

TORONTO TRANSIT COMMISSION REPORT NO.

MEETING DATE: July 9, 2009

SUBJECT: 501 QUEEN STREETCAR ROUTE: STATUS UPDATE

INFORMATION ITEM

RECOMMENDATION

It is recommended that this report be received for information on the service improvement plans for the 501 Queen Streetcar Route:

1. a) Staff will restart the 'Step Forward' route management strategy from 12:00 pm to 7:00 pm Monday to Friday following completion of the 'Modified Step Back' trial on August 3rd, 2009;
b) Staff will test the effectiveness of 'Step Forward' from 12:00pm to 5:00pm on Weekends for one board period beginning August 2nd;
2. Staff will suspend the 'Step Forward' process and implement a Split Route concept (Downtown split, concept #6) during the October Board Period (October 18th - November 21st, 2009);
3. Staff will continue to work with the City of Toronto regarding a Transit supportive Traffic Management Plan;
4. Staff will report back to the Commission at the January 2010 Commission meeting with final recommendations.

BACKGROUND

At the February 2009 Commission meeting, Staff presented an update on the 501 Queen Streetcar route. This report provided background information regarding the Queen Route's performance and discussed a number of route management strategies.

During May and June 2008, staff tested the effectiveness of multiple point spacing using route supervisors at both ends of line and two intermediate points in each direction. The strategy reduced gaps and bunching and increased the percentage of streetcar service operating near design headway between Humber and Neville, but had the negative effect of slowing service. Despite the improvement in large gaps and reduction of bunching, the strategy resulted in an elevated level of short turns.

In September 2008, staff implemented a new route management strategy on Queen during the mid-day (10am-4pm Monday to Friday) called 'Step Forward/End of Line Dispatch'. This strategy essentially disconnects the operator's schedule from the vehicle and provides a method to ensure operators are in their scheduled position each trip, without short turning streetcars. The residual short turns, are required to fill gaps in service caused by delay incidents. The application of this strategy during the month of September 2008 resulted in significant and measurable improvements in short turns, gapping and bunching. These improvements were discussed and presented at the October 2008 Commission Meeting. The 'Step Forward/End of Line Dispatch' route management strategy was expanded to include the pm peak period on October 14th, 2008. Implementation of the strategy over this extended timeframe resulted in significant and measurable improvements in short turns, gapping and bunching during the pm peak and during the early evening.

A simplified schedule (discrete branches and simplified crewing) was implemented late November to reduce connectivity issues between runs and operators on the two branches of the route. Although route performance during late November and early December was affected significantly by inclement weather, short turns, gapping and bunching levels were maintained at relatively low levels.

Based on observations made through the fall that streetcars had insufficient running time to complete trips on time and to start subsequent trips, additional running time was added to the simplified schedule in January 2009. The running time was added without increasing the number of vehicles by slightly increasing average headways. During the month of January 2009, a number of issues including extended periods of extreme cold related vehicle breakdown and multiple snowfalls affected reliable operation of the Queen route, although bunching, gapping and short turn levels were maintained at levels significantly lower than similar periods during the winters of 2006-2007 and 2007-2008.

An update on Queen 501 Route performance was provided at the February 2009 Commission meeting and Staff were to continue their plan for a further Customer Survey, to test route performance with additional run time but without the 'Step Forward/End of Line Dispatch' strategy and to test a new strategy called 'Modified Step Back'.

