boarding. It should be noted that this comparison is not between light rail and the transitway but the entire OC Transpo

system. Using the estimated boardings for the CPR line with five stations (1.53 to 1.92 million boardings per year), a comparable capital investment in the light rail pilot project would be \$12.5 to \$15.7 million. As ridership grows over time the same level of cost effectiveness would justify a correspondingly larger capital investment. Accordingly a capital investment of \$16 m is appropriate.

It is possible to provide a rough comparison to similar investments in light rail systems that have been made elsewhere. The newest light rail facility in Canada is the Spadina LRT, which was recently constructed at a cost of \$105 million (excluding vehicles). TTC staff estimate that boardings on the Spadina segment are approximately 30,000 per day, and this yields a capital cost per annual passenger of about \$11.00 (excluding vehicles).

Comparable Annual Operating Investment

Table 8 summarizes OC Transpo's system-wide average operating costs and the comparable annual operating investment, using both passenger boardings and passenger-km as the unit of service. The different operating costs for current and new passengers reflect the fact that a 10% increase in service levels generally attracts about a 7% increase in ridership, and therefore new passengers are more expensive.

Table 8: Comparable Annual Operating Investment

Unit of Service	Average Operating Cost		Estimated Service Levels		Comparable Annual Operating Investment
	Current Passengers	New Passengers	Current Passengers	New Passengers	
Passenger boardings*	\$1.43 per boarding	\$2.03 per boarding	1.19 - 1.55 M boardings	0.34 - 0.37 M boardings	\$2.4 - \$3.0 M
Passenger-km**	\$0.23 per passenger-km	\$0.33 per passenger-km	6.5 - 8.2 M passenger-km	1.6 - 2.0 M passenger-km	\$2.0 - \$2.5 M

* A transit trip involving a transfer requires more than one boarding

** "Passenger-km" refers to a unit of transit service equivalent to moving one passenger over one kilometre

Estimated Capital Costs of Pilot Project

The capital costs discussed in this section are presented as if RMOC intended to implement the light rail pilot project directly. However, because the project is recommended to be implemented through a public-private partnership, some capital costs may be borne by the private sector partner(s).

It is possible to implement the pilot project without bearing the full costs of a permanent light rail system; therefore, the estimated costs of both a minimal-cost pilot project and permanent system are given. This difference is most notable where assets (such as vehicles) would have some salvage value should the pilot project be terminated. In a similar manner, ranges are given for some cost elements – either where uncertainty exists, or where (as with stations) some variability in design or construction standards may be used.

It should be noted that the station costs presented herein are known as Class ‘D’ estimates, based on rough conceptual designs. This approach includes estimates for known station elements, as well as allowances for relocation of utilities, contingencies for unexpected costs and variations in final designs, and an allowance for engineering and supervisory costs.

Table 9 summarizes the capital cost estimates, and the various components are explained as follows:

- *Track and signal improvements:* This includes repair and upgrading costs for such things as ballast, cross-tie and rail replacement where necessary, and the cost of a siding and signals at Carleton University to allow two vehicles to pass. Improvements to the existing signal system along the CPR route, and installation of a remote Centralized Train Control panel housed in the Walkley Workshop are also included in the high estimate, with only essential signal improvements included in the low estimate. The conditions placed on operations by the regulatory authority will influence the actual extent of signal improvements required.
- *Stations:* Five stations are included (at Bayview, Carling, Carleton, Confederation Heights and Greenboro), consistent with two-train operation. Station costs and the station elements they represent are consistent with those discussed previously in this report. It should be noted that property acquisition costs are not known at this time; however, any lands required for station facilities or access routes that are not currently held by RMOC or CPR are either owned by the National Capital Commission (at Bayview and Carling) or Public Works and Government Services Canada (at Confederation Heights).
- *Vehicles:* These have an estimated purchase cost of \$3 to 4 million each, and the recommended service concept requires 3 vehicles including one spare in case of malfunction. In practice the vehicles may be leased to reduce the RMOC capital at risk, particularly during the pilot project period. Should the pilot project be terminated within five years or so, vehicles would be expected to maintain a salvage value equal to 65% of their initial cost.
- *Bridge and tunnel rehabilitation:* Preliminary inspections indicate that the tunnel under Dow’s Lake requires some rehabilitation of its structure as well as upgrades to its drainage, ventilation and safety systems to accommodate passenger services. The bridges across the Rideau River and Sawmill Creek also require some degree of rehabilitation to allow safe, reliable and frequent crossing by light rail vehicles. The expected cost for tunnel and bridge repairs is up to \$1.8 million.
- *Maintenance facility and training:* The vehicle maintenance and storage facility at the Walkley Yards will need to be refurbished. This facility could also house a centralized train control panel and local dispatch function, if required. The cost estimate includes an inventory of parts and tools, and a one-time cost for maintenance and operating crew training. An allowance for lower productivity by maintenance crews during the early months of operation has been included.

