1. NEED FOR AN ENVIRONMENTAL ASSESSMENT

The City of Toronto Official Plan designates St. Clair Avenue West as both a "Surface Transit Priority Segment" and an "Avenue" within the City's urban structure. At present, the St. Clair streetcar route carries about half of all trips made on most of St. Clair Avenue West, at various times of the day. The streetcar serves about 32,000 passengers on a weekday.

Two study areas were used in the assessment, reflective of the varying level of expected impact. The Primary Study Area was bounded by Gunns Road on the west and Avoca Avenue on the east. The study area extended 250 metres north and south of St. Clair Avenue West. The Secondary Study Area extended further north, to Eglinton Avenue West, and south to Bloor Street, to include the parallel arterial roads (Rogers Road, Davenport Road, Dupont Street). The two study areas and the streetcar line are shown in **Figure ES-1**.

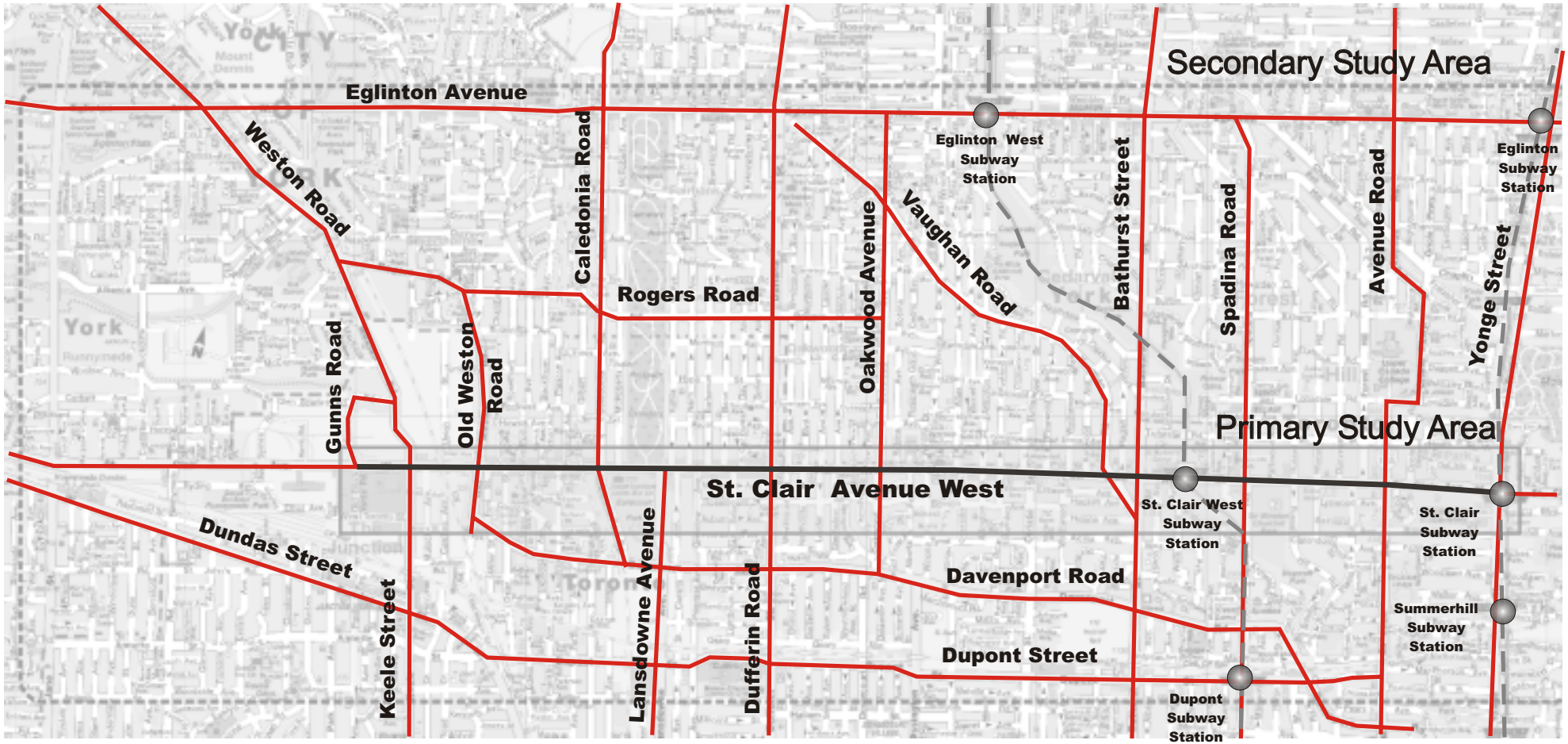
The streetcar tracks on St. Clair Avenue West are in extremely poor condition and should have been replaced by 2004 and 2005. The quality, speed, and reliability of this transit service are degraded, at various times of the day and week, by recurring obstruction and delay caused by other vehicular traffic. These detrimental effects of traffic on the streetcar service are expected to worsen over time, because traffic volumes and congestion would increase due to forecast increases in population, employment and trip-making per capita in and around the City over the next 20 to 30 years. The new tracks and trackbed will last over 30 years, so it was necessary to understand the existing deficiencies, immediate and long term needs, and opportunities to identify the appropriate sustainable improvements to transit service on St. Clair Avenue.

This Class Environmental Assessment was undertaken to identify and evaluate the options for improvements to the streetcar service in a manner that recognizes the needs of other road users, reflects the revitalization objectives of the communities along St. Clair Avenue, contributes to the City's community-building objectives, respects the policies of the Official Plan, and that would be sustainable under future conditions.

2. THE MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

The study was completed in accordance with the Environmental Assessment Act, following the Municipal Class Environmental Assessment (EA) process defined by the Municipal Engineers Association (June, 2000). This study was identified as a Schedule

St. Clair Avenue West Transit Improvements Class Environmental Assessment



TORONTO

Marshall Macklin Monaghan

Legend

- Streetcar Route
- Main Arterial Roads
- Subway Line
- Subway Station

FIGURE ES-1

St. Clair Streetcar Service and Area Context

J:\2003jobs\16-03107.rkw (TTC St Clair EA)\Report\Final Report\Executive Summary\Road Network.cdr

'C' project. The Class EA planning process is divided into five phases, which are outlined below:

- Phase 1: *Identify Deficiencies and Opportunities* – In this phase, the first round of public meetings was completed to understand the perspectives of the community. Baseline environmental data was collected, and existing conditions were defined. A problem statement was defined. Development of the evaluation framework was initiated, in terms of environmental categories, criteria and measures, for comparison of the alternative solutions and the design alternatives;

- Phase 2: *Identify alternative solutions to address the problem and establish preferred solutions* - Two rounds of public meetings and two stakeholder workshops were conducted to present first the evaluation framework, and subsequently the assessment of the alternative solutions. The evaluation framework categories, criteria and measures were defined, weighted and ranked with feedback from the public and stakeholder groups. Nine alternatives (solutions) were short-listed for comparison. Among those, two alternatives (one combining three of the nine) were chosen to be carried on to the next phase of the study;

- Phase 3: *Examine alternative methods of implementing the preferred solution, based upon the existing environment, public and review agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects* - Design concepts were developed and assessed, and a detailed concept design was prepared for the two alternatives. These alternatives were evaluated in detail, focusing particularly on the socio-economic environment and transportation effects. A stakeholder workshop and a round of public meetings were held to present the evaluation of the alternative designs and the technically preferred alternative;

- Phase 4: *Prepare the Environmental Study Report* - A summary of the rationale, and the planning, design and consultation process of the project as established through the above Phases has been prepared and the documentation is available for review by the public and the review agencies; and

- Phase 5: *Implementation* – Upon passing of the public review period, and resolution of concerns or decision of the Minister regarding any Part II order requests, the City and TTC will prepare detailed design drawings and tender documents, and the project may proceed to construction and operation. This phase includes an ongoing public and stakeholder consultation process.

2.1 Public Involvement

The EA process included public involvement throughout the study that far exceeded the minimum requirements for a Schedule C Municipal Class EA. Each of the four rounds of **public meetings** were scheduled and the public and stakeholders were notified well in advance; project newsletters were distributed to 50,000 households and businesses in the study area in advance of the public meetings and over 1,200 individuals, groups and agencies were sent direct mailings as a result of requests to be included on the project mailing list. These meetings gave the public and stakeholders the opportunity to comment on issues they were concerned with regarding the environment along St. Clair Avenue West and to obtain information on the project progress and results. Each round of public meetings included two evenings, one in the eastern portion and one in the western portion of the study area. Each public meeting was attended by two hundred attendees or more.

Three rounds of stakeholder **workshops** were held during the study. These workshops allowed focussed discussions with businesses, ratepayers and other stakeholder representatives, and gave the project team and the community groups opportunities to collectively comment and provide feedback on issues they were concerned with, to develop ideas for the alternatives and the study process, and to discuss the project in greater detail.

Throughout the study process, the Project Team repeatedly offered to meet with any community group, outside of the regularly scheduled public meetings or workshops, who wished to discuss any special concern or need they had. Numerous **individual stakeholder meetings (a total of 35 over the course of the project)** were held in order to obtain input from individual interest groups, local business groups, ratepayers, and property owners. More than 15 such meetings were held in July of 2004 alone to discuss the preferred design concept. Information was prepared and distributed that highlighted some of the major issues that were likely to be important to the participants in the meetings.

Additional public input was collected through **four surveys**, primarily designed to obtain detailed information on characteristics of the St. Clair environment. These were a resident travel survey, a business mail-back survey, and two customer interview surveys. To understand the needs, challenges and the mitigation measures for a similar project in Toronto, two surveys were also conducted along the 510 Spadina streetcar route. These were a resident interview survey and a business interview survey. Results of these surveys are discussed in detail in the Report.

In order to receive continual feedback and comments from the public, various communities, and stakeholder groups throughout the study process, the project team made available various methods of providing input. These were a regularly updated City of Toronto website, e-mail, newsletters, telephone, facsimile, and telephone hotlines in English, Italian, and Portuguese. Four issues of a project newsletter were distributed to 50,000 residences and businesses, at key decision points throughout the study. These featured Italian and Portuguese translations as well.

3. EXISTING AND FUTURE BASELINE CONDITIONS

3.1 Land Use

The St. Clair Avenue study area has a mix of employment, residential, and commercial uses. In the east, between Yonge Street and Avenue Road, high-rise office and residential uses dominate. From Avenue Road almost to Bathurst Street, there are residential uses in transition to higher density. The section from Bathurst Street to Lansdowne Avenue is a diverse commercial/residential "main street" area with many restaurants. From Old Weston Road to Gunns Road, the land uses are more industrial with some newly developed big box commercial sites. On the grid of local streets intersecting with St. Clair, the land use is generally residential, low to medium density in the form of detached and semi-detached houses. Railway corridors cross St. Clair Avenue West at two points in the primary study area – between Weston Road and Old Weston Road, and between Laughton Avenue and Caledonia Park Road. The crossings are both (rail over road) overpasses. These railway crossings create visual barriers and break up the corridor into discrete areas.

3.2 Population and Employment

The current population in the primary study area is approximately 78,300. This is expected to grow by 3,200 by year 2021. According to the 2001 census, within the study area, about 15% were aged 65 years and older. Over the next few years, it is likely that younger families will replace this cohort. Those aged less than 15 years or less constituted approximately 14%. A younger population would tend to have greater travel needs, for work and school, in the near future.

The 2001 Census data revealed that, of those in the study area 15 years of age and older, approximately 68% participated in the labour force. Of those, about 6% were unemployed. The 2003 annual employment survey conducted by the City of Toronto indicated that there were about 10,000 persons employed in the primary study area.

Within the primary study area, the majority of businesses are office, retail, and commercial with some industrial in the western portion (west of Lansdowne). Retail businesses comprised over half of all businesses in the primary study area, while offices accounted for over 42% of businesses. Offices employed over half of all employees, while retail employed nearly one-third. Approximately 80% of retail businesses were small storefronts (less than 1,000 square feet in size). The total office and retail floor space comprised approximately 40% each among all businesses. Warehousing accounted for 8% of floor space, while industrial accounted for 7%. The area east of Avenue Road accounts for more than 51% of the total employment along the corridor. Employment on St. Clair Avenue is expected to grow by over 6,100 jobs over the next 20 years.