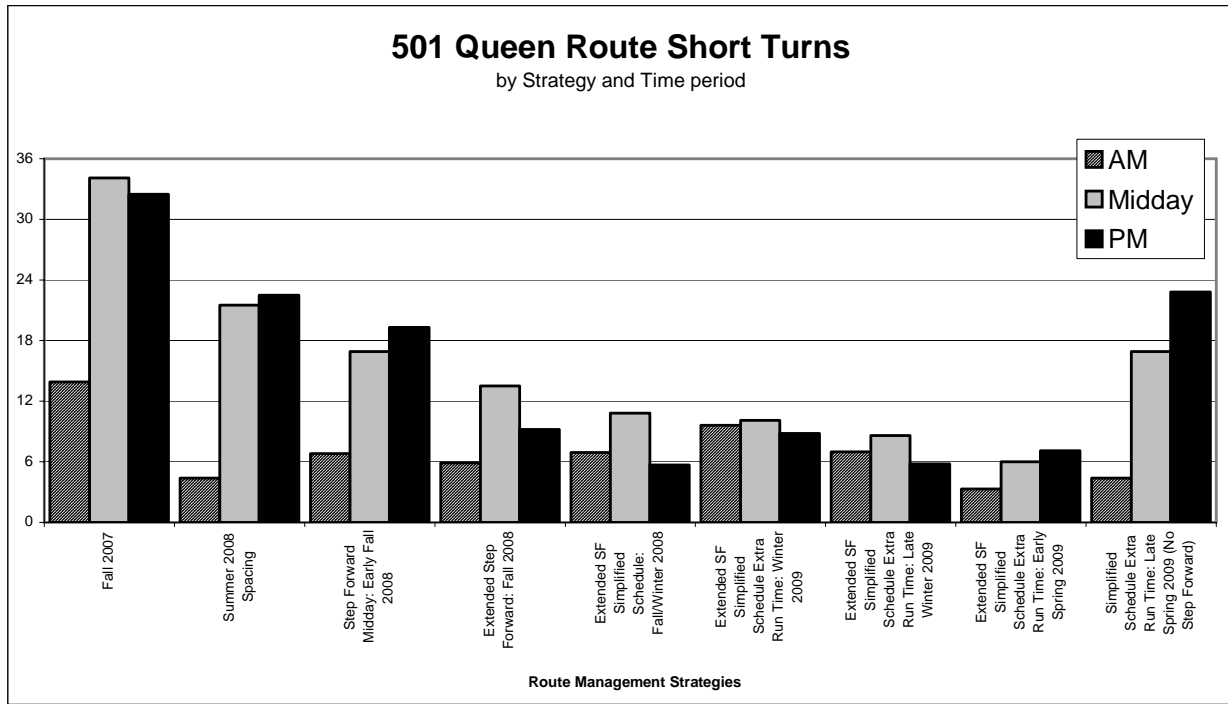
Since the February Commission meeting, Staff continued to investigate route-splitting options and continues to work with the City on traffic measures to improve route performance.

DISCUSSION:

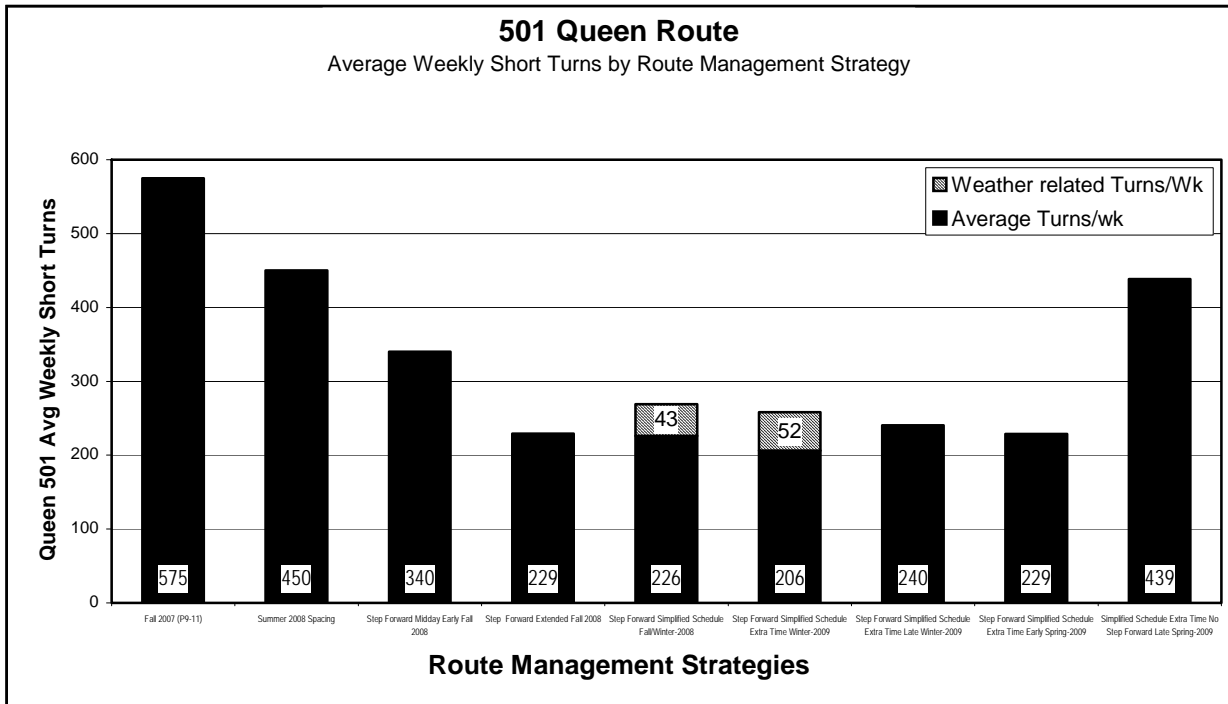
Route Management

Staff have been measuring the performance of these strategies based on their impact on the following criteria; short turns, gapping, bunching, and adherence to scheduled headway.

The effect of various Route Management Strategies on Short Turn levels is illustrated in the following chart:



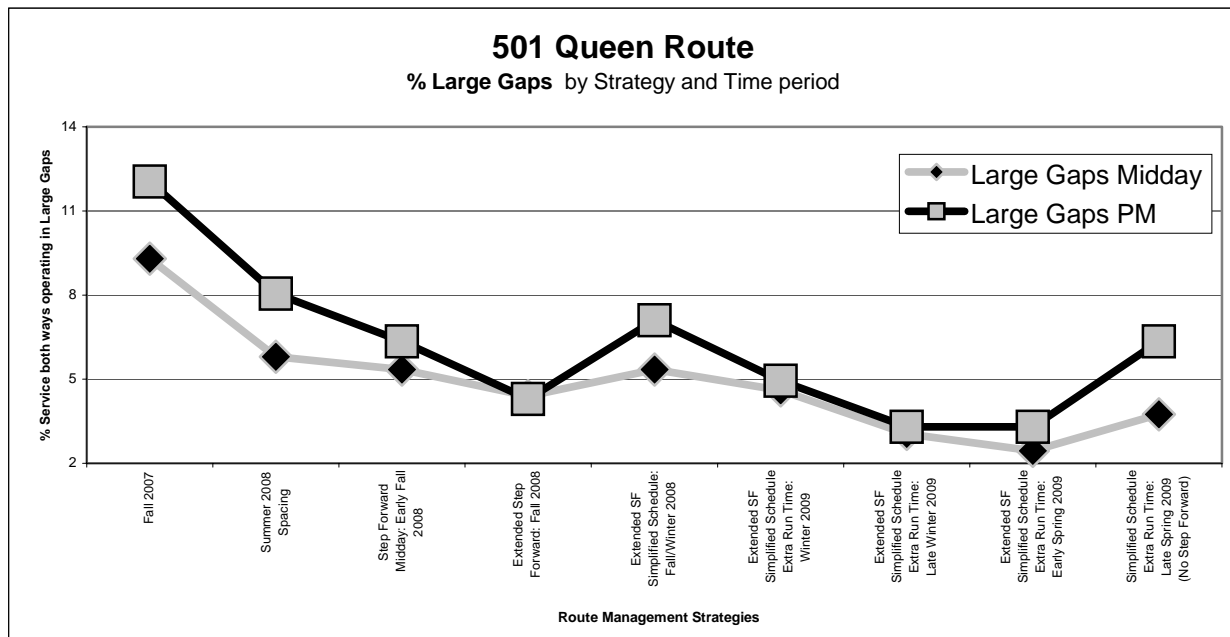
The two far right bars demonstrate the effect of removing 'Step Forward' from Queen on Short Turns during the midday and pm peak periods.



The preceding Chart measures average weekly short turns for the distinct Route Management strategies applied to the 501 Queen Route. The information graphically illustrates the effect of different strategies on the levels of short turning of our customers.

The following charts provide a comparison of gaps, bunching and service close to design headway during the Midday and PM Peak as a result of different route management strategies. The values in these charts are calculated based on every vehicle’s arrival times at 16 points in each direction. All eastbound and westbound vehicle trips (32 points per vehicle per trip) are used to measure overall route performance with respect to bunching, gaps and service close to design headway.

