TORONTO TRANSIT COMMISSION
REPORT NO.

MEETING DATE: MARCH 21, 2007

SUBJECT: IMPROVEMENTS TO THE 504 KING STREETCAR SERVICE

RECOMMENDATIONS

It is recommended that the Commission:

1. Request City Council to:

   - approve, in principle, the installation of a temporary, reserved right-of-way on a four-to-five block section of King Street, as a demonstration project during July and August of 2008, using the design concept described in this report, and following a process similar to that used by the Toronto Waterfront Revitalisation Corporation in their demonstration of temporary modifications to Queens Quay, west of Bay Street, in August of 2006;

   - rescind the existing by-law that prohibits traffic from travelling on the streetcar tracks on King Street, between Dufferin and John Street and between Jarvis Street and Parliament Street, because this measure has never been obeyed or enforce;

   - expand the designated peak-periods on King Street – when parking, standing, and stopping prohibitions are in effect -- to the hours of 7:00 a.m. to 10:00 a.m. and 3:00 p.m. to 7:00 p.m.;

   - direct City staff to:

     - introduce the necessary by-laws to designate King Street, between Dufferin Street and Parliament Street, as a “Transit Priority Zone” where, similar to Community Safety Zones, fines for traffic and parking violations are doubled, and arrange for the installation of the associated signage to make motorists aware of the more-severe penalties;

     - immediately initiate, with the Province, the process necessary to expand the red-light camera enforcement program in Toronto to allow camera enforcement of illegal left-turns, and of stopping and parking violations; and

     - report back as soon as possible on the feasibility, and cost, of constructing taxi lay-bys on King Street where taxis now block the curb lanes at the office towers between York Street and Bay Street;

- direct Toronto Police Service to commit resources for the continual and ongoing enforcement of all applicable traffic regulations within the King Street Transit Priority Zone.

2. Note that, as long as this very busy and frequent route continues to operate in mixed traffic, there is little that the TTC can do to bring about truly high-quality, reliable service on the 504 King streetcar route; only marginal improvements will be achievable; and

3. Forward this report to the City of Toronto Public Works and Infrastructure Committee, the General Manager - Transportation Services, the Toronto Police Services Board, the Executive Director and Chief Planner - City Planning Department, and the Greater Toronto Transportation Authority.

FUNDING

This report has no effect on the TTC's capital or operating budgets.

BACKGROUND

The 504 KING streetcar route is used for approximately 48,000 customer-trips on a typical weekday. Over the years, a variety of measures have been implemented in an attempt to improve this streetcar service. Most of these measures achieved little benefit in reducing delay or obstructions to streetcars. The quality of this service is still poor during periods of peak traffic congestion, because service regularity deteriorates, bunching and gapping occur, and many streetcars become so crowded that they are unable to pick-up passengers.

This report recaps the measures that have been taken on King Street to-date, their effectiveness in improving the quality of service, and discusses some measures to improve the operation of this streetcar route.

DISCUSSION

1. Big Improvements Not Possible Without Permanent Right-of-Way

The public and the Commission have asked staff to find ways to dramatically improve the quality and reliability of service on the 504 KING streetcar route. This can be achieved only with three complementary components:

- a physically-separate right-of-way to isolate the streetcar operation from all other users and activities on the street and to, thereby, reduce the magnitude and variability of delays which affect streetcar operations
- larger-capacity streetcars, such as the current ALRV's, to make each vehicle better able to accommodate the variability in passenger volumes and loading, and to be better able

to withstand unavoidable minor delays which, cumulatively, have major effects on regularity when smaller-capacity vehicles are used and spaced closely together

- Proof-of-Payment (POP) fare collection to reduce the magnitude and variability of passenger service time at all stops

Staff stand by this position, despite previous arguments to the contrary and believe that, with any service as frequent as every two minutes, there is no way to effectively manage and ensure reliability on a route operating in mixed traffic, an environment over which the TTC has no control. Good streetcar service in mixed traffic is no more achievable than would be frequent, reliable service on the Yonge subway line if that service were made to operate in mixed traffic on Yonge Street, subject to delivery trucks and illegally-parking vehicles on the subway tracks. As staff have said previously, there is no other city in the world which attempts to operate service as frequent as the 504 KING route in mixed traffic. Therefore, it is critical to understand that, as long as this route continues to operate in mixed traffic, there is little the TTC can do to bring about dramatic improvements in the reliability or regularity of this service. The best that will be achieved is marginal improvements.