3.3 Community / Social Characteristics

St. Clair Avenue West is a mature inner-city urban community, with a network of community facilities, including places of worship, community centres, public libraries, and schools. Landmarks that generate activity along St. Clair Avenue include the Joseph J. Piccininni Community Centre, Oakwood Collegiate, St. Nicholas di Bari Church, St. Clare's Church, St. Matthew's Church, Timothy Eaton Memorial United Church, and Prospect Cemetery at Lansdowne Avenue.

Organized and impromptu festivals occur along St. Clair Avenue West (e.g. Festival Italia, Winterfest, Sunflower Festival, World Cup celebrations), on a regular basis.

Parts of St. Clair Avenue West face challenges in terms of community development and vitality, according to a report developed by a community committee (St. Clair West Revitalization Committee). The section from just east of Dufferin Street west to Keele Street is seen by this group as being potentially vulnerable, based on the following comments in the report: large numbers of Italians have left the area, leaving this section with a void in terms of historic identity, and “by the 1990s, there were fewer business establishments in the area and the quality of retail declined sharply”. The cafes and restaurants along St. Clair act as social gathering points, primarily for local clientele during the day and a broader clientele during the evenings.

The area east of Dufferin Street to Bathurst Street does not exhibit many of these same concerns to the same degree. The concerns expressed in this area relate primarily to parking and streetscape. East of Bathurst Street, the community is primarily residential and high-rise office, and is more concerned with issues of vehicular access and transit service, based on the comments received.

3.4 Natural Environment

The study area is heavily urbanized and there is relatively little of the natural environment along the street. Stormwater flows into the sewer system, with little non-hard-surface area available to absorb storm flows. Tree canopy and landscaping along St. Clair Avenue West is very limited. Many of the trees are in poor condition due to poor design of the tree pits/planters. Natural areas and open spaces along St. Clair include the Cedarvale Ravine and Winston Churchill Park east of Bathurst, Prospect Cemetery and Earlscourt Park west of Lansdowne, and the Hydro corridor west of Caledonia Road.

The air quality in the study area is typical of urbanized neighbourhoods in Toronto. Air quality was cited as the primary natural environment concern by attendees at the first public meetings. A recently approved Board of Health report provides the transportation context and implications for air quality: "The transportation sector, made up primarily of car, buses and trucks, is the largest source of nitrogen oxides (NOx, which includes nitrogen dioxide) in Toronto, and accounts for 65% of all NOx emission sources in the city. The steady increase in nitrogen dioxide levels of Toronto during the last two decades mirrors the steady increase in vehicle use in the Greater Toronto Area. Furthermore, by 1996 the use of public transit fell by 20% relative to the ridership highs of the late 1980's. This was likely due to the loss of significant provincial contributions to transit funding during the 1990s, and the resultant increase in transit fares at the same time that service levels deteriorated. When average nitrogen dioxide levels are compared over a 10-year period in 27 major cities world wide, Toronto's levels were fourth highest, exceeded only by Los Angeles, Hong Kong and New York. Reducing emissions from the transportation sector in Toronto clearly needs to become a priority activity... Toronto Public Health estimates that air pollution in our city gives rise to 1,700 premature deaths and 6,000 hospitalizations each year… This study underscores the need to expand and sustain public transit infrastructure on a priority basis, to enhance energy conservation measures within the city, and to stimulate the shift to cleaner sources of energy…"[1]

3.5 Road Network and Traffic Operations

The road network is shown in Figure ES-1. Between Eglinton Avenue and Davenport Road, there are very few continuous east-west roads. St. Clair Avenue West is the only street that extends throughout the entire length of the study corridor. Virtually all east-west traffic travelling across the entire study area north of Dupont Street, up to Eglinton Avenue, must use either St. Clair Avenue or Eglinton Avenue. Partial parallel minor

[1] *Toronto Board of Health, Report 5, Clause 1, June 29, 2004 -Adopted by Council July 20, 21 and 22, 2004*

road links are created by Heath Street/Tichester Road, and Alcina Avenue/Benson Avenue/Rosemount Avenue. St. Clair Avenue is not designated for any bicycle travel priority in the City's Bike Plan; there are bike lanes on Davenport Road and Poplar Plains Road. Many of the intersecting local streets in the study area have neighbourhood traffic management (traffic calming) measures installed, and a number have one-way traffic mazes in place to discourage through traffic.

There are 26 signalized **intersections** on St. Clair Avenue in the 7 kilometre long study area, and 36 unsignalized intersections. There are also 77 private driveways, a low number, reflecting the pedestrian/transit orientation of the development form. Between Bathurst Street and Keele Street, the driveways are generally associated with fast food restaurants or auto-related uses such as auto repair.

In terms of **operations**, there are always at least two through lanes for vehicular traffic per direction. In almost all locations, one lane is shared with the streetcar. During weekday peak periods, "no left turn" prohibitions are in place at key intersections to reduce the potential delays and assist in streetcar schedule adherence. From Vaughan Road east to past Yonge Street, there are several short sections where the streetcar lanes are reserved (in turning lanes) for transit only during peak periods, marked by pavement striping and signage. Transit Signal Priority (TSP) is an operational strategy, in use on St. Clair Avenue, that facilitates the movement of streetcars, through traffic-signal controlled intersections. Its effectiveness is limited by congestion which occurs on the street near-side stops.

The majority of the **TTC stops** are located in the roadway as 1.5 metre wide passenger platform islands. Eight stop locations do not have islands, and require passengers to wait on the sidewalk, and cross one or two lanes of traffic to reach the streetcar, requiring all traffic to stop during the loading and unloading of passengers. This occurs eastbound at Keele, Old Weston, Laughton, and Lansdowne; and westbound at Keele, Old Weston, Laughton, and Via Italia. This creates an undesirable situation for transit passengers and motorists, in addition to increasing delay for the motorists.

Traffic analysis has focused primarily on the weekday p.m. peak hour, to reflect the effect of business traffic and "worst case" traffic conditions. Weekday a.m. and mid-day conditions have also been assessed. An investigation of traffic operations at the major intersections was completed in order to determine the performance of the intersections in assessing the existing demand. The analyses show a significant level of congestion today on St. Clair Avenue West at many locations between Yonge Street and Keele Street. Major intersections such as Avenue Road, Bathurst Street, Old Weston Road and Keele Street/Weston Road are operating close to, or at their effective capacity during peak times. Traffic demands during the off-peak periods are generally lighter, but the Old

Weston Road and Keele Street/Weston Road intersections are operating close to capacity on weekends as well.

Commercial traffic is active on this Avenue, because the businesses on St. Clair are predominantly retail and commercial. Very few businesses have a designated off-street loading zone. Much of the business loading and delivery activities occur on the street.

3.6 Travel Habits and Patterns

The 2001 Census indicates that about 35% of study area residents travelled via transit to work, while about 56% travelled via auto. This is a change from the 1996 Census, which indicated that the transit and auto mode shares were 43% and 48% respectively. The greatest percentage of people who took transit and who walked to work in 2001 was in the area east of Avenue Road - 45% by transit and 9% by walking, although the largest transit passenger volumes occur west of Bathurst Street.

Customer surveys conducted on St. Clair Avenue indicated that virtually all customers are frequent visitors. The first survey was random on the street, and the second was targeted to "destination businesses" at the request of BIA representatives. A range of 19% to 44% of customers travelled to St. Clair for shopping by transit, compared to 21% to 47% by auto, and 33% to 34% walked. Customers were asked about their perception of parking availability, and 53% to 57% believed that parking supply is at least adequate or better.

The 2003 **Business Survey** conducted of the approximately 1,100 businesses along St Clair Avenue West added further data, particularly for the office and shopping/services uses. Fifty-three percent of the employees were located in the area between Tweedsmuir Avenue (near Spadina Road) and Yonge Street. Twenty eight percent of all businesses along St. Clair Avenue West had on-site parking available for customers and clients. When asked if there was sufficient parking in the area for their needs, 54% of the respondents indicated that there was not. Based on the responses, 52% of the employees travel to work via automobile while 39% use public transit.

The **Residential Travel Survey** of approximately 11,500 households in the primary study area indicated that:

- 29% of households do not have a motor vehicle; 48% had access to one vehicle;
- 69% of residents made one or more trips daily;
- Trips to work (54%) were the highest percentage during the a.m. peak period;
- During the a.m. peak period, 93% of all trips remained within the City. Of these, 21% were destined for St. Clair Avenue.

- Auto trips accounted for 47% of all trips made during the a.m. peak period. The TTC accounted for 36% of the trips during the a.m. peak period.

3.7 Public Transit Infrastructure and Service

The 512 St. Clair streetcar service operates from Gunns Road, just west of Keele Street, to just east of Yonge Street - a distance of 6.8 kilometres. The streetcar tracks are in the centre of the roadway throughout the primary study area. The route connects with over 17 bus routes, and links to the Yonge-University-Spadina Subway at St. Clair Station (Yonge Street) and St. Clair West Subway Station (east of Bathurst Street).

The condition of the streetcar tracks and trackbed is very poor. There is surface structure failure, meaning the pavement surrounding the tracks is crumbling. Sub-surface structure failure has also occurred, weakening the track below the road surface. At many locations, the tracks are sinking below the level of the surrounding concrete, causing the undercarriage of the streetcar vehicles to scrape the concrete, damaging the vehicles, and requiring streetcars to operate at slower speeds for safety reasons. This is illustrated at right. The only way to rectify the current situation is to replace the streetcar tracks and trackbed. Similarly, the condition of passenger platforms is deteriorating and, at 1.4-1.5 m widths, these are narrower than desirable platform widths. This compromises safety for passengers. The traffic lanes pavement has deteriorated on St. Clair Avenue, with sections due for resurfacing in the next few years.

The St. Clair streetcar service carried about 32,000 passengers per weekday and approximately 28,000 passengers per weekend (total of Saturday and Sunday) in 2003. On average, about 18,000 passenger boardings occurred during the morning and afternoon peak periods. During the busiest hours of the peak travel periods, the St. Clair streetcar service carries over 1,600 passengers per hour (peak direction). A number of westbound streetcars are forced to make short-turns at Lansdowne Avenue in order to adjust for the delays and service disruptions and maintain planned headways.

The 512 St. Clair streetcar service operates in mixed traffic and is, therefore, subject to delays, obstructions, and disruptions from a number of factors, including traffic congestion, private vehicles in collision on the tracks, private vehicles in collision with the streetcars, left-turning vehicles blocking streetcars, and traffic bottlenecks which result from double-parking or delivery vehicles.

The streetcar service has become unreliable, primarily due to traffic congestion:

- A significant number of short turns occur. The "short-turning" of streetcars refers to the situation whereby streetcars are turned back before they reach their planned destination because they are so far behind schedule that corrective action must be taken. This situation causes significant inconvenience to customers, as they are required to get off the short-turned streetcar and wait for a subsequent streetcar on which to complete their trip. This further compounds customers' perception of poor service quality, and provides additional incentive for people to find another way to travel rather than on transit. On a monthly basis, looking at the occurrences of short-turns on the 512 St. Clair streetcar route for the years 2001-2003, an average of 8% of all trips during the morning peak period were unable to reach their destination, an average of 13% of all trips during the midday were unable to reach their destinations, and an average of 14% of all trips during the afternoon rush hour were unable to complete their destination. In the worst month observed, the short-turning of streetcars escalated to 12% in the morning, 16% in the midday, and 21% in the afternoon. There were approximately 8,000 incidents of short-turning on weekdays, or about 30 per weekday in 2002. Approximately 72% of all short-turns were due to traffic congestion or collisions;
- A survey of streetcar delays was conducted at Dufferin Street and Avenue Road in 2004. This confirmed that delays extend throughout the day, peaking between 10 a.m. and 4 p.m., illustrating that the problem is not associated only with peak hours. Delays due to left turning vehicles blocking the streetcar are higher during the mid-day;
- The streetcar service experienced almost 10,000 minutes of delay due to traffic and collisions during 2002, creating a significant negative effect on reliability and schedule adherence. With streetcars operating at the current 2.5 minute headway, even minimal interference can cause bunching of streetcars and put service off schedule. Bunching has a ripple effect on the reliability of the entire service, especially during the peak periods, but extending throughout the entire day. Once the first streetcar becomes delayed due to traffic or a collision, other delays compound the problem. The lead streetcar will begin arriving late at stops; boarding and alighting times become extended to accommodate added demand; the streetcar

becomes overcrowded, and streetcars behind the lead car will be impeded by the delay, and will also fall behind schedule.