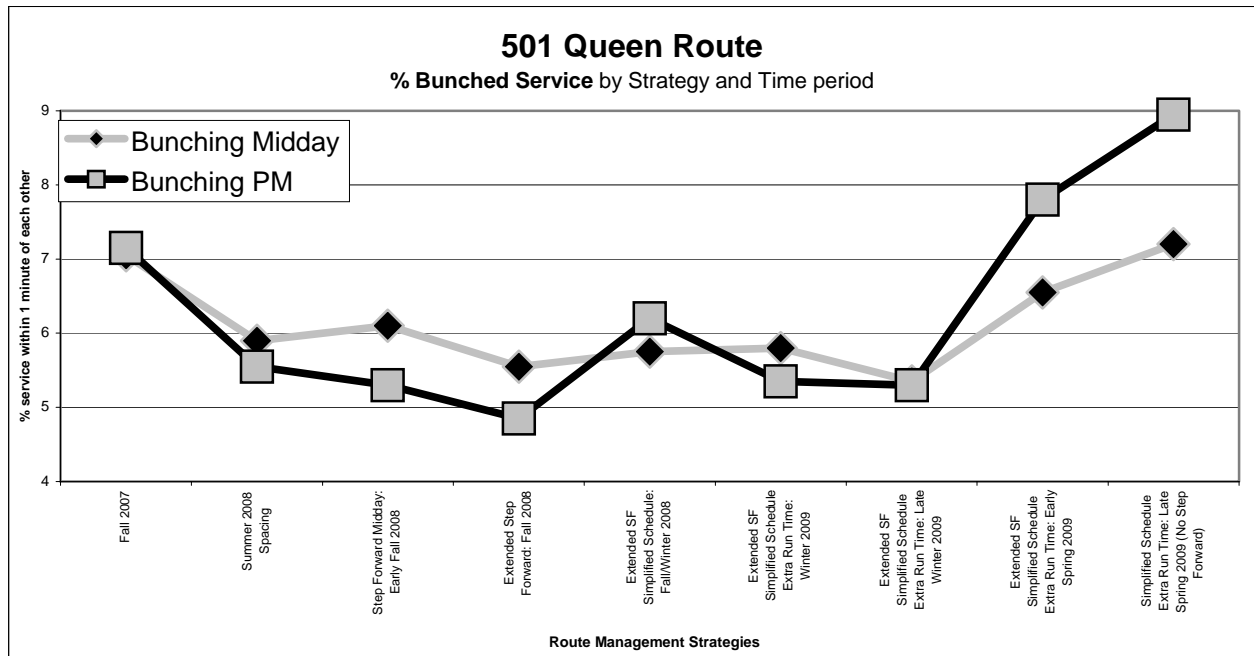
‘Large Gaps’ measures the % of streetcars operating with gaps of 15 minutes or more east of Humber and gaps of 30 minutes or more west of Humber.