Table 9: Estimated Capital Costs for CPR Route

Capital Cost Component	Pilot Project	Permanent Service
Track & signal improvements	\$2.7 M	\$2.7 - 5.3 M
Stations	\$5.5 M	\$5.5 - 6.6 M
Vehicles	\$3.5 M	\$9 - 12 M
Bridge & tunnel rehabilitation	\$1.8 M	\$1.8 M
Maintenance facility	\$1.3 M	\$ 1.3 M
Training	\$0.5 M	\$ 0.5 M
Total	\$15.3 M	\$20.8 - 27.5 M

As Table 9 shows, the capital cost of a permanent service (\$20.8 to 27.5 million) is higher than the comparable capital investment of \$12.5 to 15.7 million. However, the \$15.3 million capital cost of a pilot project is within the comparable capital investment range, and it was previously noted that the comparable capital investment would increase as ridership grows over time; as shown in Table 3, the CPR route's daily ridership would approximately double by 2021.

Estimated Annual Operating Costs of Pilot Project

Table 10 summarizes the estimated light rail pilot project operating costs, including the following components:

- *Operating crew:* An operating crew will cost approximately \$800,000 annually for salaries and other expenses. It is possible that operational requirements will necessitate the addition of "step-back" operators to provide schedule reliability, leading to annual operating crew costs of as much as \$1.2 million.
- *Dispatching:* If a local dispatch function is required to achieve reliable, on-schedule pilot project operations, the expected cost to employ three train dispatchers to cover all shifts, seven days a week will be approximately \$210,000 annually. Otherwise, operations will be handled remotely from Montreal at an expected rate of \$0.20/train-kilometre or an annual total of approximately \$90,000. There may need to be a provision for a CPR supervisor on a shared basis with the light rail pilot project being responsible for the workload it accrues and additional time could be allocated to regular CPR operations.
- *Fuel:* Given the average fuel efficiency of diesel light rail vehicles (about 0.75 l/car-km), the cost of rail diesel fuel (about \$0.50/l) and the expected 440,000 km of annual service, the estimated annual fuel costs would be about \$165,000.
- *Vehicle maintenance:* The estimated cost of vehicle maintenance and consumables is about \$465,000 per year. A "car-house" crew will be required to service the fleet at a cost of \$600,000 per year.
- *Track maintenance:* The estimated cost for track maintenance is about \$200,000 per year, which will help meet other CPR requirements and therefore may not all be borne by the project.

- *Station maintenance, security and fare inspection:* These services are estimated to cost about \$410,000 based on OC Transpo experience with Transitway stations and operations.
- *OC Transpo costs:* These include marketing, customer relations, planning, management and administration costs, collectively estimated at 8.5% of direct operating costs.

As Table 10 shows, the estimated annual operating cost of a pilot project (\$2.97 to 3.54 million) is above but immediately adjacent to the comparable annual operating investment range of \$2.0 to 3.0 million. Achievement of ridership at the high end of the forecasts would help to ensure that annual operating costs do not exceed the comparable investment. In addition, the expected ridership growth over several years would increase the comparable investment.