- The obstructions and delays which the St. Clair streetcar experiences result in passengers' travel time varying significantly. In a survey undertaken in September of 2003, streetcars travelling over the "middle" section of the route, between Spadina Road and Lansdowne Avenue, took anywhere from 11 minutes to 33 minutes, with an average of 13 minutes for this travel. Such large variability in travel times reduces the dependability of the service and reduces customers' confidence in how long it will take to make their daily trips by transit.

Overall, this represents poor service to TTC riders and a highly inefficient use of the streetcars, particularly west of Lansdowne Avenue.

In summary, customers of the 512 St. Clair streetcar route are subject to long, erratic waiting times, highly-variable travel times, and the highly-inconvenient and frustrating experience of short-turned vehicles. Typical transit trip times can experience variability of 15-25 minutes, in addition to the problem of short-turning. These problems, collectively, contribute to an inferior and unreliable quality of service which deters people from choosing transit as their preferred mode of travel.

3.8 Safety and Collisions

The area is typical of older urbanized parts of the City of Toronto. However, St. Clair Avenue is wider than many older arterial roads in the City, by approximately one lane width on each side in some areas (i.e. 5 to 7 metres). This added width may be a concern for some pedestrians crossing St. Clair, particularly those who have mobility difficulties.

Emergency services vehicles do not currently have any specific measures in place along St. Clair Avenue to enhance response times (such as exclusive lanes or signal pre-emption systems). In this regard, the area is similar to most areas of the City. Emergency services are affected in neighbourhoods as a result of one-way street mazes and traffic calming measures such as speed humps and all-way stops.

The average number of collisions per year in the study area was 1,126 (2000-2002). St. Clair stood out in terms of city-wide 2002 mid-block collision rates for arterials. The portion of St. Clair from Avenue Road to Yonge Street was rated in the highest category of more than eight collisions per million vehicle-kilometres travelled. Other sections of St. Clair, rated in the mid-level category of four to six collisions per million vehicle-kilometres travelled, included Dufferin Street to Glenholme Avenue, Christie Street to

Vaughan Road, and Bathurst Street to Spadina Road. The Dufferin/St. Clair intersection has the 12th highest intersection collision rate in the City.

3.9 Future Conditions

Future transportation conditions were first assessed for the Do Nothing Alternative. The horizon 2021 was examined and compared to 2001 conditions, for both auto and transit. Two computerized travel demand models were used to project future demand. The City of Toronto's regional 2021 EMME/2 model was used at a broad network level.

EMME/2 trip matrices were used to develop a more detailed Paramics microsimulation model of the St. Clair Secondary Study Area. Transit and auto operations were analysed to assess the performance of the corridor as a whole and by section. Intersection capacity analysis was also performed, to project the performance of the network at a local level.

Estimated growth along the corridor is projected to include 6,100 additional jobs and 3,200 additional residents by year 2021. This growth is projected to affect auto traffic and transit ridership along St. Clair Avenue West. The model indicates the following:

- Projected p.m. peak hour growth in auto demand in the area would be approximately 14% under the do-nothing scenario;
- Projected p.m. peak hour growth in auto demand by section would range from 7 to 35%;
- Neighbourhood p.m. peak hour traffic would increase by 9 to 45%, varying by sections;
- The St. Clair streetcar ridership would increase by at least 9% by 2021, with the existing service level and conditions. The projected 2021 ridership is 34,900 passengers per weekday and 19,600 passengers per weekend.

The growth in auto traffic and transit ridership would impact auto and transit operations:

- Transit travel times on the St. Clair streetcar service in the p.m. peak hour would increase by 12 to 35% relative to existing travel times;
- Streetcars would be able to complete 29% fewer trips in the p.m. peak hour;
- Average auto speed on the roadway network during the p.m. peak hour would decrease by 28%; and
- Auto travel time along St. Clair Avenue from Runnymede Road to Avoca Avenue would increase by 9 to 20% during the p.m. peak hour.

The analyses show that traffic operations will deteriorate to a level at which it will be difficult to accommodate the current level of vehicle occupancy and transit usage. The analysis indicates that traffic growth would result in greater traffic infiltration in adjacent neighbourhoods. Transit level of service would also be affected by the growth in traffic, resulting in poorer service to riders. That would discourage people from using transit, which is counter to the Official Plan policy direction of reducing dependence on auto travel.

4. NEEDS ASSESSMENT

Transit improvements are needed on St. Clair Avenue to cope with existing and future transportation demands.

The City of Toronto Official Plan sets the context for the potential improvement of transit service on St. Clair Avenue West, setting out a policy of intensification along primary streets, as a means of accommodating population growth in a sustainable manner. It designates certain streets as corridors for enhancement of transit service, and advocates that Toronto's high-demand surface transit lines should operate in exclusive transit lanes to improve their efficiency and ability to attract new riders. St. Clair Avenue West is one of these streets. The Official Plan was vetted through extensive public consultation over a three-year period. There is widespread support for the transit-supportive direction of the Plan.

The key elements in defining the need for transit improvements on St. Clair Avenue West are:

1) **Deteriorating infrastructure:** The TTC has scheduled replacement of the streetcar tracks and trackbed for 2005, because of the deteriorating infrastructure. This was originally scheduled for 2004. In numerous locations, the trackbed has rotted to the point that the tracks have sunk into the roadbed, causing the streetcars to scrape the concrete; in this situation, the streetcars are not securely guided by the rails. This is a deteriorating safety situation, which needs to be addressed;

2) **Improving transit connections for current and potential riders:** The St. Clair Streetcar service is an integral link in the TTC's grid network of services, connecting to north-south bus services, and to the Spadina and Yonge Subway lines. The streetcar service carries about 32,000 riders per weekday and 28,000 riders per weekend (total of Saturday and Sunday). Of the residents in the Primary Study Area, **36% depend on the TTC** as their primary mode of transport, including over 22% of the residents who have access to one or more automobiles but choose transit as their

primary trip mode. These "choice" riders should be considered: it can be construed that these people do not have to use the TTC if service does not meet their needs. Of the businesses in the Primary Study Area, an estimated 4,200 (41%) of employees depend on the streetcar service.

St. Clair streetcar riders are subject to long, erratic waiting times, highly-variable travel times, and the highly-inconvenient and frustrating experience of short-turned vehicles. Typical transit trip times can experience variability of 15-25 minutes, in addition to the problem of short-turning. These problems, collectively, contribute to an inferior and unreliable quality of service which deters people from choosing transit as their preferred mode of travel.

What can be done to attract more choice riders? Market research conducted in March 2003 by the TTC, regarding mode choice, asked why people do not take transit. Sixteen percent stated transit is too slow, 25% stated the car is faster, and 10% cited "poor transit connections/wait times too long". This indicates that improved speed and reliability is the key to attracting riders.

The platform widths on the St. Clair streetcar line are currently insufficient for the demands. Wider platforms and improved shelters would also improve conditions for riders.

3) **Inadequacy of existing transit priority measures.** The City has implemented restrictions on left turns from the streetcar lanes at many locations, to improve reliability (i.e. providing a regular, well-spaced service that is not degraded by bunching of streetcars). However, these intermittent restrictions on vehicular access have not resulted in the reliable, quality service needed to keep existing riders and attract new riders in keeping with the Official Plan goals. Transit Signal Priority is also in place on St. Clair Avenue, although its effectiveness diminishes as the route becomes increasingly congested. The streetcars are impeded by left-turning vehicles since the streetcars operate in the median lane and are unable to manoeuvre around turning vehicles. This results in long and highly variable delays in travel time. This unreliable and inconsistent service represents a highly inefficient use of the streetcars and poor service to the riders.

4) **Inability to cope with growth in travel demand through additional low occupancy vehicle trips.** Future demand projections show that projected auto travel growth cannot be readily accommodated within the existing road configuration. A sustainable solution is needed which does not result in overloading of the network or unacceptable traffic infiltration into neighbouring residential communities.

Problem Statement

Taking into consideration the assessment of existing conditions and future needs, a problem statement was developed to reflect the numerous issues that both the public and study team identified. The final version of the Problem Statement, as amended through feedback from the public, is as follows:

> *The St. Clair streetcar route carries about half of all trips made on most of St. Clair Avenue West, at various times of the day. The quality, speed, and reliability of this transit service are degraded, at various times of the day and week, by recurring obstruction and delay caused by other vehicular traffic. These detrimental effects of traffic on the streetcar service are expected to worsen over time, because traffic volumes and congestion will increase due to forecast increases in population and employment in and around the City over the next 20-30 years.*
>
> *Toronto's Official Plan aims to make more effective use of the City's existing road capacity and to reduce congestion, pollution and energy consumption by encouraging more people to travel by transit. This requires enhancing the attractiveness of bus and streetcar services through improving their frequency, speed, reliability and comfort. The purpose of this study is to identify how to bring about such improvements to streetcar service on St. Clair Avenue West in a manner that recognizes the needs of other road users, reflects the revitalization objectives of the communities along St. Clair, contributes to the City's community-building objectives, respects the policies of the Plan, and will be sustainable under future conditions.*

Related Needs and Opportunities

The Phase 1 consultation and analysis of baseline conditions led to the identification of the following needs, which are ancillary to the issue of transit improvement, but which could be addressed through this project:

- Improved parking supply in selected areas for the needs of the business community;
- Improved pedestrian access along St. Clair Avenue and crossing the street; and
- Improved traffic operational strategies. The number of lanes which private vehicles can use varies block by block. This leads to weaving and traffic operational conflicts, resulting in an unsafe situation, demonstrated by the high mid-block collision history.

Opportunities which can be investigated through the assessment of alternative solutions and alternative designs include:

- Improved streetscape including improved pedestrian environment, connections to the parks and public space systems, and the introduction of public art reflecting the heritage and culture of the different areas;
- Enhanced cycling access facilities (east/west and north/south);
- Expanded plantings of trees, to improve air quality; and
- Improved ground permeability by decreasing the amount of hard surface, to decrease stormwater quantity and improve water quality.

5. IDENTIFICATION AND ASSESSMENT OF ALTERNATIVE SOLUTIONS

In Phase 2 of the EA process, the project team and the public/stakeholders identified alternative solutions. These were defined based on EA requirements and projected needs, along with the feedback received through community consultations and stakeholders meetings/workshops. Eight distinct alternatives were defined, plus one additional alternative that was identified as a combination of elements of some of the other alternatives.

Alternative 1 – Do Nothing (Reconstruct Tracks) – would involve only the mandatory replacement of the streetcar tracks. Streetcar platforms would be reconstructed with their current widths in their current locations.

Alternative 2 – Minor Transportation Improvements – would include track replacement on St. Clair Avenue West as well as minor changes to the roadway or to traffic operations strategies at specific locations, to improve the flow of all vehicles. This would include traffic signal timing improvements, selected exclusive left turn/right turn lanes, and addition of more turning restrictions (either at all times, or during peak periods). This could involve restricting on-street parking in selected locations during peak periods and/or removing selected on-street parking spaces.

Alternative 3 – Transit Priority Improvements – would involve implementation of traffic signal and road design changes to give transit vehicles a time advantage over other vehicles. Design changes could include establishing exclusive streetcar lanes only at selected intersections, to allow streetcars to bypass left-turn vehicle line-ups. This alternative would also include track replacement.

Alternative 4 – Other Transportation System Strategies – would include implementation of policies, programs, and infrastructure to improve the efficiency of the

area transportation network. Programs could include travel demand management (TDM) measures, transportation system management (TSM) measures, and high occupancy vehicle (HOV) lanes. This alternative would also include track replacement.

Alternative 5 – Transit Improvements on Other East-West Streets – would include improving transit service on other parallel routes such as Eglinton Avenue, Rogers Road, Davenport Road, or Dupont Street by operating more service, and/or using measures such as signal priority, queue jump lanes, or HOV/reserved bus lanes. This alternative would also include track replacement.