2. Improvement Measures Already Implemented/Attempted on King Street

A number of measures have been implemented to improve the quality of the 504 KING streetcar service. Measures that proved to be effective, to varying degrees, are:

- signal priority: effective in reducing signal delays by holding traffic signals green longer, or ending the red light sooner, when a streetcar is detected on the approach to an intersection;

- left-turn prohibitions at most intersections in the central area on King Street: has reduced delays due to motorists sitting on the streetcar tracks and waiting to make a left-turn, but effectiveness is limited because there is still a high violation rate;

- adding extra streetcars to increase capacity: in the busiest operating periods, up to 30% more streetcars are operating on the line than would normally be assigned based on TTC load standards. This is to help address the capacity problems that occur when streetcars become bunched and vehicle loads are imbalanced;

- using larger, articulated streetcars: while this is an effective way of increasing capacity on the route, it is limited because all but a limited number of articulated streetcars are already assigned to other routes and there will be no new articulated streetcars available before 2010-2011;

- rear-door loaders at specific stops: effective in reducing the passenger service time at busy stops; and

- construction of by-pass tracks at 504 KING streetcar terminals: by-pass tracks at Dundas

West and Broadview Stations resolved the "bottleneck" and delays that often resulted when the 504 KING and 505 DUNDAS streetcar routes shared a single track at these terminals and blocked each other's progress.

Measures that were found to be not effective were:

- reserved streetcar lanes: motorists were prohibited from travelling in the streetcar lanes through the central area of King Street during peak-periods. However, because the reserved right-of-way for streetcars did not incorporate any form of physical barrier, it was totally ineffective. The reserved lanes remain in place, using signs and pavement markings, between Dufferin and John Streets and between Jarvis and Parliament Streets only. They do not provide any benefit to streetcars, so they should be removed.

- 10-week police blitz on King Street: In 2000, the TTC hired paid-duty police officers to enforce the stopping, parking, and turning prohibitions in the downtown section of King Street. This blitz did not result in an appreciable, ongoing, improvement to the quality of service on the line and, given its very-high cost, was not continued.

3. Further Improvements to the 504 King Streetcar Operation

The City's new Official Plan designates King Street as a "transit priority corridor", meaning that streetcars on King Street should have significant and noticeable priority over other traffic. The following improvement measures are necessary steps towards achieving the faster and more-reliable streetcar service on King Street that is envisaged in the Official Plan and which customers are asking for.

4. Create a Temporary Transit Right-of-Way for Streetcars on King Street as a Demonstration Project

As had been indicated in past Commission reports, the only way to achieve a dramatic improvement in the 504 KING streetcar operation is to physically separate it from other traffic and to, thereby, remove it from the delays caused by traffic congestion on this roadway. As stated previously:

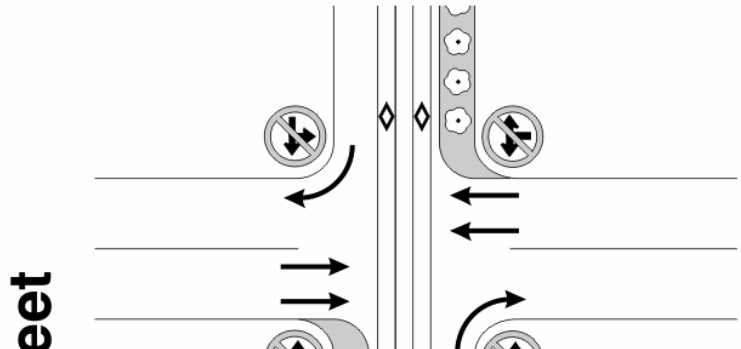
> *Many Torontonians take for granted the high frequency of service offered by the TTC on most of its routes, and likely fail to appreciate how unusual the 504 KING situation is. In most other North American cities, and in many European cities, a transit route is considered to have high frequency service when streetcars come every five minutes, or even every ten minutes; the two-minute service offered on the 504 KING streetcar is an extraordinarily high-frequency service by any standards. Moreover, in most North American cities which operate streetcars or light rail transit, and in virtually all European cities which operate such service, the vehicles operate in their own physically-reserved right-of-way, not in congested mixed traffic with no more priority than private automobiles.*