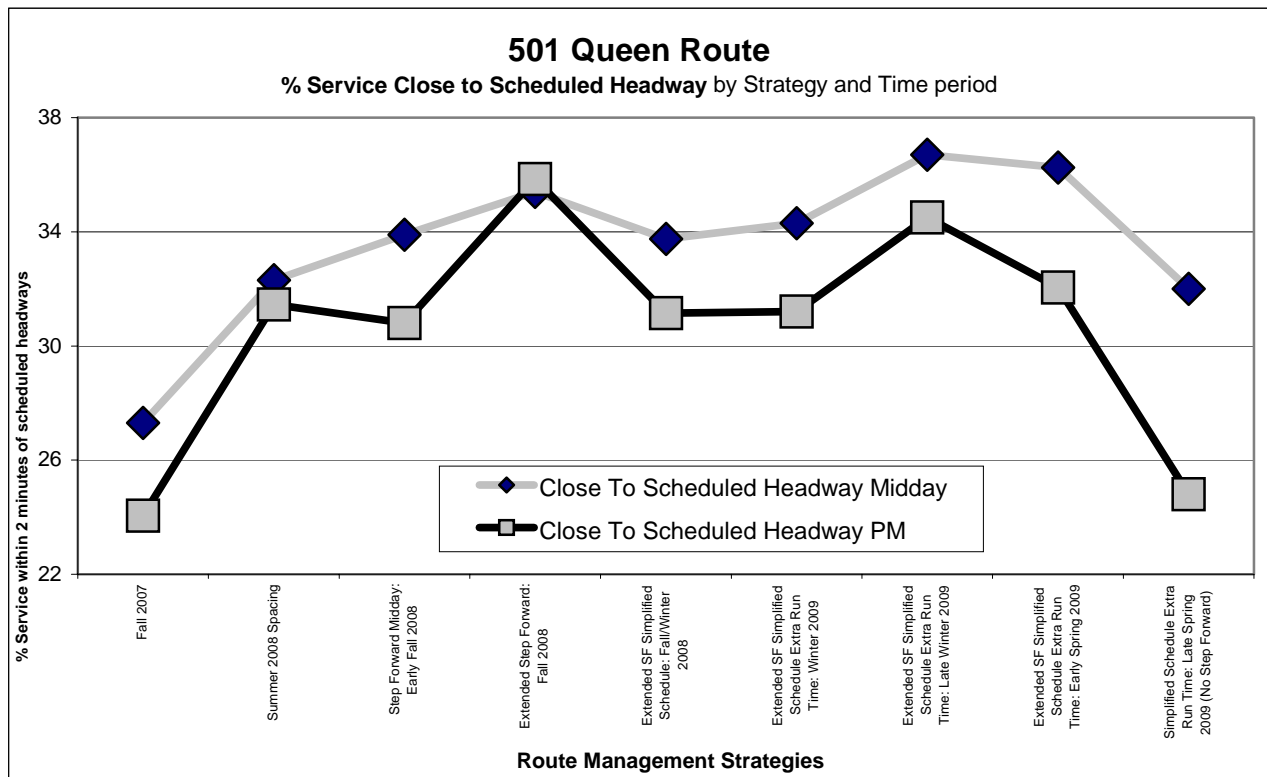
Staff concludes that the additional running time applied since January 2009 has had a significant impact on large gaps during both the midday and PM Peak periods. Based on the increase in large gaps shown in the data point representing the most recent period, where ‘Step Forward’ was not used, Staff conclude that ‘Step Forward’ has a more significant effect on reducing large gaps during the PM peak than during the midday.

‘Bunching’ measures the % of streetcars within one minute of each other.

Congestion, road closures and route diversions caused by Tamil protests, construction projects and Gardiner Expressway closures, significantly affected bunching during the early spring (March 23 to May 8).



'Close to Schedule' measures the % of Streetcars with headways of 4 to 8 minutes, east of Humber and operating with headways of 10 to 14 minutes, west of Humber.



Operation of the Queen 501 route without the 'Step Forward' strategy has contributed to a significant reduction in the % of service operating close to schedule during the PM peak. The midday period also experienced a reduction, although much less severe.

Withdrawal of the 'Step Forward' strategy from the route has allowed Staff to identify performance benefits of additional running time and 'Step Forward' separately. Results indicate that additional running time reduces large gaps, but increases bunching. During the midday, withdrawal of the 'Step Forward' strategy increases the number of short turns to some degree, but overall route performance (Bunching, large gaps and % service close to scheduled headways) remains relatively the same. During the PM peak, however, withdrawal of the 'Step Forward' strategy results in significant increases to short turn levels and also results in a significant reduction in the % of service operating close to design headways. The deterioration of performance during the PM peak extends to the early evening time period as well.

Modified Step Back Test (June 22nd to July 31st, 2009)

Staff began a trial of an alternate strategy to 'Step Forward' on June 22nd. This trial will be in place for a 6-week period during the PM peak period, Monday to Friday. This strategy acts in a similar manner to 'Step forward', disconnecting the streetcar from the operator's schedule, but achieves this in a scheduled manner similar to the implementation of Step-Backs used in the subway. While designing and preparing schedules and crewing and while training operating, clerical and supervisory personnel to use this new system, staff recognized it adds a level of complex connectivity between runs and operators. A number of other issues remain because of the non-standard methods required to manage waybills, transfers, crewing, operator breaks and relief's. These issues may render the concept unsustainable for continued long-term implementation. While staff feels that the concept may provide similar improvements to bunching, gaps and short turns, the level of improvement may not reach the levels achieved with the 'Step Forward' process. Staff remains committed to implementation and measurement of performance of this trial to closure over the six week period ending July 31st, 2009 to determine whether the system provides enough operational benefit to justify changes and adjustments to our current methods of training, crewing, operator procedures, clerical procedures.