Alternative 6 – Exclusive Transit Lanes on St. Clair Avenue – would involve creating exclusive lanes for transit vehicles on St. Clair Avenue. Emergency services vehicles could also use these lanes. Other vehicles would be prohibited from travelling in the lanes, or crossing them, except at signalized intersections. This alternative would include track replacement.

Alternative 7 – Change Transit Technology – would include replacing the existing streetcars with other types of transit vehicles. This could include buses, of differing technologies, in mixed traffic, reserved bus lanes (RBL) or articulated buses.

Alternative 8 – Road Widening: St. Clair Avenue or Nearby Parallel Roads – would include widening St. Clair Avenue or other parallel roads such as Eglinton Avenue, Rogers Road, Davenport Road, or Dupont Street to increase capacity. This could involve simply removing the on-street parking, or widening if the on-street parking was to remain. This option also includes track replacement.

Alternative 9 – Combination of Some of the Alternatives – would include a combination of some of the above alternatives by section. Components from Alternatives 2, 3 and 6 were considered in Alternative 9. This option would include track replacement.

5.1 Alternatives Assessment Framework

The assessment methodology addressed a comprehensive range of criteria and measures. The framework was defined in terms of three major components. These components are categories, criteria, and measures. The four categories are transportation, business and community, natural environment, and cost. Criteria are the parameters that characterize the categories that emerged from the combined input of the public and Project Team. Measures are quantifiable attributes assigned to criteria.

The input of community groups, business groups, and the public was used to establish the weighting of the categories. The average weighting of the categories was as follows:

- Transportation: 38%
- Community and Business: 38%
- Natural Environment: 14%
- Cost: 10%

A list of criteria was developed with the combined input of the stakeholders, the public and the Project Team. The criteria for each category are listed in **Figure ES-5.1**. Within each category, the criteria were weighted in order to understand their relative importance. Criteria for each category were scored and ranked based on the feedback from the public and stakeholder/interest groups.

5.2 Case Studies

In response to concerns raised by community stakeholders, case study research was undertaken to determine the effects of the implementation of priority streetcar service in other cities. Information was gathered on more than 60 light rail routes, resulting in identification of 15 light rail routes that operate in an environment similar to that of St. Clair West, and that are considered to be successful. The operators were contacted to collect information on policies, operations, right-of-way design, and, if the route was recently implemented, public attitudes during planning and methods for measuring economic impacts before and after installation, if applicable. It was found that installation of priority streetcar services was often used as a tool for economic development and revitalization, and had measurable benefits. **Appendix 8A** of this report summarizes the positive economic and social benefits which have been experienced by other cities which have recently invested in new streetcar services.

A literature search was also conducted to identify research regarding transit service effects on local economic conditions. This search included sources from many well-respected research institutes and organizations on a range of subjects from evaluating economic and community effects of transit changes, to defining effects of investments in rail transit on local business and property values. The findings included the following:

- ***Comprehensive Evaluation of Rail Transit Benefits,*** Victoria Transportation Policy Institute, April 2004: "Rail transit tends to increase regional employment, business activity and productivity. It can provide a catalyst for urban redevelopment, increasing business activity and tax revenues. Property values often increase substantially near rail stations."

Figure ES-5.1: St. Clair Ave. West Transit Improvements Class EA Study: Criteria and Measures

CATEGORY	WEIGHTING	#	CRITERION	MEASURE (S)
Transportation	38%	A1	Travel time savings	∉ Marginal change in travel time from Gunns Road to Yonge Street, relative to existing service *
		A2	Efficiency (vehicle utilization)	∉ Number of vehicles required to address demand *
		A3	Reliability/quality of service	∉ Marginal change in number of short turns projected * ∉ Uniformity of spacing between vehicles * ∉ Consistency in day-to-day trip times*
		A4	Ability to attract riders/ accommodate demand	∉ Competitiveness with other modes (travel time, trip cost) ∉ Measure comfort of trip (no. of passengers/vehicle)
		A5	Ability to connect with potential GO Rail station	∉ Qualitative assessment of feasibility (access, available space, integration with east-west transit service)
		A6	Accessibility for the disabled	∉ Qualitative assessment; width of platforms; access from sidewalk
		A7	Improves passenger accessibility, comfort	∉ Provision of adequate/safe passenger waiting facilities ∉ Number of passengers per vehicle
		A8	Changes to vehicle delays, travel time (existing and future demands)	∉ Marginal change in travel time for transit and automobiles from Gunns Road to Yonge Street * ∉ Marginal change in delay to transit and automobiles in primary study area (average and/or overall delay) *
		A9	Flexibility and adaptability of transit service to technological change	∉ Qualitative assessment of future upgrades, replacement, and/or development time
		A10	Overall person carrying capacity	∉ Number of persons carried per segment of roadway (both transit and automobile).
		A11	Intersection operations (existing and future demands)	∉ Change in overall level of service (at key intersections)* ∉ Number of major intersections with critical movements (e.g. less than 10 percent of capacity unused) *
		A12	Corridor traffic operations	∉ Change in overall level of service on parallel routes *
		A13	Emergency vehicle operations	∉ Change in emergency vehicle time response time ∉ Changes in emergency vehicle access
		A14	Safety (vehicle, passenger, pedestrians, cyclists)	∉ Projected change in collisions: vehicles, pedestrians, cyclists, and transit vehicles
		A15	Pedestrian accessibility, comfort	∉ Net change in sidewalk-width (# of metres by BIA or road section) ∉ Change in intersection crossing times ∉ Changes in intersection waiting times ∉ Changes to cross-street access at non-signalized intersections ∉ Effect on cross-street access (provision of median islands, differential in grades for ROW)
		A16	Cyclist accessibility, comfort	∉ Change relative to existing situation; ability to provide reserved or shared bike lanes ∉ Ability to enhance crossings of St.Clair Ave. ∉ Ability to provide cycling storage
		A17	Construction feasibility	∉ Qualitative assessment of construction feasibility
		A18	Ability to maintain road and related facilities	∉ Ease of maintenance (snow removal, minor repairs)

Table ES-5.1 (Continued)

CATEGORY	WEIGHTING	#	CRITERION	MEASURE (S)
Community and Business	38%	B1	Support of Official Plan and other policy objectives	∉ Qualitative assessment of how well the alternative meets the Official Plan goals for Avenues (supporting mixed-use, transit-oriented development, quality pedestrian environments, enhanced street amenities, etc.) ∉ Evaluation of alternative meeting broader planning policy guidelines (e.g. Provincial Policy Statement, Smart Growth etc)
		B2	Effects on redevelopment potential	∉ Projected change in development potential relative to baseline, up to horizon of 2021
		B3	Support of community planning initiatives	∉ Potential to improve public spaces ∉ Potential to improve personal safety
		B4	Ability to meet Urban Design objectives	∉ Potential for streetscape enhancement ∉ Potential for sidewalk expansion/improvement ∉ Opportunity to create public spaces ∉ Opportunity to create areas for cultural/art features (festivals, special events, and street festivals) ∉ Opportunity to promote community cohesion (north and south sides of St. Clair)
		B5	Economic effects on adjacent businesses	∉ Projected change in employment, land use, building permits ∉ Projected change in retail activity based on changes to vehicular access (addressing parking supply, left turn access, loading access) ∉ Projected change in sidewalk commercial activities ∉ Projected change in business attractiveness due to improved streetscape (qualitative) ∉ Estimation of broad economic gains/losses for the short term (1-2 years after construction), medium term (5-10 years) and long term (15-20 years)
		B6	Economic effects on residential property	∉ Assessment value (limited by data availability) comparing broad Spadina situation to St. Clair. Short, medium and long-term timeframes to be assessed
		B7	Effects on property and business access for employees, customers and deliveries	∉ Changes to hours during which on-street parking and loading are permitted ∉ Changes to permitted turning movements on access routes (consideration for absolute number of route alternatives) ∉ Changes to delivery and loading access (# of businesses affected)
		B8	Parking availability in commercial/retail areas	∉ On-street: net change in number of spaces, by section (e.g. BIA boundaries) ∉ Off-street: opportunity to create off-street parking by section (e.g. BIA boundaries)
		B9	Effects on neighbourhood traffic volumes and access (existing and future demands)	∉ Projected change in volume, by section of the corridor, and on local streets (compared to existing conditions and expected future conditions with 'do nothing') ∉ Change in number of full-moves accesses into and out of specific neighbourhoods of concern ∉ Changes to Emergency vehicle access to primary routes ∉ Changes in activity patterns in sensitive areas (schools, daycares, seniors residences)
		B10	Access to community services	∉ Changes in the access of existing public institutional, cultural and recreational facilities and services (e.g. Piccininni Community Centre
		B11	Noise impacts (after construction)	∉ Marginal change in noise levels as per MOE criteria
		B12	Effects during construction	∉ Duration and extent of construction relative to baseline (replacement of tracks only) (noise/vibration)
		B13	Effect on heritage features	∉ Number of heritage features affected (i.e. level of irreversibility, severity and duration of effect)
Natural Environment	14%	C1	Air quality	∉ Qualitative effect on air quality due to changes in vehicle delays/speeds
		C2	Natural habitats (plants & animals)	∉ Qualitative effect on local natural environment (terrestrial and aquatic habitat, vegetation such as street trees)
		C3	Stormwater management	∉ Requirement for stormwater management facilities ∉ Effect on existing stormwater facilities ∉ Ability of soil to allow for (storm)water infiltration
Costs	10%	D1	Effects on City/TTC budgets	∉ Construction cost ∉ Capital and operating costs over a 20 year lifecycle ∉ Utilities (relocation, upgrading, etc.)
		D2	Cost effectiveness	∉ Change in operating costs from existing ∉ Cost per new rider

- ***Economic Impact Analysis of Transit Investments: Guidebook for Practitioners***, Transit Cooperative Research Program, Report 35, 1998: "Offices and commercial-retail activities can be expected to enjoy both accessibility and agglomeration benefits as a result of compact station area growth. As fixed permanent investments that provide relatively high-quality services, rail systems guarantee that properties near stations enjoy accessibility advantages."
- ***Implementation of Zurich's Transit Priority Program***, Norman Y. Mineta International Institute for Surface Transportation Policy Studies, San Jose State University, October 2001: "Zurich (Switzerland) is famous for the quality of its public transit system. Critical to Zurich's success is a comprehensive 'transit priority' program implemented over the last 30 years. Transit priority improvement techniques are designed to speed up transit. According to Professor Robert Cervero, 'The results of this program have been nothing short of exceptional. Zurich has one of the highest rates of transit usage today, about five hundred sixty transit trips per resident per year, almost twice as many as Europe's largest cities. Transit priority improvements advance customer service by providing faster more reliable service. Improvements empower transit's bottom line by enabling it to operate more service with the same resources and by attracting more passengers. By reducing conflicts with private traffic, transit priority improvements also can reduce accidents and driver stress."

Spadina Corridor Review

The Spadina Streetcar service is the most similar historical comparator in Toronto to test the effect of implementing exclusive transit lanes. A review of the changes on the Spadina corridor between 1993 and 2003 was undertaken. The initial construction was completed in 1997; the current design was implemented in the year 2000. The change from bus service to dedicated streetcar lanes coincided with significant changes in the makeup of the Spadina corridor. However, as other factors external to the corridor were occurring over the some time period, it is not possible to link these changes directly to the transit technology change.

On-street parking was changed from angle to parallel parking, resulting in a reduction of 40 percent with the introduction of the exclusive streetcar lanes, a fact that was mentioned by a number of the business survey respondents. Notwithstanding this, most businesses indicated that conditions stayed the same or improved following the introduction of the exclusive streetcar lanes:

- Following the introduction of the streetcar, employment growth along Spadina was more than double that of the City as a whole;

- The percentage of people employed in the retail and retail service sectors exceeds the City-wide rate, and retail employment losses which occurred before the streetcar was introduced (1993-1997) were reversed following the introduction of the streetcar;
- House rent and property values increased around Spadina Avenue after the streetcar was introduced;
- The majority of residents and retail owners believed that the variety and quality of businesses have improved since introduction of the streetcar service; and
- Over 75% of survey respondents believe that the introduction of the streetcar has provided improved access to local businesses, shops, and stores.