Table 10: Estimated Annual Operating Costs for CPR Route

Operating Cost Element	Estimated Annual Cost
Operating Crew	\$0.80 - 1.20 M
Dispatch	\$0.09 - 0.21 M
Fuel	\$0.17 M
Vehicle maintenance	\$1.07 M
Track maintenance	\$0.20 M
Station maintenance/security/fare inspection	\$0.41 M
OC Transpo costs	\$0.23 - 0.28 M
Total operating cost*	\$2.97 - 3.54 M
Farebox revenue**	\$1.22 - 1.53 M
Net cost	\$1.44 - 2.32 M

* Excludes any allowance for profit or rail access fees

** Based on OC Transpo's system-wide average revenue per boarding

Conclusions

The principal finding of this cost-effectiveness analysis is that the capital and operating cost estimates are close enough to the comparable investments to warrant the commencement of negotiations with CPR, in order to determine with certainty if a workable and cost-effective agreement can be reached. To reinforce this finding, some limitations to the “comparable investment” approach are noted below which suggest that the comparable investments identified herein may be conservatively low:

- It is assumed that the transit service levels and ridership provided by the light rail pilot project could actually be achieved through improved bus service, yielding the same benefits such as a reduction in travel by automobile and the need for new or widened roads. However, it would be difficult to provide a high level of service (15-minute frequency along a direct route from Transitway transfer points) by bus to many of the specific trips served by the CPR route.
- Rail vehicles generally last longer than buses, and no life-cycle capital cost adjustment has been made to account for this.

- No value has been specified for the improved comfort level or reduced travel time of potential light rail passengers. While real, this value would be very difficult to quantify in a meaningful way.

In view of the comparable investments and the estimated costs of the pilot project, it is concluded that negotiations with CPR should lead to an agreement that limits the exposure of public-sector partners to capital costs with a present value of not more than about \$16 million, and operating costs that are about equivalent to OC Transpo system averages for service to equivalent ridership (likely about \$3.0 million per year). These operating costs should include any financial allowance required by CPR for profit or access to its rail line.

CONSULTATION

There have been a number of consultation activities undertaken to date to obtain community input on the light rail pilot project and its potential impacts:

- *Light Rail Pilot Project Steering Committee:* This committee includes two RMOC Councillors, two members of the public, RMOC and OC Transpo staff and Consultants. The role of this committee is to guide the project and take responsibility for project decisions. This committee has met 12 times since its formation.
- *Light Rail Pilot Project Sounding Board:* The Sounding Board has been formed to allow representatives of interest groups, agencies, communities and other stakeholders to contribute directly to the process. The Sounding Board provides feedback on work undertaken for the light rail pilot project. The Sounding Board has met four times since its formation.
- *Community Forums:* Three Community Forums have been held as part of this project:
 - The first Community Forum was held on 26 February 1998, at the launch of the pilot project. Approximately 200 people gathered at the Jim Durrell Recreation Centre for an evening jointly planned and promoted by the City Centre Coalition, Transport 2000, Auto-Free Ottawa, Communities Before Cars Coalition and RMOC.
 - The second Community Forum was held on 18 June 1998 at the Ottawa-Carleton Centre to obtain public input on the corridor, stations and vehicle alternatives being considered for the pilot project. Close to 300 persons attended this event, which included break-out sessions to facilitate discussion and feedback. The public input received during and after the meeting was used to formulate the draft study recommendations, and led to more explicit consideration of the CN route serving Barrhaven.
 - The third Community Forum was held on 28 July 1998 at Carleton University, when the study team presented the *Interim Report and Draft Recommendations* and the draft *Environmental Assessment Terms of Reference* for public review and comment. Comments on the former were received through 11 August 1998, and comments on the latter through 28 August 1998.

The Community Forums were extensively promoted through varied means including media releases, advertisements in daily newspapers and community newspapers throughout the region, delivery of notices to interested individuals and groups, and use of the RMOC website. The second forum was particularly heavily promoted in order to maximize input on the pilot project alternatives, and additional measures taken included:

- delivery of a letter and flyer to 41,000 households and businesses adjacent to the subject rail corridors;
- distribution of 50,000 “take-ones” on OC Transpo buses;
- provision of an article to community newspapers;
- delivery of notification to community associations throughout the region; and
- distribution of posters to area municipalities for display at community and recreation centres.