Communication and Information System Upgrades (CIS)

At year-end 2008, virtually all of the streetcar fleet was retrofitted to use GPS location information to determine vehicle location. The GPS enhancements now in place are providing more accurate tracking of vehicles, and a real time scale map display indicates exact vehicle position, including vehicle position off route. This feature has proved useful in managing diversions, short turns and vehicles operating off-route.

Expansion of the Next Vehicle Arrival System (NVAS) management reports from the Spadina route to all Streetcar Routes recently occurred. The management reports have proved useful to review the effects of supervisory actions on headways and gaps.

Staff are now deploying several different handheld 'weather resistant and hardened' computing devices to supervisors on the Queen, King and Spadina routes to determine their field usefulness and functionality. This field trial will continue until December 31st, 2009. These devices display real time information regarding vehicle location and headways, allow replay of real time information, provide access to traffic flow, traffic cameras, internal

email. The IT department is developing an interface for these units that will allow the on-street supervisor to submit delay reports, investigative reports and short turn information immediately and directly to the TTC's internal network. Results and recommendations from this pilot project will be included in the January 2010 Queen 501 Commission report.

A number of other improvements to CIS software are currently being investigated in order to achieve the desired route management improvements. These include the following:

CIS Enhancements:

- Headway Adherence Functionality:
 - Toggle between schedule adherence and headway adherence on CIS Console;
 - Option of changing trump (Onboard Vehicle Display) from schedule to headway;
- Real-Time analysis of current Point to Point Running Time;
- Real-Time route-schedule modifications to running time, headway, routing in order to manage blockages, diversions, emergencies and general delays more effectively;
- Full-Service Mobile CIS for on-street supervision.

Management Reports:

- Schedule and/or Headway adherence by Route, Vehicle, Operator, Stop;
- Layovers (Scheduled, Unscheduled);
- Short Turns by direction, location, timeframe, cause;
- Gapping/Bunching by direction, location, timeframe;
- Point to Point running time analysis over time and date ranges.

Staff has now confirmed business requirements for this new functionality. A number of these requirements may be satisfied with implementation and expansion of the new Next Vehicle Arrival System (NVAS) and some integration of that system with CIS operations. A further review is required and has commenced, which will confirm how much of the NVAS functionality can be used to achieve the required Route management improvements. In addition, this review will confirm the timeline for development of the remaining required software enhancements. This review and a further update, will be completed by mid 2009.

Customer Survey

A second survey of 1040 customers on the 501 Queen Route was conducted between May 8 and May 20, 2009. Customers were intercepted at various locations east of Kingston Rd and west of the Humber Loop. Survey respondents averaged 10 trips per week.

Origin/Destination Point Analysis:

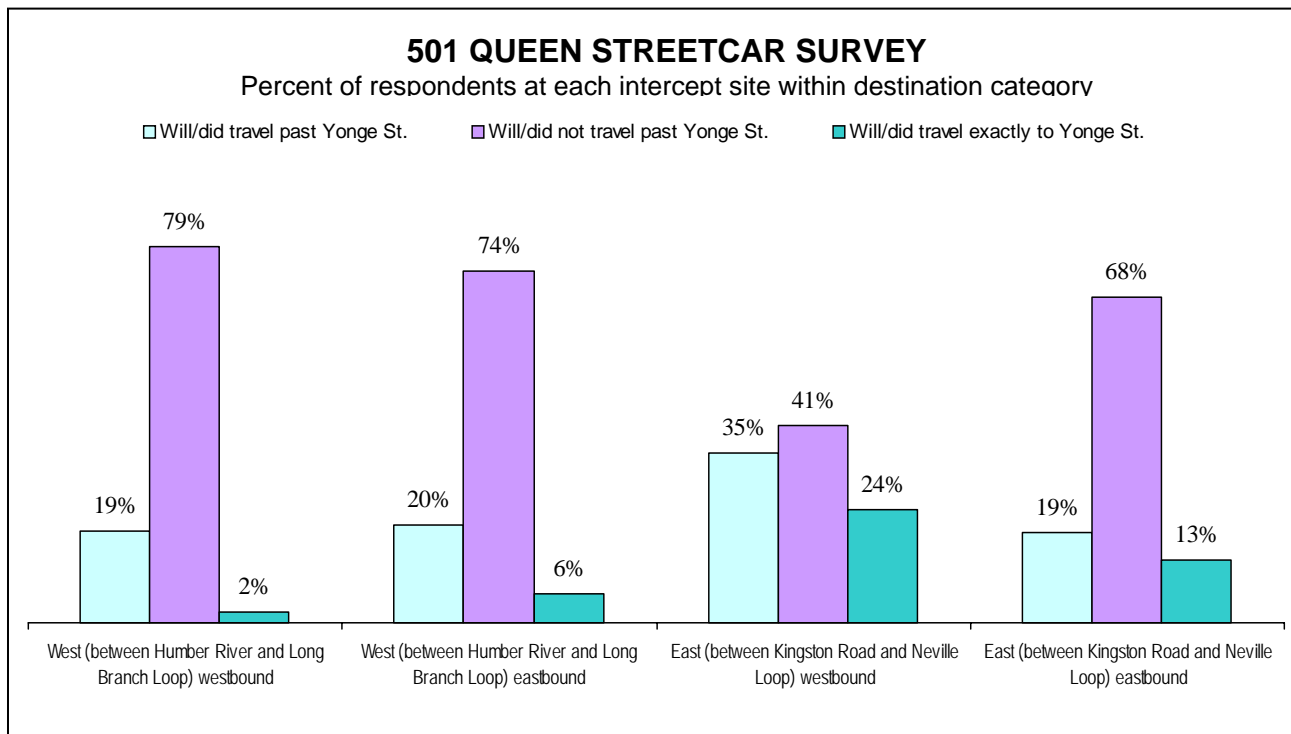
An origin/destination analysis was conducted to determine the % of customers travelling between the downtown core and both the Beach and Long Branch. Overall, 35% of customers surveyed, traveled to or beyond Yonge Street on their trips to and from both the east and west ends of the route.

Inbound to or beyond Yonge Street:

59% of customers travelling from the Beach and 26% of customers travelling from west of Humber intended on travelling to or beyond Yonge Street.

Outbound from or beyond Yonge Street:

32% of eastbound customers surveyed east of Kingston Rd had trips originating from or west of Yonge Street. 21% of westbound customers surveyed west of the Humber Loop originated their trips from or east of Yonge Street.