Much of the data indicate a different trend in the 1993-1997 period from the following 1997-2003 period. It can be concluded that the changes to transit did not negatively affect the economics of this area because, **following the 1997 completion of the streetcar line, Spadina outperformed the City in all significant economic factors**.

5.3 Assessment of Alternative Solutions

The evaluation process involved an assignment of weight to each criterion, according to the ranks of their importance. The public were asked to pick the five most important criteria from each category and rank them in order of their perceived importance. The score of each criterion was then evaluated by assigning the following weights to the top five ranks:

Importance	Weight
Most Important	5
2nd Most Important	4
3rd Most Important	3
4th Most Important	2
5th Most Important	1

Based on the scores (i.e. weight multiplied by number of responses for a given criterion), the five most important criteria from each category were chosen as the focus of the comparative assessment of the alternatives. These criteria, in decreasing order of their perceived importance, are as follows:

Transportation

i. Reliability / quality of service
ii. Ability to attract riders / accommodate demand
iii. Safety (vehicles, passengers, pedestrians, cyclists)
iv. Overall person carrying capacity

v. Travel time savings

Business and Community

i. Economic effects on adjacent business
ii. Effects on neighbourhood traffic volumes and access (existing and future demands)
iii. Ability to meet Urban Design objectives
iv. Support of Official Plan and other policy objectives
v. Effects on property and business access for employees, customers and deliveries

Natural Environment (contained only three criteria)

i. Air quality
ii. Natural habitats (plants & animals)
iii. Stormwater management

Costs (contained only two criteria)

i. Effects on City/TTC budgets
ii. Cost effectiveness

The assessment by alternative is summarized as follows.

Alternative 1 – Do Nothing: The alternative of replacing the streetcar tracks and maintaining the current road cross-section, with passenger platforms reconstructed as they are now, was not carried forward to Phase 3 for several reasons. The reliability and quality of transit trips would remain the same initially, then decrease in the future, due to increasing interference from traffic and collisions. Risk of collisions would be expected to remain the same or increase over time. Safety would decrease for pedestrians and cyclists. Passenger satisfaction would also decrease as trip demand grows and streetcars are impeded by traffic. More streetcars could be added to the line to address increased traffic congestion, however, they would operate at a declining quality of service, speed and reliability, contrary to the objectives and needs of the community.

Alternative 2 – Minor Transportation Improvements: Changes to the roadway or to traffic operations elements at specific locations, such as traffic signal timing improvements and additional exclusive left-turn/right-turn lanes and/or turn restrictions, would have some minor benefits relative to the added costs. However, the transit service would benefit only marginally and there would therefore be only a limited effect in attracting more riders. On its own, this alternative would not provide sufficient improvements to transit service, but could be used in combination with other improvements. This alternative was carried forward in combination with other alternatives, as part of Alternative 9.

Alternative 3 – Transit Priority Improvements: Changes such as special traffic signals for transit vehicles only, road design changes to give transit vehicles priority, or reserved lanes for streetcars at intersections only, to bypass other vehicles would have some minor benefits relative to the added costs. Benefits would be limited, because the transit service would be only marginally more attractive. This alternative was carried forward for further analysis as part of Alternative 9.

Alternative 4 – Transportation System Strategies: It was concluded that policy measures such as travel demand management and lanes reserved for use by high occupancy vehicles would be unable to address the travel needs in the corridor. They are more appropriately part of a City-wide strategy to reduce dependence on the automobile. This alternative would not provide any significant direct benefits related to the community or business in terms of streetscape or safety. This alternative was not carried forward to Phase 3.

Alternative 5 – Major Transit Improvements on other East-West Streets: The alternative of improvements on parallel routes was not carried forward to Phase 3 because the assessment concluded it would not have any direct benefits for travellers in the St. Clair corridor and did not adequately address the related major evaluation criteria, such as transportation service, including transit service reliability and person-carrying capacity. Also, the need to purchase additional buses and construct the required maintenance/storage facility would make this an expensive option.

Alternative 6 – Exclusive Transit Lanes on St. Clair Avenue: This alternative would include exclusive lanes for transit use on all or a portion of St. Clair Avenue. This could be done with signs and pavement markings, or with some form of physical separation such as curbs, bollards, landscaped strips, textured pavement, etc. A number of design options would be considered for this alternative. This alternative was carried forward to Phase 3 because the assessment concluded that this alternative provided the highest net benefits, particularly with regard to the categories of transportation service, community and business, and natural environment. This alternative is expected to improve the community's public spaces through enhanced streetscape, infrastructure and upgrades to local landmarks. The natural environment is expected to be marginally improved by reducing auto emissions impacting air quality through a shift of trips to transit, and a marginal improvement to management of stormwater by addition of trees and planted boulevards. This alternative is expected to improve public safety by widening platforms and adding platforms in locations where there are none currently. Neighbourhood traffic is expected to increase on some streets and decrease on others, but within a narrow range. There is expected to be little to no impact on business, employment and retail activity. Auto travel time would increase very marginally. Parking would be retained n both sides, but peak period on-street parking would be restricted, consistent with most arterial roads in Toronto.

Alternative 7 – Change Transit Technology: Replacement of streetcar services with buses operating in HOV lanes was evaluated in some detail as the only reasonable alternative within this group of alternatives. This option was not carried forward to Phase 3 for a number of reasons including concerns with service capacity (buses could not carry sufficient passenger volumes to satisfy future demands or attract new riders), the effects on streetscape and pedestrian environment, and cost of purchasing the required new buses and the pro-rated cost of the associated new bus storage and maintenance facility.

Alternative 8 – Road Widening: St. Clair or Parallel Roads: This alternative would increase capacity for private vehicles only or include additional lanes for use by high occupancy vehicles only. This alternative was not carried forward to Phase 3 because the assessment concluded the impacts would be significant to existing development, and would not cost-effectively address the needs along St. Clair Avenue, especially in terms of transportation, land use, natural environment, urban design and business and community criteria.

Alternative 9 - Combination of Some of the Above Options: This alternative was intended to consist of the best combination of Alternatives 2, 3 and sections of 6, which would be detailed in Phase 3, to reflect the opportunities and constraints of the distinct communities along St. Clair Avenue. The component alternatives are expected to have little negative or positive effect on the business and residential communities, or on the natural environment.

Alternatives Carried Forward to Phase 3

Two alternatives were carried forward:

- **Alternative 6**, Exclusive Transit Lanes on St. Clair Avenue was expected to significantly improve transit reliability and quality while expanding person-carrying capacity, to have little negative effect on the business and residential communities, and to have a slightly positive effect on the natural environment. Costs were projected to be within a reasonable range, and the cost-effectiveness, in terms of attracting new riders, was good.

- **Alternative 9**, comprising the best combination of Alternatives 2, 3 and sections of 6, was also carried forward. This was because each of these options had some potential to improve transportation and transit, and to reflect the opportunities and constraints of the distinct communities and physical characteristics along St. Clair Avenue. Given that neither Alternatives 2 or 3 were expected to have any significant negative effects, it was concluded that Alternative 9 would have a similar effect.

6. EVALUATION OF THE DESIGN ALTERNATIVES

6.1 Ideas Considered

In the evaluation of the design alternatives, the team used the full complement of 75 weighted criteria developed in consultation with the community, and it was also guided by a number of considerations and priorities expressed by the stakeholders as the public consultation proceeded. These included:

- Maintaining safe access for pedestrians, cyclists, and drivers
- Maximizing the amount of parking
- Maintaining capacity for all users of the road
- Minimizing any reductions to sidewalks
- Contributing to community revitalization
- Minimizing traffic infiltration in residential neighbourhoods
- Protecting and promoting healthy neighbourhoods
- Establishing sustainable transportation which is safe, convenient, and economically competitive

The pavement width is typically 21 m along St. Clair Avenue between Yonge Street and the CN Rail overpass west of Caledonia. This is not sufficient to maintain on-street parking and traffic lanes, and add bike lanes. Given that the City's Bike Plan does not designate this street as a priority cycling route, a preliminary decision was made to maintain sidewalk width and vehicular capacity as much as possible and not add dedicated bike lanes, subject to review with the stakeholders.

Various ideas were considered in developing an optimized concept for each alternative. Ideas for Alternative 6 included:

i) Exclusive streetcar lanes marked only by pavement markings and signage (could be peak period only or round the clock); and
ii) Physically separated or distinguishable exclusive transit lanes.

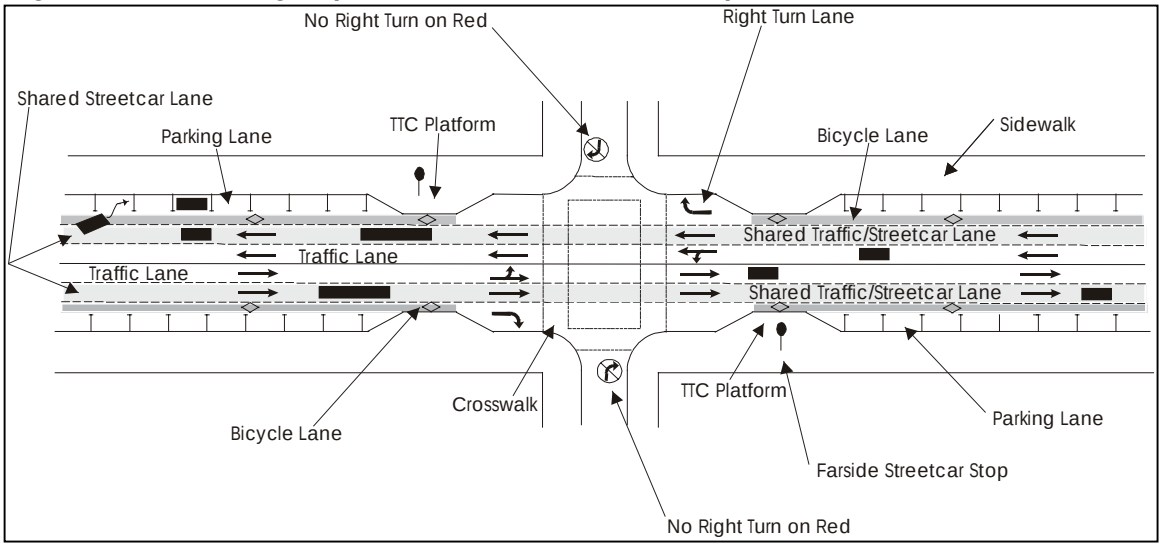
The TTC's experience on King Street has shown that dedicated streetcar lanes marked only by pavement markings and signage are widely violated and difficult to enforce. Innovative enforcement mechanisms, such as cameras on streetcars, are difficult and expensive to implement, maintain and administer. The use of reserved lanes during peak periods only was rejected because the problem occurs throughout the day, not merely

during peak periods. In addition, there is no effective way of enforcing this during peak periods only, and no effective way of regulating and managing traffic in significantly different ways by time of day. The physically separated transit lanes concept was chosen as the preferred Alternative 6 design because this design concept best fulfills the objective of a consistent, reliable transit service free from delay due to traffic congestion and collision.

Alternative 9 was developed to be the best possible alternative to Alternative 6, without exclusive transit lanes. The goal was to provide improved transit service by removing the delay due to left turning traffic. Various design concepts were studied:

1) Option 1: Side of street transit operation: The major deficiency in this configuration is the delay to the streetcar from vehicles entering or leaving curb-side parking and unregulated right-turning vehicles. Disabled vehicles pushed to the side of roads, loading and deliveries, and snow clearing, all of which occur at the sides of the road, would further interfere with transit operations. The proposed far side stop would create potential traffic operations safety concerns. Drivers following the streetcar may not expect the streetcar to stop on the far side. Vehicles stopped behind a stopped streetcar will block the intersection.