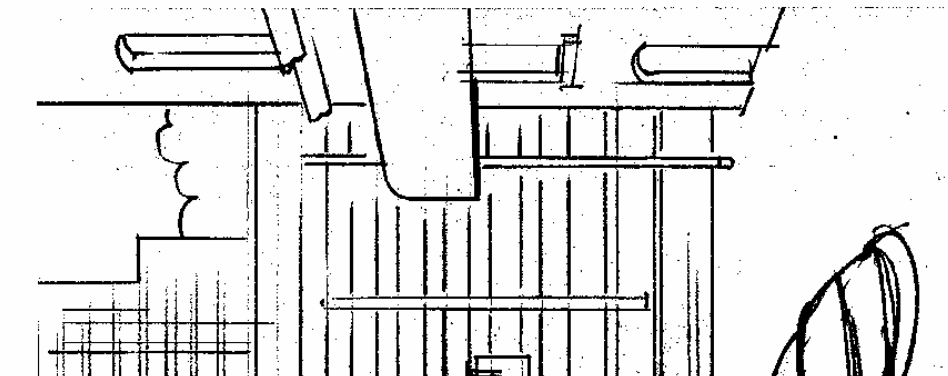
With the most-recent service additions, the 504 KING streetcar route now has a morning peak-hour frequency of a streetcar every two minutes. The Yonge subway, by comparison, has a morning peak-period frequency of a subway every two minutes and 21 seconds. The subway, however, operates in its own private tunnel, while the 504 KING streetcar route, with more-frequent service, must operate in congested mixed traffic. At such a high service frequency, even the smallest disruption -- things such as a stopped taxi, a minor traffic accident, an emergency vehicle stopped briefly on the tracks, or even disproportionately-high passenger loading or unloading -- can cause gaps in service, with the associated bunching and overloading of streetcars. The bottom line is that a route with as high a frequency of service as that operated on the 504 KING route cannot operate effectively in mixed-traffic conditions.

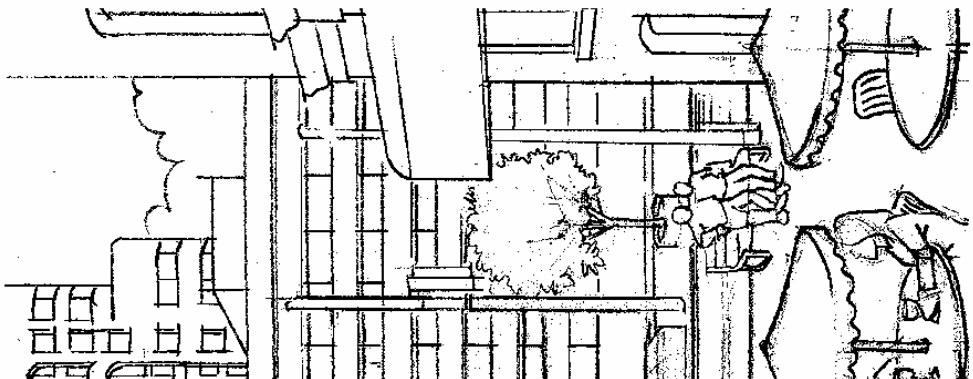
These two facts taken together -- the high-frequency service and the mixed-traffic operating environment -- present an extraordinarily-difficult operating challenge to the TTC with respect to the provision of fast, reliable, transit service.

The only way to ensure a higher-quality service on King Street is to operate the service in its own dedicated right-of-way.

The concept that was developed in 2001 is illustrated in Exhibits 1,2, and 3, and is described in more detail in Appendix 1. This concept incorporates physical modifications to the street, whereby through traffic would be banned at all times, but traffic would still have access to one side of each block, so that all normal commercial and residential activities could be carried on. The number of traffic lanes would be reduced from four, to three, by replacing one of the curb lanes with a widened sidewalk. This expanded sidewalk would alternate by block, between the north and south side of the street.







While this measure was supported by the Commission when it was originally presented, it faced opposition from some business owners, and strong concern was expressed by some City Councillors about its potential effects on King Street. Some of the concerns related to the fact that it would be a dramatic, permanent change to King Street with a significant reduction in on-street parking and capacity for autos. As a result, the concept was never implemented.

In response to these concerns, but recognising the need for a fundamental change in the way streetcars operate on King Street, it is recommended that a right-of-way be implemented, on a

demonstration-test basis, on a relatively-short section of King Street that would be in place for the months of July and August of 2008. Staff of the TTC, and the City's Transportation Services, Planning, and Economic Development Departments, would work with urban design consultants to develop design concepts and to consult with adjacent businesses before selecting a recommended alternative. The designs would allow businesses, on the side of the block where the sidewalk space is expanded, to create new, or larger, outdoor sidewalk-oriented activities, such as restaurant patio space, to take advantage of the additional sidewalk width. This demonstration project would illustrate the benefits of this concept to the streetcar operation and to the urban design and pedestrian environment on King Street as a whole, and allow a full assessment of any associated effects.

Through this consultation process, a four-to-five block section of King Street would be selected where the demonstration would be implemented. It might be appropriate to include the area west of John Street, where there are numerous sidewalk cafés, and/or the theatre district, where the sidewalks become crowded before, and following, a performance.