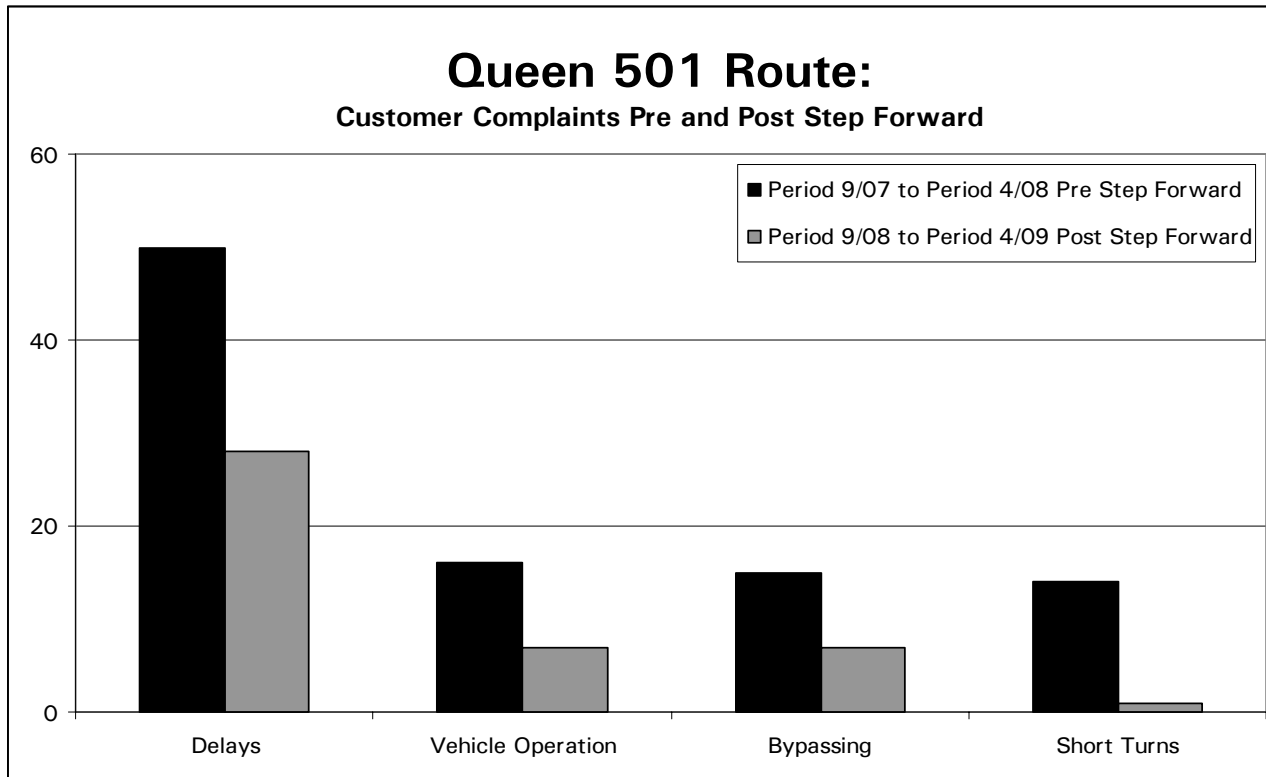


Approximately one third of the respondents had noticed recent changes to the 501 Queen Streetcar service compared to the fall of 2008. Observed improvements included fewer short turns, fewer gaps in service, and improvements in even spacing and better schedule adherence on both route segments.

Overall, only 13% of those surveyed offered negative or neutral comments, 87% of customers surveyed made positive comments. 45% of customers traveling east into the Beach and 14% of those traveling west past Humber noticed fewer short turns. 34% of customers traveling towards the downtown core from the Beach and 30% of customers traveling from beyond Humber noticed streetcars spaced more evenly. 24% of customers traveling towards Long Branch noticed no large gaps or waits for streetcars. 32% of customers overall indicated their average wait for streetcars had decreased.

Customer Complaints:

An analysis of customer complaints received by the Marketing Department from customers on the 501 Queen Route from Period 9 2007 through Period 4 of 2008 vs. the same period in 2008/2009 reveals the following:



Split Route Analysis

Staff in the Transportation and Service Planning departments reviewed the implementation of one of the nine split route concepts in the October 2009 Board Period (October 18th to November 21st, 2009) as a trial, in order to determine the effect of such a split on gapping, bunching, short turns and on the customers forced to transfer in order to continue their trip beyond the split.

Staff short listed three of the nine options for review based on availability of vehicles, location of electrified track switches and availability of alternate routings and turnbacks for service adjustments and diversions. These three options are:

- #2 All service from Neville to Long Branch
- #3 Split at Humber Loop (Long Branch to Humber and Humber to Neville)
- #6 Downtown overlap (Long Branch to Church or Parliament and Neville to Bathurst or Shaw)

Transportation and Service Planning were unanimous in proposing option #6 Downtown overlap for trial during the October Board Period based on projected performance improvements.

PLAN

Staff will continue to measure and analyse gaps, bunching and short turn levels to determine and compare the effects of 'Modified Step-Back' to 'Step-Forward' and to 'Additional Running time'. During the month of August, 'Step Forward' will be re-implemented during the PM peak in order to compare these three strategies back to back.

The usefulness of handheld weatherproof computers to on-street supervisory personnel will be tested from August through December to determine whether these devices and the information provided by the NVAS system is useful in managing the 501 Queen route as well as two other streetcar routes.

During the October Board Period from October 18th to November 21st, a test of a split route schedule will be conducted to determine the effect of isolating service disruptions between the east and west ends of the Queen route. Staff will continue to analyse and compare performance of the 501 Queen Route against past performance to quantify the effects of these changes.

Staff will provide the final report and recommendations regarding this initiative at the January 2010 Commission meeting.

June 18, 2009
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