Figure ES-6.1.1: Design Option 1 Side of Street Transit Operation

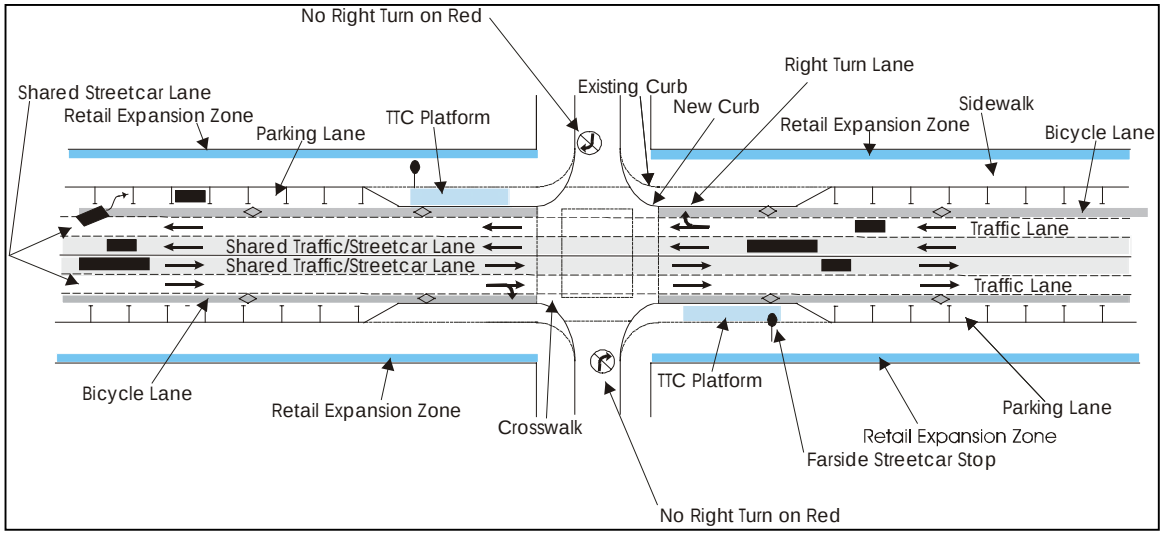


2) Option 2: Mixed traffic with sidewalk widening and permanent parking bays (Based on a report by Brown and Storey Architects for the Corso Italia BIA)

The main issues related to this concept are:

- The permanent loss of two lanes of road space would result in an estimated overall reduction in traffic capacity compared to the current situation;
- This loss of capacity and resulting congestion would result in approximately 12% reduction in travel speeds for traffic on St. Clair which, could cause drivers to seek alternative routings on side streets;
- There would be a projected 15% to 22% increase in traffic volumes using local side streets;
- Streetcars would continue to experience delays due to left-turning vehicles, traffic congestion, and collisions on the tracks, and these delays would continue to worsen over time as traffic volumes and congestion increase;
- The recommended relocation of streetcar stops to the far side of intersections is not feasible because of the traffic and pedestrian safety issues noted for option 1 above. The need to keep the stops near-side would mean that a streetcar stopped to serve customers would require all traffic moving in that direction to stop, thus further reducing traffic capacity on the street; and
- Overall, traffic conditions would worsen and so would the reliability and speed of streetcar operations.

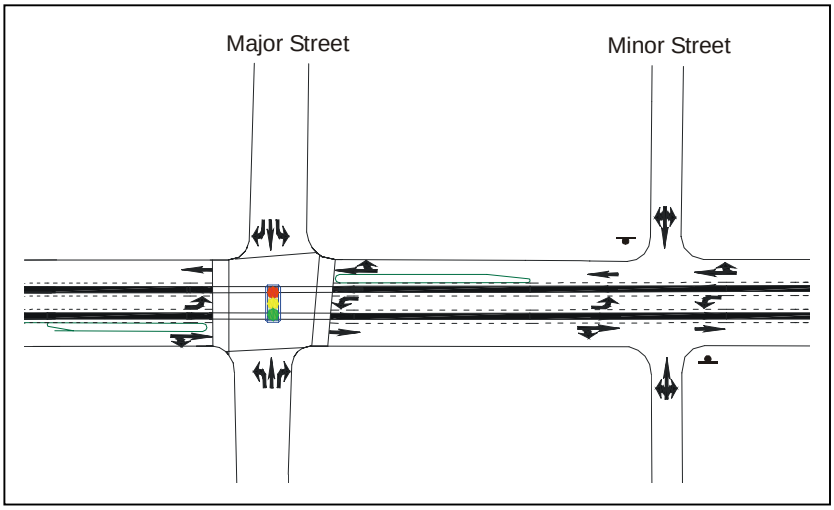
Figure ES-6.1.2: Design Option 2, Mixed Traffic with Sidewalk Widening and Permanent Parking Bays



3) Option 3: Reserved transit lane on one section of the street only: This concept proposed reserved transit lanes only between St. Clair Avenue West Subway Station and Yonge Street. All streetcars travel the entire length of the route from Yonge Street to Gunns Road. Reserved lanes would reduce delays and improve conditions on the one section. However, the mixed traffic operation to the west of

the St. Clair West subway station would not provide the consistency or reliability of service needed to accommodate growth in travel demand. Streetcars would face traffic congestion in the mixed traffic area, which would lead to increased streetcar bunching and short turns, and lower reliability over the full length of the line.

4) Option 4: Centre two way left turn lane: This concept would involve a centre two-way left-turn lane in addition to two through lanes, to move the left turns out of the streetcar lanes. The left turn lane would be between the through lanes where, streetcars would operate in shared traffic lanes. Streetcar loading platforms would be at the near side of the intersections.



Streetcars would face fewer delays from left-turning vehicles. Most left turn prohibitions would be removed, reducing neighbourhood traffic infiltration. On-street parking would be available in parking bays along both sides of the street at all times. The centre left-turn lane space could be used for streetscaped/ planted medians where the turn lane is not required.

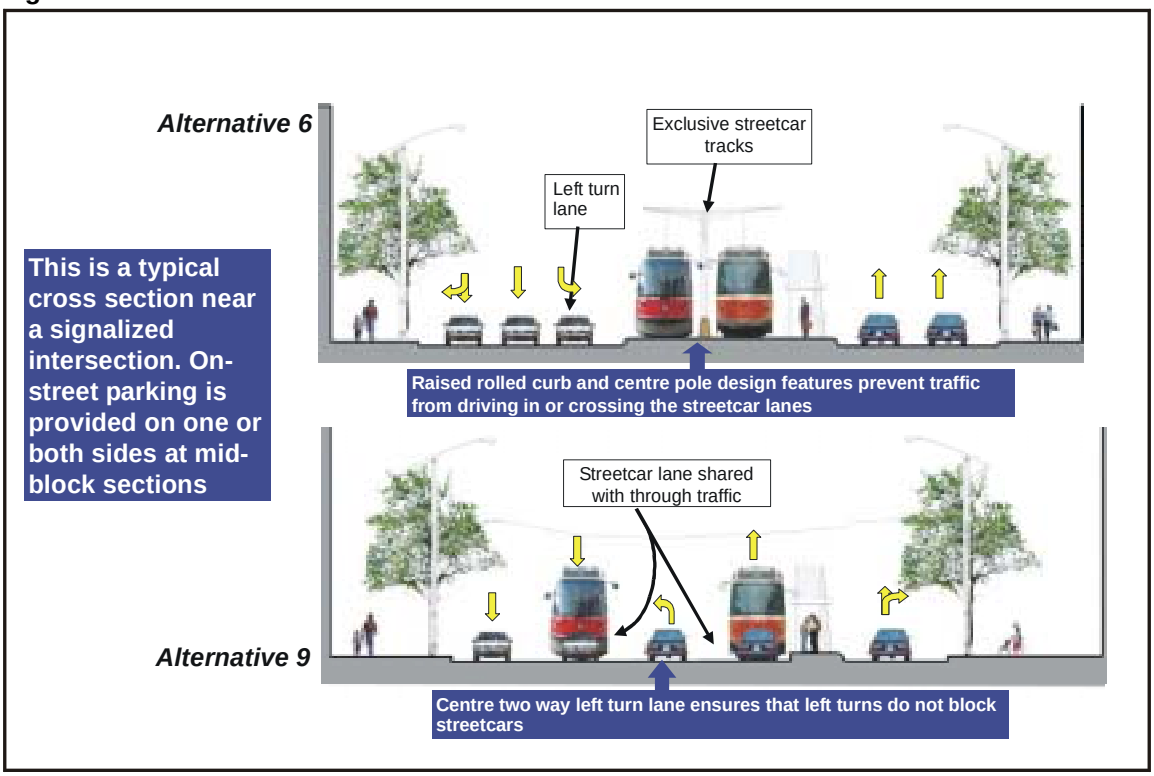
After assessing the various design concepts for Alternative 9, the Project Team chose Option 4 (Centre Two-Way Left Turn Lane) to be carried forward for a detailed evaluation.

The next stage of detailed evaluation involved developing a design plan of the roadway between Gunns Road and Yonge Street, and generating the microsimulation model for Alternatives 6 and 9, in order to understand their traffic and transit performance.

6.2 Design of the Two Preferred Alternatives

The typical features of the chosen option for each alternative are noted below, and shown in **Figure ES-6.2**:

Figure ES-6.2: Cross Sections of Alternatives 6 and 9



Alternative 6: Exclusive Transit Lanes

- Dedicated streetcar lanes throughout raised up about six inches, designed with a mountable edge so that any vehicle could enter or leave the lanes if required
- Streetcar platforms at the far side of intersections
- Exclusive left/U-turn lanes at all signalized intersections (would eliminate existing left turn prohibitions)
- Left turns and U-turns allowed only at signalized intersections
- Regularly spaced U-turns provide neighbourhood access
- Transit signal priority added where applicable (2 more intersections) and improved where possible
- On-street parking on both sides: some parking would be prohibited during peak periods, but 570 of the existing 611 spaces would be retained (93% retained)
- Two travel lanes for traffic in each direction during peak periods. One wide lane would be available in each direction during off-peak periods.

Alternative 9: Shared Traffic/Transit Operation with Centre Left Turn Lane

- Centre two way left turn lane between through lanes

- Most left turn prohibitions removed; left turns permitted at all times
- Through travel lanes accommodate streetcars operating in mixed traffic
- Two through traffic lanes per direction at all times
- Streetcar stops at the near side of intersections
- Transit signal priority added where applicable (2 more intersections)
- Parking on both sides, available at all times: 541 of the existing 611 spaces would be retained (11.5% loss).

BIA Proposal: Streetcars in Mixed Traffic with Sidewalk Loading

A third alternative (modified option 2 above) proposed for one of the local BIAs by Brown and Storey Architects during the evaluation of planning alternatives, was also carried forward for analysis regarding its effects on traffic and transit operations only. While the Project Team had done a preliminary review of this option, it was agreed that it should be tested as a reference point for the other design concepts. This alternative was promoted as a better option for pedestrians and businesses. Its features included:

- Two through lanes for general traffic, including streetcars in the centre lanes
- Near-side stops with passenger loading from the sidewalk (far side stops recommended in the BIA proposal are not feasible, as explained in Section 6.1)
- No platforms; passengers must cross curb lane to board streetcars
- No turn at intersections occur from/through streetcar lanes during rush hours
- Parking in lay-by areas
- Widened sidewalks at intersections for passengers and other pedestrian or business-related activities.

6.3 Evaluation of the Design Concepts

As discussed previously, there are four key categories to the evaluation of the alternatives:

- Transportation
- Community and Business
- Natural environment
- Costs

The discussion below focuses on the various aspects of these categories and provides a summary of the overall evaluation of the design concepts put forward.

6.3.1 Traffic Impacts and Modelling of Design Concepts

A significant issue in the development and comparison of the design concepts was the effect on traffic operations along and around St. Clair Avenue West. In order to ensure that traffic flows and operations were assessed in detail, experts in the area of traffic microsimulation worked with the Project Team to develop a state-of-the-art model of the St. Clair Avenue West study area, that reflected all of the details of traffic movement on St. Clair Avenue West and roads in surrounding neighbourhoods.

The model is able to measure changes in travel speeds, travel times, delays, traffic diversion, and congestion based on different intersection designs, changes in access, parking, new signals, to name just a few. Results from the modelling are shown in **Figure ES-6.3.1** and **Figure ES-6.3.2**.