Public information related to the project, including reports, has been progressively posted on the RMOC website. In addition, a “Notice of Intent” was published in daily newspapers to announce the beginning of the Environmental Assessment process.

While there is general public support for the contents of the *Interim Report and Draft Recommendations* of 28 July, concerns have been expressed over the following issues:

- the potential for noise and vibration impacts on homes adjacent to the rail line;
- the possible devaluation of adjacent properties and compensation for homeowners;
- the need to integrate bicycle, pedestrian and other transit facilities and services with light rail;
- the accessibility of stations to people in wheelchairs as well as those with baby strollers, large packages and bicycles;
- the safety and freedom of movement of pedestrians who cross or use the corridor;
- the need for stations to provide good lighting, telephones, heating, elevators, information sources, security and bicycle parking;
- the possible exclusion of stations should be weighed against potential ridership losses;
- the ability to maintain 15-minute service frequencies with only two vehicles in operation; and
- the overall pilot project cost to taxpayers, particularly in view of declining public transit ridership.

CONFORMANCE WITH OFFICIAL PLAN AND TRANSPORTATION MASTER PLAN

The recommendations contained herein conform to both the Official Plan and the Transportation Master Plan.

FINANCIAL IMPLICATIONS

This report has no immediate financial implications. However, as noted in the previous section “Implementation Process and Schedule”, approval will lead to continued project work and the following project milestones having financial implications:

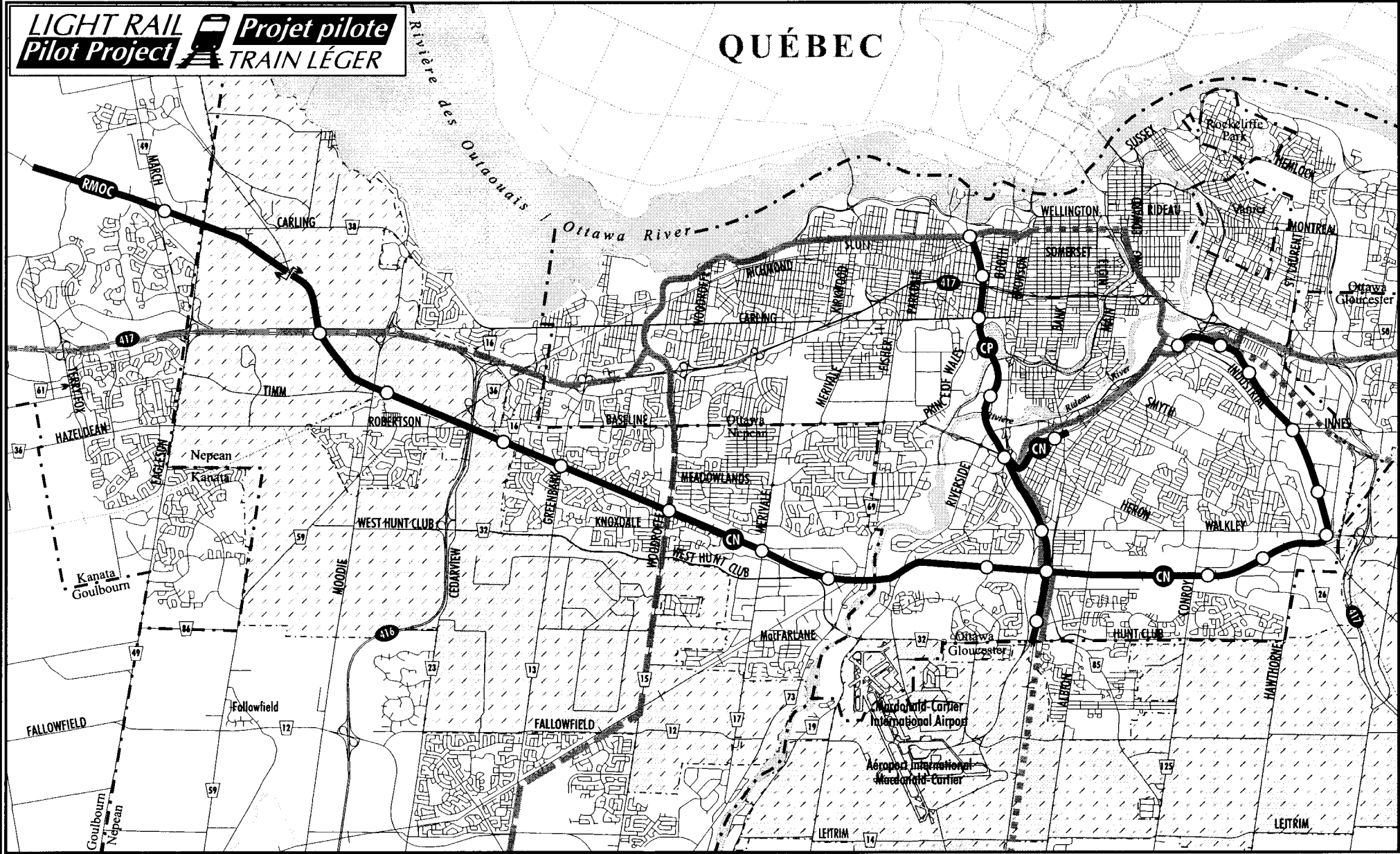
- October 1998 - Corporate Services and Economic Development Committee and Council approve a memorandum of understanding with CPR governing the implementation of the light rail pilot project.
- December 1998 - Corporate Services and Economic Development Committee and Council approve an agreement with CPR to procure light rail vehicles for the pilot project and begin design work.
- October 1999 - Corporate Services and Economic Development Committee and Council approve an agreement with CPR to implement and operate the light rail pilot project.