The approach being proposed is similar to the one which was followed by the Toronto Waterfront Revitalization Corporation to "showcase" the winning design from its Central Waterfront Innovative Design Competition. Implemented in August, 2006, this demonstration allowed everyone to see and appreciate the potential for significant roadway modifications, to allow improvements to the urban design, and the pedestrian and cycling environment, on Queen's Quay, between Spadina Avenue and Bay Street.

4.1 Expand the Duration of the Morning and Afternoon Peak-Periods On King Street

The peak-period designations on King Street -- when parking, standing, and stopping prohibitions are in effect -- are relatively short in duration: 7:00-to-9:00 a.m. and 4:00-to-6:00 p.m. In the hours immediately before, and after, these peak-periods, the curb lanes become blocked with cars legally stopping and parking, and the capacity of the roadway is dramatically reduced. However, as shown in the following table, there are still very-high volumes of customers travelling by streetcar on King Street in these "shoulder" periods that are affected by this congestion and the reduced-quality streetcar service.

Ridership on 504 KING
Between Dufferin & Parliament

Time	Two-Way Ridership
7 – 8AM*	2170
8 – 9AM*	3450
9 – 10AM	2680

3 – 4PM	1570
4 – 5PM*	2860
5 – 6PM*	3040
6 – 7PM	2510

(* existing peak-period)

Given the high ridership in the "shoulders" of the existing designated peak-periods on King Street, it is recommended that City Council expand the peak-periods traffic regulations on King Street, between Dufferin Street and Parliament Street, to the hours of 7:00-to-10:00 a.m. and 3:00-to-7:00 p.m.

It is essential that the roadway operate as well as possible during all of these hours because any significant delays that occur in the hours surrounding the current peak hours create gaps and bunching that continue to affect the quality of streetcar service during the mid-day and the afternoon peak period.

4.2 Make King Street a "Transit Priority Zone" with Doubled Fines for Traffic and Parking Offences

The fact that there was no significant reduction in the very-high violation rate of the turning, stopping, and parking regulations on King Street during the 10-week police blitz in 2000 clearly demonstrated that enforcement, by itself, is not a sufficient deterrent to motorists in Toronto who regularly and blatantly disregard traffic regulations in this area. If the level of traffic violations on King Street is to be significantly reduced, regular police presence on King Street must be re-enforced by much-higher fines for traffic-related offences.

Therefore, it is recommended that City Council designate King Street, between Dufferin Street and Parliament Street, as Toronto's first "Transit Priority Zone". Similar in concept to "Community Safety Zones", fines for traffic violations in the Transit Priority Zone would be doubled.

Here are some examples of the resulting increases in fines in a Transit Priority Zone:

Offence	Set Fine (Existing)	Set fine (Proposed)
Illegal Parking	**$30**	**$ 60**
Illegal Stopping	**$60**	**$120**
Prohibited Turns	**$90**	**$180**

The establishment of the Transit Priority Zone would have to be widely publicized in the media. Toronto Police Service would be required to provide a high level of police enforcement in the initial months, and then a continuing, regular police presence thereafter. At the same time, the

City of Toronto must provide similar high levels of enforcement of parking/stopping regulations by its By-Law Enforcement Officers.

4.3 Camera Enforcement of Illegal Turning, Stopping, and Parking in the King Street Transit Priority Zone

In order to reduce the extent of Police and By-Law Enforcement personnel presence required on King Street, and to develop an even-more effective, long-term approach to eliminating the very-high violation rate of the turning, stopping, and parking regulations, the City should be directed to work with the Province to expand the red-light camera enforcement program to allow camera enforcement of illegal turning, stopping, and parking, using the King Street Transit Priority Zone as a pilot project for this new program.

4.4 Lay-bys for Taxis on King Street, Between Bay and York Streets

There is a continuing problem of taxis parking illegally on King Street, at many hours of the day, in front of the office towers between Bay Street and York Street. Given that they are blocking one of the two lanes in the affected direction, they remove 50% of the road's capacity and create a significant 'bottleneck' for all traffic on this section of King Street.

There are specific locations in this area where the sidewalk appears sufficiently wide to allow lay-bys to be constructed without a significant impact on the pedestrian environment. Therefore, City staff should be requested to examine the feasibility, and associated cost, of building taxi lay-bys so that taxis can wait for customers at the office towers without creating traffic congestion and degrading transit service.