Figure ES-6.3.1: Microsimulation Comparisons of Auto and Transit Travel Times and Speeds (PM Peak Hour)

Measure	Existing	Alt. 6	Alt. 9	BIA Proposal
Average auto travel time for average vehicle (minutes)	6.3	6.2	6.3	7.3
Average auto speed (km/h)	25	26	25	22
Average streetcar travel time westbound * (minutes)	28	23	27	27
Average streetcar travel time eastbound ** (minutes)	27	24	26	26
# streetcars making complete trips	17	20	17	17

* from Avoca Avenue to Gunns Road

** from Gunns Road to Avoca Avenue

Figure ES-6.3.2: Microsimulation Comparisons of Side-street Travel Changes (PM Peak Hour – Vehicle–kilometres travelled)

North/South side streets between:	Existing	Alt. 6	Alt. 9	BIA Proposal
Old Weston-Dufferin North side	595	545	560	760
Old Weston-Dufferin South side	635	565	635	810
Dufferin to Bathurst North side	700	700	715	810
Dufferin to Bathurst South side	750	650	720	770
Bathurst to Avoca North side	720	600	705	735
Bathurst to Avoca South side	495	535	485	615
East/West Side streets between:	**Existing**	**Alt. 6**	**Alt. 9**	**BIA Proposal**
Old Weston-Dufferin North side	250	250	230	320
Old Weston-Dufferin South side	245	220	250	285
Dufferin to Bathurst South side	885	815	850	850
Bathurst to Avoca North side	1045	1060	1130	1560
Bathurst to Spadina South side	720	700	760	835

The results of the micro-simulation model provide a number of useful insights into the traffic impacts of the three alternatives. Figure ES-6.3.1 shows that there is very little impact on average auto travel times and speeds along St. Clair Avenue West during the afternoon peak-hour under the conditions created by Alternatives 6 and 9, whereas the BIA Proposal impacts both these measures in a noticeably negative manner. All three alternatives improve streetcar travel times in both directions, with Alternative 6 yielding the most significant gains, particularly for westbound (peak direction) streetcars.

Examining the traffic impacts on side-streets, the micro-simulation model can be used to calculate changes in total vehicle-kilometres travelled (VKT) during the afternoon peak-hour associated with each of the three transit alternatives. VKT figures provide a measure of the amount and intensity of travel. These figures are shown in Figure ES-6.3.2 for both the north/south and the east/west streets along defined sections St. Clair Avenue West and can be compared to the existing or baseline conditions. Alternative 6 reduces the total VKT on both the north/south and east/west streets and, consequently, has generally beneficial impacts in terms of reducing traffic infiltration. Alternative 9

marginally reduces the total VKT figures on the north/south streets and marginally increases them on the east/west streets. In contrast, the BIA Proposal significantly increases total VKT on all the adjacent streets. These increases in VKT are attributable to the negative impacts that the BIA Proposal has on traffic along St. Clair Avenue West, which as a result, is encouraged to infiltrate the side streets.

A comparison of levels of service at major signalized intersections on St. Clair Avenue for existing conditions and the alternatives in terms of the traffic flows and intersection configurations is shown in **Figure ES-6.3.3**. The analysis shows that the projected traffic flows with Alternative 6 result in minor beneficial variances in level of service from existing conditions and that the level of service is within an acceptable range for an urban arterial during peak periods.

Figure ES-6.3.3: Intersection Capacity Performance of Existing Scenario, and alternatives 6 and 9 (expressed as volume to capacity (v/c) ratio)*

	Existing			Alternative 6			Alternative 9		
Intersection	**AM Peak Hour**	**P.M. Peak Hour**	**Off Peak Hour ****	**AM Peak Hour**	**P.M. Peak Hour**	**Off Peak Hour ****	**AM Peak Hour**	**P.M. Peak Hour**	**Off Peak Hour ****
Keele St/ Weston Rd	0.71	0.89	0.59	0.75	1.03	0.60	0.66	0.92	0.53
Old Weston Rd	0.72	0.96	0.56	0.68	0.82	0.63	0.57	0.79	0.50
Caledonia Rd	0.68	0.88	0.52	0.74	0.92	0.73	0.68	0.95	0.54
Dufferin St	0.91	0.67	0.81	0.93	0.88	0.81	0.98	0.85	0.84
Oakwood Ave	0.73	0.77	0.56	0.84	0.97***	0.74	0.91	0.91	0.56
Vaughan Rd	0.99	0.84	0.75	0.74	0.91	0.80	0.90	0.82	0.72
Bathurst St	0.86	0.95	0.64	0.98	0.97	0.67	0.91	0.90	0.55
Spadina Rd	0.90	0.85	0.63	1.00	0.93	0.92	0.91	0.87	0.59
Avenue Rd	1.00	0.95	0.66	0.99	1.00	0.72	0.99	0.95	0.60
Yonge St	0.99	0.94	0.63	1.06	0.90	0.67	1.11	0.89	0.63

* *v/c ratio of greater than 1.0 indicates that the projected traffic volume exceeds the available capacity*

** *representative of mid-day and weekend*

*** *v/c at Oakwood expected to be lower due to special signal timing arrangements that are not reflected in analysis*

The most important conclusions from these results are:

- Alternative 6 does not result in auto speed or travel times changing compared to existing conditions;

- Streetcars benefit under Alternative 6 in several ways, including reductions in round trip times of 8 minutes (14%), but more importantly, increasing the schedule adherence to reduce travel time variability, reduce waiting times associated with vehicle delays, and allow an additional 3 streetcars to make a round trip each hour;
- Supplemental data from the model regarding schedule adherence shows that travel time variability improves by 30% for Alternative 6 while variability worsens by 10% for Alternative 9;
- Alternative 6 does not result in increases in neighbourhood traffic, compared to the existing situation, as shown in Figure ES-6.3.2. Both north-south and east-west side streets show no increases, except two areas which increase by 2% and 8%; and
- The BIA Proposal shows a marked decrease in auto travel speeds and a resulting increase in travel on side-streets.

6.3.2 Transit Service Comparison

A number of measures of transit service were used to compare the two design concepts. These included measures of reliability, potential new ridership, delays, and passenger/ pedestrian safety. The following comparison shows the findings of the transit assessment for the two design concepts.

Criterion	Alternative 6: Exclusive Transit Lanes	Alternative 9: Combination Alternative (Shared Transit Lanes with Centre Left turn lane)
Reliability/Quality of Service	-Eliminates 70% of delays -Reliability improves significantly compared to existing conditions, variability in route travel times reduced by up to 30% in peak direction - increase in daily riders of 8,000 based on 2001 travel needs and by an additional 7,000-11,000 daily riders by 2021 - transit travel times decrease by 8 minutes round trip during peak period - 3 additional streetcars are able to make complete trip	- No significant reduction in delays - Reliability is reduced compared to existing conditions, variability in route travel times is increased by 10% in the peak direction - increase of 2,400 daily riders by 2021, no increase based on 2001 travel needs - Some improvement in travel times, decrease of 2 minutes per round trip - same number of streetcars can complete round trip during peak periods
Overall	Very positive benefits	Mostly marginal and some negative impacts to transit

6.3.3 Comparison of Economic Effects between the Alternative Design Concepts

The socioeconomic assessment was a key factor in the assessment of the design alternatives. Availability of parking is clearly an issue for business owners, based on the surveys and comments from business groups. Parking is heavily used in many of the prime 'main street' areas. The two alternatives deliver acceptable traffic operations and varying degrees of improvements to transit operations, based on the transportation assessment discussed earlier. However, they differ in their effects on on-street parking supply.

The available parking supply with each alternative has been utilized as a key factor for determining the relative effect on business activity under each alternative, together with auto usage. It should be noted that using parking as the analysis "driver" is not intended to downplay the positive effects of improving transit services, which increases customer access for business.

Do Nothing (*Replace Tracks*)

- Business and economic activity along the corridor would not change materially under a "Do-Nothing" scenario. However, over time, reductions in accessibility via automobile and transit, as a result of increased congestion, could affect economic activity and have a negative effect on retailing.

Alternative 6

- Alternative 6 introduces some new peak period a.m. and p.m. parking prohibitions in some areas:
  - south side (eastbound) during a.m. peak;
  - north side (westbound) during p.m. peak;
- The p.m. peak period reductions have the potential to affect sales at a limited number of stores such as convenience stores and other similar businesses;
- Without replacing parking in relative proximity to its current location, there is potential for a reduction in corridor sales of 2%;
- Areas of concern (pre-mitigation) would be:
  - *St. Clair Gardens BIA*
  - *Area between St. Clair Gardens and Corso Italia BIA's (though it is noted that there are very few businesses in this section, and even fewer without their own on-site parking)*
  - *St. Clair West BIA*
  - *Businesses between St. Clair West BIA and Hillcrest Village BIA*

- Mitigation of the loss of on-street parking spaces (see below), particularly in the St. Clair West BIA, reduces the potential loss in sales to 0%.

Alternative 9

- While Alternative 9 does not introduce peak period parking restrictions beyond those in place today, there is a loss of on-street parking in a number of locations resulting in a decrease of 70 spaces.
- Without replacing parking in relative proximity to its current location, there is potential for a reduction in corridor sales of 3% for independent retail business;
- Areas of concern (pre-mitigation) would be:
  - *St. Clair Gardens BIA*
  - *Area between St. Clair Gardens and Corso Italia BIAs (though it is noted that there are very few businesses in this section, and even fewer with no on-site parking)*
  - *St. Clair West BIA*
  - *Businesses between St. Clair West BIA and Hillcrest Village BIA.*
- Mitigation of the loss of on-street parking spaces (see below), particularly in the St. Clair West BIA, reduces the potential effects on sales to 0%.

Effects on retailing can be mitigated through the addition of easily accessible parking in the affected areas. The Toronto Parking Authority has already identified locations for potential additional off-street facilities through its on-going programs and is working with City staff to identify and develop new opportunities for off-street parking in affected areas.

6.3.4 Urban Design Potential

Urban design proposals were developed for each of the two Alternatives, and presented in the final round of consultation. This involved concepts for the transit lanes, shelters and platforms, and the location of the streetcar power poles. The proposals also included areas for major improvement to the St. Clair Avenue streetscape, in terms of unique sites for enhancement or addition of heritage, public access or public art features. These included:

- The Lansdowne streetcar loop/entrance to Earlscourt Park (illustrated at right);

- Alberta Avenue;
- Bathurst Street/Vaughan Road;
- Wychwood Avenue;
- the St. Clair West Subway Station portal area; and
- Gunns Road streetcar loop.

Alternative 6 offers more scope to improve the streetscape, because of the changes required to the sidewalk, platforms and shelters. The TTC and City are committed to introducing public art as part of its facilities and developing a public art program as part of the detailed design of the project. On St. Clair Avenue, the urban design plan would recognize the distinct heritage in the various communities, through design of shelter and platform elements, sidewalk inlays, street furniture elements and the design of the TTC power poles (which may include lighting or banners for the commercial areas). The focus of the urban design improvements would be on the area west of Bathurst Street, in the "main street" commercial/residential area. There is the potential to incorporate improvements to streetlighting as part of the project. This would be discussed at the detailed design stage of the project.

6.3.5 Emergency Services Access to the Community

An extensive process of consultation was completed with Fire Services, Emergency Medical Services (EMS) and Police Services of the City of Toronto, to ensure that they were in agreement first with the selection of the preferred Design Concept, and second with the design of the exclusive transit lanes. Meetings were held with emergency services representatives to review the results of the microsimulation model, and to reach consensus on the design specifications for the transit lanes, drawing on their collective experience with other transit lanes in the City.

The concept for the transit lanes has been shown in Figure ES-6.2, and it is illustrated at right in terms of a perspective drawing. It involves slightly raised transit lanes (15 centimetres/6 inches), paved in a contrasting material to the traffic lanes to indicate that the lanes are reserved. A rolled curb would facilitate emergency vehicle access into and out of the transit lanes. There is acknowledgement by both emergency services and the Project Team that the treatment of the space between the streetcar tracks is important to deter vehicles from making left turns or crossing the tracks. The exact treatment to be implemented will be resolved at the detailed design stage in full consultation with emergency services representatives.

The raised lanes and centre treatment would not be implemented at signalized intersections. No differential in height would be present through the signalized crossings of north-south streets.

Winter maintenance of the transit lanes was the only other issue raised by the emergency services staff that requires mitigation. Prompt and effective maintenance is required to ensure that the lanes are accessible and safe for emergency services. This will be discussed by the appropriate maintenance and operations staff at the City and TTC.