In addition, Council approval will likely be required for staff to retain consultants to complete the Environmental Assessment. The draft EA Terms of Reference has been developed within the framework of the consulting agreement with KPMG as approved by Council on 27 May 1998, however completion of the EA Report lies outside the scope of this assignment. A report documenting the approach, cost and consultant selection for this work will be brought before Corporate Services and Economic Development Committee for approval at the earliest possible date.

*Approved by
Nick Tunnacliffe*

GN/




Attach. (5)






**LIGHT RAIL PILOT PROJECT:
CORRIDORS IN OFFICIAL PLAN**

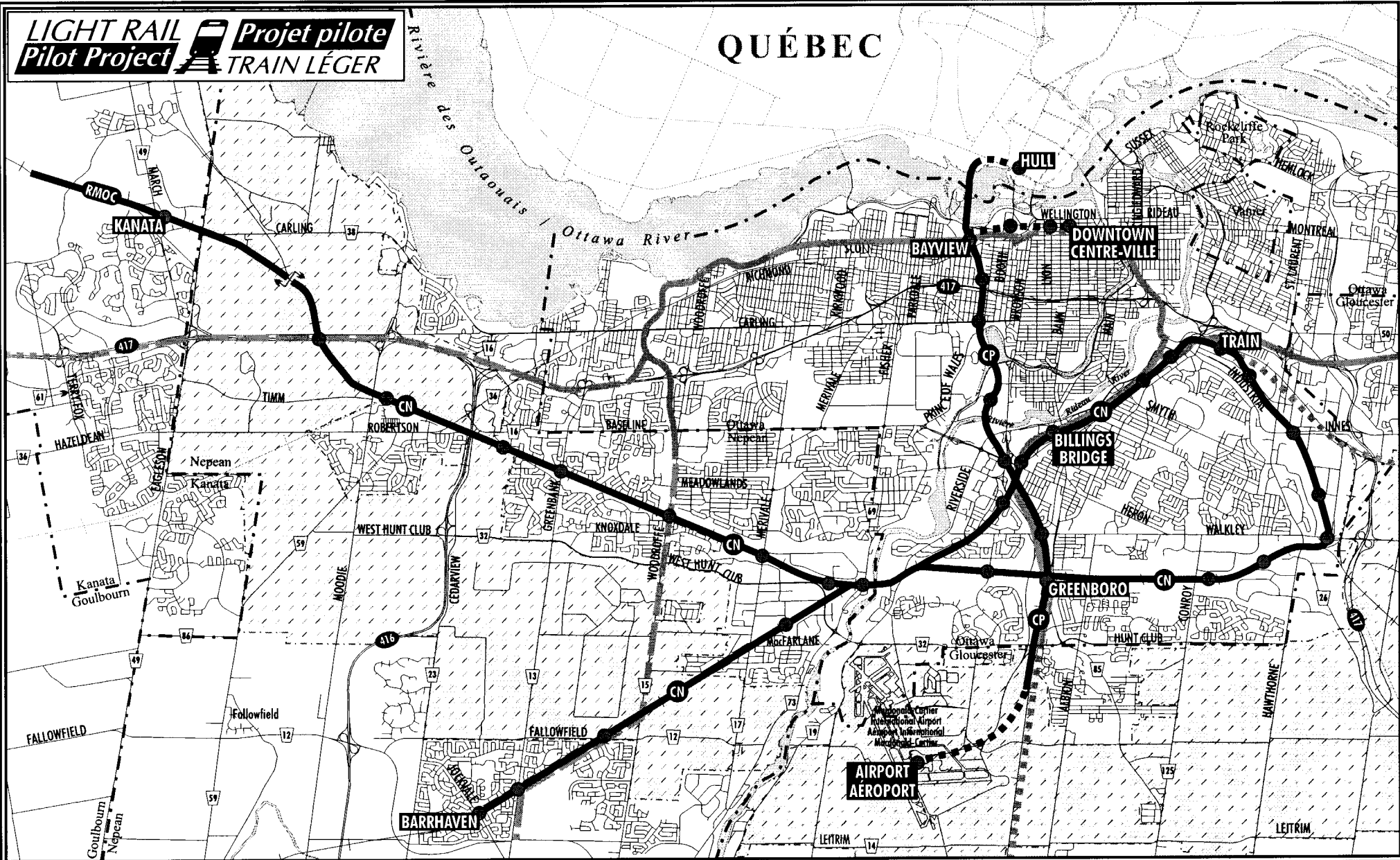
**PROJET PILOTE
DE TRAIN LÉGER:**

COULOIRS DANS LE PLAN DIRECTEUR

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| CANADIAN PACIFIC |  | CANADIEN PACIFIQUE |
| CANADIAN NATIONAL |  | CANADIEN NATIONAL |
| REGIONAL MUNICIPALITY
OF OTTAWA-CARLETON |  | MUNICIPALITÉ RÉGIONALE
D'OTTAWA-CARLETON |








- | | |
|-----------------------------|---|
| TRANSITWAY CORRIDORS | COULOIRS DE TRANSITWAY |
| EXISTING |  ACTUEL |
| FUTURE (LOCATION DEFINED) |  FUTUR (ENDROIT DÉTERMINÉ) |
| FUTURE (LOCATION UNDEFINED) |  FUTUR (ENDROIT NON DÉTERMINÉ) |