5. 504 King Route Not Ready for Proof-of-Payment (POP)

Proof-of-payment fare collection, which is now in place only on the 501 QUEEN streetcar line, reduces the amount of time required to serve customers at stops, because it allows customers who already have a proof-of-payment (e.g. paper transfer or Metropass) to use all doors for boarding and alighting. The issue of passenger boarding and alighting times becomes increasingly important on routes with larger-capacity vehicles, such as the ALRV streetcars. These vehicles have three sets of doors that, with POP in place, allow for much-faster customer boarding and alighting.

The 504 KING route is operated primarily with standard-length CLRV streetcars and, while the time spent serving customers at stops is still significant, the congested traffic conditions that are typical on this route means that the reductions in passenger service time which could be achieved from POP would not be likely translate into comparable reductions in travel time. Only if streetcars on King Street were operating obstruction-free in a reserved right-of-way would the savings in passenger service time resulting from POP translate into equivalent, round-trip travel time savings.

This being the case, the benefits achievable by implementing POP on the 504 KING route under the current conditions of mixed-traffic operations, would not be great enough to warrant the expense of the required additional fare enforcement officers. Instead, more consistent use of rear-door loaders -- TTC staff who can check for passes and transfers -- will allow reduction of passenger service times at the busiest stops on the route.

SUMMARY

There are a variety of problems contributing to the slow and unreliable service on the 504 KING streetcar route. If there is to be a dramatic improvement in the operation of this route, the solutions must be more aggressive than the improvement measures which have been implemented on this route in the past: these include a physically-separate right-of-way, large-capacity vehicles such as ALRV's, and a proof-of-payment (POP) type of fare collection system.

This report describes some modest steps which can be taken now to help improve service on the 504 KING streetcar route. The key recommendations at this time include creating a Transit Priority Zone in the central section of King Street where fines for illegal movements would be doubled, accompanied by visible Police presence. There should also be a demonstration of an effective right-of-way for streetcars in the summer of 2008. Furthermore, it is recommended that City staff immediately initiate the process of expanding the red-light camera enforcement program to allow camera enforcement of turning, stopping, and parking violations in this new Transit Priority Zone on King Street.

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March 13, 2007
11-31-78
Attachment: Appendix 1

Appendix 1

Excerpts from the April 2001 Report, "Dedicated Streetcar Lanes on the 504 KING Route"

The concept of a streetcar right-of-way on King Street was developed based on three principles:

i) The streetcar operation must be separated, to the greatest extent practical, from traffic;

ii) All regular commercial activities on King Street, except for on-street parking, should proceed unimpeded; and

iii) The solution must, to the greatest extent possible, be self-enforcing; that is, it should not require a police officer on every corner to ensure motorist compliance.

As illustrated in the following table, at peak times, there are often over twice as many people traveling on King Street in streetcars, between Dufferin and Parliament Streets, than in private autos. This is clear justification for creating a right-of-way for streetcars, separated from the impacts of traffic congestion, even if this requires reducing, or eliminating, the road space available to general traffic.

Transit Market Share on King Street in the Morning Peak Hour

King Street at:	People on Streetcars	People in Other Vehicles
Strachan Avenue	2210	1520
Spadina Avenue	2660	1040
University Avenue	2310	1170
Yonge Street	1950	1050

The concept that was developed is shown in Exhibits 1 through 3. Through-traffic would be banned from King Street at all times, but vehicles would continue to have access to one side of every block. This design would allow vehicles to stop in the curb lane for deliveries, pick-ups, drop-offs, taxi standing, etc. While vehicles would be restricted from traveling in the dedicated streetcar lanes, they would be allowed to come onto the tracks to pass a vehicle stopped in the curb lane. Private-use vehicles would not be permitted to travel beyond the one block they are on, because the only movement permitted at the next intersection would be a mandatory right-turn.

On the opposite side of the street from the "stopping lane", the sidewalk would be widened out to meet the streetcar lane, thus eliminating the curb lane for traffic. This widened sidewalk would significantly increase the space available for sidewalk amenities on that side of the street. As shown in Exhibit 1, by alternating this treatment between the north and south sides of the street, the expanded sidewalk would act as a physical barrier to motorists wishing to travel, illegally, along King Street beyond that particular block.

Such a solution would provide for all commercial activities such as deliveries, taxi stands, hotel pick-ups and drop-offs, and access to and from off-street parking lots. All driveways would be restricted to right-in, right-out operation; left-turns would be prohibited.

This option would force motorists, destined for a particular business on King Street, to pre-plan their routing. However, people quickly learn to adjust to arrangements such as these, just like people do in cities with extensive one-way street systems.

This proposal would eliminate all on-street parking. However, as can be seen by comparing Exhibits 2 and 3, the widened sidewalk area would significantly enhance the streetscape along King Street, which would be a benefit to many of the neighbouring businesses.