6.3.6 Natural Environment

Since St. Clair Avenue West is a highly urbanized area, the prime considerations for impacts on the environment are air quality, natural environment (primarily street trees, parks, other vegetation) and stormwater management.

The following describes the findings regarding the natural environment for the two alternative design concepts:

- Alternative 6 would result in the addition of street trees and platform plantings, would improve air quality, natural habitat, and stormwater quality and quantity. The decreased delay caused by left turns and other traffic movements would improve air quality. In the long-term, the potential to shift a significant number of travellers to transit could also improve air quality. The stormwater drainage system may need to be altered to accommodate drainage from the transit lanes.

- Alternative 9 could improve air quality marginally due to the reduced delay caused by left turns, and addition of trees. However, the potential for increased delays and congestion from lower transit use would degrade air quality. New trees would improve the natural habitat and improve stormwater management, however the narrower platforms would eliminate the potential for plantings.

6.3.7 Costs

The capital costs of the alternatives compare as follows:

- Do-nothing (track replacement only): $25 million (this has been budgeted by the TTC);
- Alternative 6: $17 million in addition to replacement of the tracks, including a basic level of streetscape improvement (does not include property, streetlighting replacement, urban design for streetcar loops, public square, public art, parking replacement, or road resurfacing);
- Alternative 9: $30 million in addition to replacement of the tracks, including a basic level of streetscape improvement (does not include property, streetlighting replacement, urban design for streetcar loops, public square, parking replacement, or public art). This includes a cost premium of 50% on the trackbed construction as a result of the need to build two separate trackbeds and reconstruct the over-head wiring to cover a wider track spacing and reconstruct/relocate any utilities that may be within the area of the new spread-apart trackbeds.

Alternative 6 provides a much higher level of cost-effectiveness than either the do-nothing or Alternative 9, based on its ability to attract additional riders and offer them a reliable, quality transit service which can be maintained into the foreseeable future. If the capital costs are amortized over the 30 year life-cycle of the tracks/streetcar facility and other capital works, the capital cost per additional customer trip is $0.37 for Alternative 6 and $2.67 for Alternative 9.

The cost estimates do not include Toronto Parking Authority budgets required for any mitigation of parking losses or the costs for any property acquisition.

6.3.8 Preferred Solution

Based on the outcomes for each category and its relative weight, each criterion and its relative importance, the overall evaluation identifies Alternative 6: Exclusive Streetcar Lanes for St. Clair Avenue as the preferred design concept. The final evaluation of the two design concepts was completed in August 2004 and resulted in the following conclusions regarding the technically preferred alternative (exclusive lanes for transit):

- The quality of the transit service offered on St. Clair Avenue West would improve significantly. This improvement would be sustainable in the long term, even if traffic volumes increase and traffic congestion worsens;
- The plan allows retention of 93 per cent of all existing on-street parking. With the addition of more off-street parking, there will be an overall increase in parking supply;
- All current traffic volumes on St. Clair Avenue West can continue to be accommodated and operate at an acceptable level of service;
- The performance of some of today's worst intersections on St. Clair Avenue West would be improved, so that queuing and congestion would be reduced for all road users;
- Emergency vehicles (Police, Fire, EMS) would have a new opportunity to improve their response times and performance because they would be able to travel, at any time, in the unrestricted lanes reserved for only them and transit;
- The plan allows and encourages all current street activities and pedestrian movements so as to retain the community's sense of connectedness;
- The pedestrian environment, streetscape, and public spaces would be improved;
- There would be negligible effects on local residents' access to their own residential streets, and on the amount of traffic using local streets;
- There would be negligible effects on access to businesses, and on loading and deliveries;
- More pedestrians and shoppers would be attracted to the street by the improved quality of transportation provided;
- There is no effect on community facilities or festivals;
- There is a marginal loss in on-street parking. Mitigation of that effect is discussed below; and
- The urban design quality of the street can be improved, creating a unique identity for St. Clair Avenue.

7. MITIGATING MEASURES

Mitigating measures would be required for only a few effects of the undertaking. These fall into the categories of effects related to construction, economic effects and potential neighbourhood traffic infiltration. The mitigating measures defined in each category are as follows:

7.1 Construction Mitigation

The socio-economic impact assessment indicated that the construction period would be a significant concern with respect to the impacts on the business community. The TTC has considerable experience gained from applying mitigation during construction on other streetcar routes including College Street and King Street.

The TTC and City will work with the business community to define, develop and implement a business outreach and consultation program during construction. This program will include elements such as:

- Scheduling construction by section of the street so as to avoid peak sales seasons;
- Maintaining vehicular access along St. Clair Avenue in each direction (one lane will be kept operational);
- Maintaining city services such as garbage pickup;
- Maintaining sidewalk access throughout the construction periods;
- Providing advance notification of upcoming construction activity, so that business owners can make necessary arrangements;
- Accelerating construction schedules. Consideration will be given to working 24 hours per day, seven days a week where possible;
- Organizing set-up of materials storage at suitable sites along the corridor so as to minimize the period of disruption along St. Clair Avenue;
- Maintaining a community liaison construction officer on-site, who will be committed to addressing business and community issues;
- Encouraging construction staff and local residents to patronize local businesses;
- Developing a communication plan to ensure that the public is aware of the activities, location and schedule of construction including a website and contact number; and
- Requiring construction workers to park off-site, so that the parking supply is reserved for customers and residents.

This business outreach program would be documented and disseminated to the local business community well in advance of construction.

7.2 Economic Impact Mitigation

The socio-economic impact assessment indicated that one of the other main concerns for the business community, aside from the construction period, was the effect of reductions in on-street parking. The following mitigation measures address that issue:

- Creation of off-street parking lots. The Toronto Parking Authority (TPA) is committed to building three off-street parking lots in locations where these are needed along St. Clair Avenue, during the 2005/2006 period, to supplement on-street parking

in areas that require more parking. The City will work with the TPA to identify new sites to replace spaces lost on-street in those areas that require replacement. The areas identified as needing mitigation are the St. Clair Gardens BIA, the St. Clair West BIA and the area between St. Clair West BIA and Hillcrest Village BIA;

- Introduction of additional on-street parking spaces on streets connecting to St. Clair Avenue;

- Improving the availability of on-street parking, adjacent to the Corso Italia BIA. The TPA is planning to convert the on-street spaces west of Lansdowne Avenue to Caledonia Road to 'pay and display'. This will decrease the average parking duration for these spaces, thus making them available for use by more shoppers and short term parkers.

7.3 Monitoring of Traffic Conditions

There are a number of locations where monitoring of traffic volumes should be implemented after the completion of construction, because of sensitivities identified by community stakeholders. These locations include:

- Heath Street between Spadina Road and Yonge Street
- Alcina Avenue / Benson Avenue / Rosemount Avenue

This would be undertaken in the normal way by Works and Emergency Services Department. The monitoring program related to local traffic impacts will be an ongoing initiative. It is not possible to be definitive at this time regarding the specific measures (such as turn prohibitions) that would be implemented as a result of the monitoring program, because the exact nature and magnitude of the traffic effects is uncertain to some degree. However, the City has a neighbourhood traffic management program in place to deal with community traffic issues.

7.4 Winter Maintenance of Transit Lanes

Responsibility for winter maintenance (i.e. snow plowing) of the transit lanes should be clearly defined in an agreement between the City and the TTC, to ensure that the lanes are kept in safe, useable condition, for both transit and emergency vehicles, at all times of the year.

8. NET EFFECTS

The net effects of the project are expected to be positive for the street, its residents and businesses, and the City overall.

The proposed undertaking will maintain the existing traffic capacity on St. Clair Avenue, while providing a significant improvement to the reliability and quality of transit service. At constrained intersections, the undertaking includes improvements to enhance traffic access. The proposed plan includes enhancements for generally improved pedestrian safety and comfort, through enhanced platforms and shelters, and enhanced pedestrian crossing designs.

The improvement in transit service achievable through this proposal, and sustainable in the long term, would bring positive environmental benefits to the area, attract more shoppers and pedestrians, reduce automobile dependency in the area and beyond, and contribute towards a more people-friendly environment on St. Clair.

9. CONCLUSIONS

The need to replace the streetcar tracks on St. Clair Avenue West presents the City with the opportunity to reassess the function and design of this important corridor in terms of both local, community revitalization objectives and wider city-building goals. Council recognized these prospects for positive change and, in February 2003, approved funding for the St. Clair Avenue West Transit Improvements Class Environmental Assessment (EA) study.

At the local level, there is a pressing need to reconstruct the tracks used for the 512 St. Clair streetcar service and, at the same time, create a more pleasant and inviting pedestrian environment to strengthen and invigorate activities along the street.

The transportation planning policies of the Official Plan recognize that in a mature city like Toronto the emphasis has to be on using the available road space efficiently. This can be accomplished by encouraging more people to travel by transit to reduce congestion, pollution and energy consumption. This requires enhancing the attractiveness of bus and streetcar services through improving their reliability, frequency, speed and comfort.

A key means to bring about surface transit improvements is to give greater priority to buses and streetcars on City roads. This has proven to be the only workable and sustainable approach in the world's major cities – London, New York, Hong Kong,

Berlin, and Paris to name only a few- and is the approach advocated in the recommendations of the EA study for St. Clair Avenue West.

The terms of reference for the St. Clair Avenue West Transit Improvements EA reflect the larger significance of the project. Although focussing on the primary issue of improvements to the quality of transit, the study also addresses considerable attention to many related issues including business impacts, the needs of other road users, pedestrian safety, environmental concerns, and urban design features.

The EA study was undertaken in accordance with the Municipal Class Environmental Assessment process, which imposes a number of formal requirements on the conduct of the study. Public involvement has been a vital and ongoing part of the study process. The project team has gone far beyond the legislated requirements for public participation. Notably, the project team worked closely with the community by engaging in more than 54 public meetings, workshops, and many informal stakeholder meetings, plus thousands of contacts (by e-mails, letters, phone calls and web-site hits), in a combined effort to identify opportunities for the revitalization and "beautification" of St. Clair Avenue West.

The section of St. Clair Avenue West between Yonge Street and Gunns Road (just west of Keele Street) is made up of a number of vibrant and diverse residential, business and institutional communities that have expressed a wide range of interests and views on the streetcar project.

Throughout the evaluation process, the project team focussed on responding to specific local concerns. The result is a Preferred Design Concept which is very mindful of the need to take into account community issues, concerns and aspirations. In particular, the recommended design concept has been continually adjusted and refined to address key concerns relating to possible "barrier effects", potential loss of on-street parking, threat of adverse effects on businesses, reduced access for emergency vehicles, capacity to accommodate current traffic volumes on St. Clair Avenue West, traffic infiltration on local streets, and reductions in sidewalk widths. It was critical to deal with these concerns in developing an alternative that, on balance, offers the greatest net benefits.

The Preferred Design Concept brings a number of benefits which extend beyond those strictly related to improving streetcar service on St. Clair Avenue West. Among these are significant improvements to the "public realm" as a result of enhancements to the streetscape and other design features.

These enhancements include pedestrian safety features, improved designs for streetcar platforms, shelters and stops, civic improvement projects at key locations along the route,

introduction of public art, street-lighting improvements, additional tree planting and replacement and improved connections to parks and other open spaces.

The final designs for a number of these public realm elements will be addressed in the detailed design phase. One of the next steps is to create a community design consultative group to assist in the formulation of this important "beautification" component of the project. In addition, the project team will continue to work with the St. Clair Avenue West business community to develop and document a Business Outreach Program. Staff of the City's Economic Development Division will consult with local BIAs on opportunities to jointly fund other streetscape improvements.

The City is poised to make a fundamental statement about the way it envisages this City and its communities growing and developing. Upgrading transit service on St. Clair Avenue West, by giving priority to streetcars, indicates a commitment to reducing auto dependency and creating a more liveable, people-friendly, attractive and sustainable City. Improved streetcar service on St. Clair Avenue West supports the land use planning objectives of seeing this corridor develop as a vibrant, mixed-use "Avenue" where the emphasis is more on the quality of the pedestrian environment than on the accommodation of traffic.