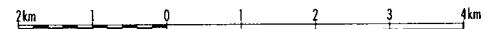


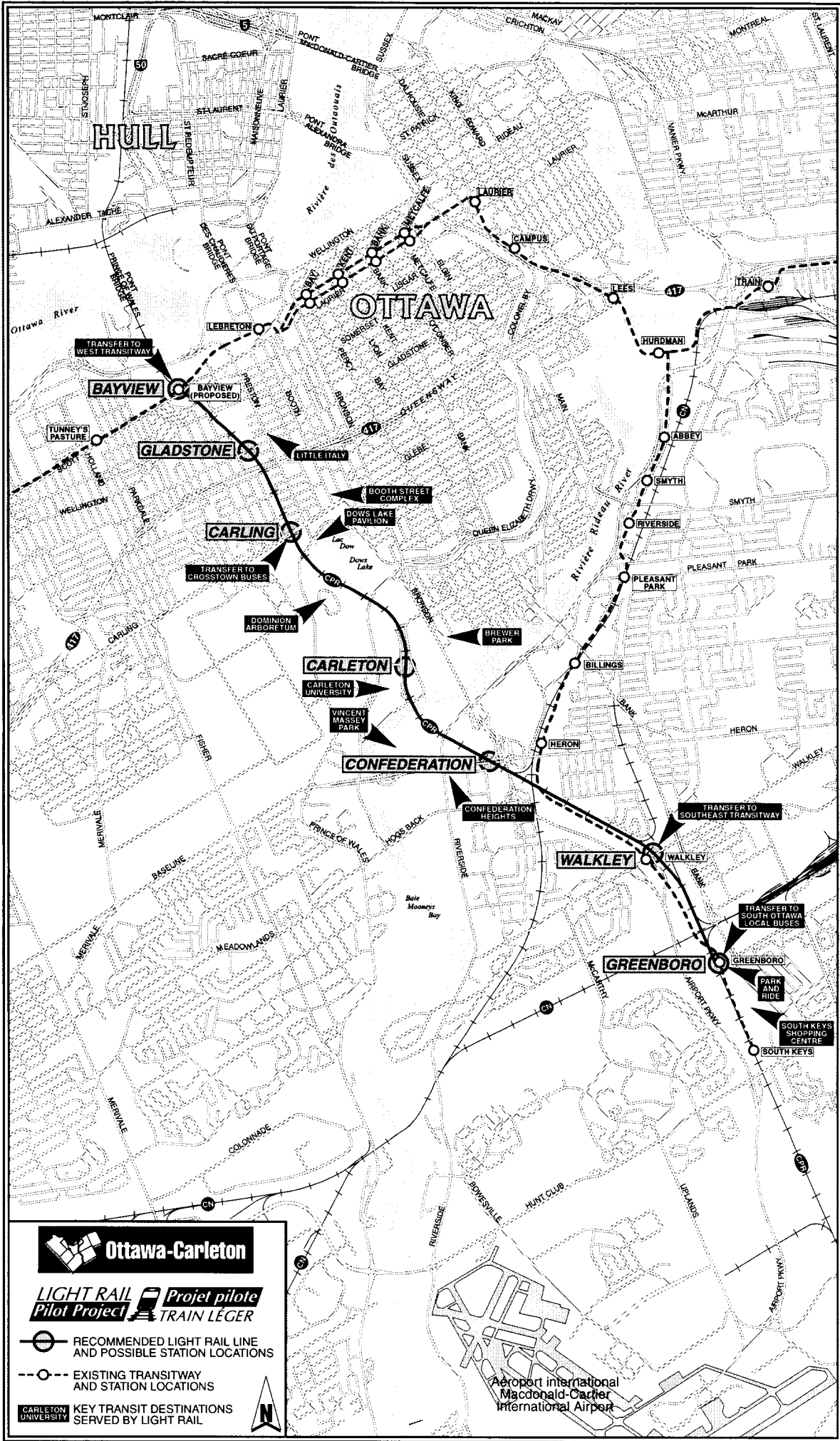


**LIGHT RAIL PILOT PROJECT:
CORRIDORS EXAMINED**

**PROJET PILOTE
DE TRAIN LÉGER:
COULOIRS EXAMINÉS**

CANADIAN PACIFIC		CANADIEN PACIFIQUE
CANADIAN NATIONAL		CANADIEN NATIONAL
REGIONAL MUNICIPALITY OF OTTAWA-CARLETON		MUNICIPALITÉ RÉGIONALE D'OTTAWA-CARLETON
UNDEFINED		NON DÉTERMINÉ
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TRANSITWAY CORRIDORS		COULOIRS DE TRANSITWAY
EXISTING		ACTUEL
FUTURE (LOCATION DEFINED)		FUTUR (ENDROIT DÉTERMINÉ)
FUTURE (LOCATION UNDEFINED)		FUTUR (ENDROIT NON DÉTERMINÉ)





Ottawa-Carleton

LIGHT RAIL *Projet pilote*
Pilot Project *TRAIN LÉGER*

- RECOMMENDED LIGHT RAIL LINE AND POSSIBLE STATION LOCATIONS
- EXISTING TRANSITWAY AND STATION LOCATIONS

CARLETON UNIVERSITY KEY TRANSIT DESTINATIONS SERVED BY LIGHT RAIL

Aéroport international
 Macdonald-Carlier
 International Airport

**Proposed principles of public-private partnership
to be negotiated with CPR**

It is proposed that a memorandum of understanding (MOU) to be approved by RMOC, the Regional Transit Commission and CPR would contain the following provisions:

- **Mission statement**
 - The purpose of the light rail system for Ottawa-Carleton is to support the development of a livable region by making transit more attractive to existing and new riders, and reducing the need for additional infrastructure such as new or widened roads.
- **Pilot project duration**
 - The pilot project duration would be not less than two years and not more than six years, during which time Council will retain the option to terminate the pilot project or declare its operations permanent on the basis of ongoing monitoring and evaluation. If Council declares the service permanent, the agreement would provide a fixed-cost structure for a period approximating the anticipated life of the light rail vehicles (20 to 30 years), and protect the RMOC's position should it extend service beyond the time specified.
- **Financial provisions**
 - CPR would conduct the design of the system, with estimated out-of-pocket costs recoverable from the RMOC to a maximum dollar amount to be defined in the MOU.
 - Any capital costs to be financed by CPR would be amortized over a period of 20 to 30 years, with termination of the pilot project requiring payment of unrecovered and unsalvageable capital costs at the time of termination. Alternatively, RMOC would have the option to pay capital costs "up front".
 - OC Transpo would serve as the contract administrator, monitor performance and make periodic payments to CPR based on performance, subject to a minimum payment. The payment formula will include incentives and penalties as required to achieve excellent service.
 - CPR would initiate vehicle ordering during the fall of 1998, reporting back on any penalties that may result from subsequent cancellation.

- **Design, operating approvals and construction**

- Following execution of the MOU, an agreement would be developed with CPR to proceed with pilot project design and vehicle procurement. Approval of that agreement would provide CPR with six months to prepare infrastructure designs and costs, acquire the necessary approvals for pilot project operation, and meet all regulatory requirements. This will include completion of the Environmental Assessment process and preparation of the EA Report. The EA process will include consideration of the possible addition of stations at Gladstone, Walkley and South Keys as well as the additional passing tracks, switches and signals required to accommodate three-vehicle operation.
- RMOC and OC Transpo would have the right to approve all resulting designs and selections. CPR would demonstrate that the design of all components of the light rail project are fully accessible.
- CPR would be responsible for all construction activities.

- **Operation**

- CPR would provide a turnkey service, with full responsibility for operations, maintenance of vehicles and infrastructure and all other aspects of the service except fare collection and enforcement which will be the responsibility of OC Transpo. Marketing and service scheduling would be led by OC Transpo with input and participation by CPR.
- Service would be provided on a 15 minute headway from 06h30 to 24h00 on weekdays, from 07h00 to 24h00 on Saturdays, and from 07h30 to 23h00 on Sundays and statutory holidays.
- CPR would provide adequate insurance to protect the RMOC and passengers.
- Service would commence in the summer of 2000.

- **Protection of opportunities for system expansion**

- The agreement would provide opportunities for evaluation and protection of future opportunities to develop an integrated light rail network incorporating service on rail lines under different ownership and/or control.
- The agreement would provide for short-term options to expand service, such as adding additional vehicles or stations to meet growing demand.

- **Summary of roles and responsibilities**

Area of Responsibility	Role of CP Rail	Role of OC Transpo	Role of RMOC
Environmental Assessment	Input	Input	Development of the EA Report and submission for approval by the Ontario MOE and federal Responsible Authorities
Design	Design of stations, track and tunnel rehabilitation, workshop refurbishment	Input to and approval of station design	Input to and approval of station design
Station Construction, Track and Tunnel Rehabilitation	All procurement procedures, contracts and work	Monitoring	Land acquisition
Vehicle Procurement	Negotiation, delivery, compliance with regulations, compatibility with track and signal systems	Input and approval	Input and approval
Operations	Operation and maintenance of rolling stock, corridor infrastructure, dispatching, stations to provide a sufficient level of service. Input to scheduling and marketing	Scheduling, fare collection, monitoring and marketing	Evaluation and determination of project continuance or termination
Financing	Project management and financing on a turnkey basis	Operating costs (minimum with incentives)	Capital costs

