Final Report

Hamilton Street Railway Operational Review

Submitted to City of Hamilton/Hamilton Street Railway
by IBI Group

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IBI GROUP

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Executive Summary

Background

Hamilton Street Railway (HSR) is the provider of conventional transit services within the City of Hamilton as a Division of the Public Works Department. With over 175 buses on the road each day, HSR is one of the most visible public services in the community serving over 70,000 revenue passengers on an average weekday or some 21 million passengers per year. Approximately 7% of the City's population travels by transit everyday while an estimated 30% or more of the population make use of transit at some point during the year.

HSR is also a major employer within the City, with over 600 full time or part time employees including bus operators, customer service representatives, mechanics, schedulers, supervisory and management staff. Collectively these employees contribute to the image of transit within the community, and by all measures are doing an exceptional job.

As with any organization, there is room for growth and improvement. In particular, in the coming years, transit is expected to take on an increasing role in accommodating the travel needs of Hamiltonians in order to meet the City's environmental, economic and social objectives, as articulated by the Vision 2020 Plan. This operational review provides the necessary benchmarking of existing conditions and a framework to guide future improvement such that everyone involved in delivery transit services can continue to take pride in the system and what it means to the City.

Study Objectives

The HSR Operational Review was initiated by the Transit Division in August 2008 in response to recommendations of the Transportation Master Plan and other City initiatives to increase the role of transit in meeting current and future transportation needs. Completion of the study also fulfills a commitment made to the Amalgamated Transit Union during the last round of Collective Bargaining.

The primary objectives of the HSR Operational Review are:

- To provide the City with a plan to improve and develop public transit services in Hamilton over the next five years, consistent with the City's vision of sustainable development and the Hamilton Transportation Master Plan; and,

- To ensure public transit services are being operated in a safe, efficient and effective manner considering the needs of customers, employees and the general public.

The Comprehensive Review covers conventional services only. Specialized services have been and will be the subject of separate reviews, although there are links between some of the recommendations of the comprehensive review for conventional services and opportunities and improvements for accessible transit.

Study Scope and Approach

The primary focus of the comprehensive review was on collecting data to assess existing route performance and ridership. An extensive on-board survey was undertaken over a period of three months commencing in October 2008 and collected data regarding boardings, alightings, user characteristics (use of accessibility devices), operational issues (delays) and fare payment for all routes on a typical weekday, Saturday and Sunday. At the same time, travel time and location data was recorded for each route and time period using Global Positioning System (GPS) devices providing a continuous stream of data to measure schedule reliability, bus speeds, locations of delays and other statistics of interest to the Amalgamated Transit Union. All of the data is summarized in tabular and/or map form within this report. It is noteworthy that the survey undertaken is believed to be one of the largest and most comprehensive data collection exercises in history for a transit organization in Canada.

In addition to the data collection exercise, the study also included the following tasks:

- A peer review of other transit systems with regard to performance;
- A route performance assessment;
- Stakeholder consultation;
- A market opportunities assessment;
- A review of marketing programs and future needs; and,
- An organizational and staffing review.

The results of each of these tasks are presented within the Main Report.

Key Study Findings

How is HSR performing compared to peer transit systems?

A peer review of eleven transits systems including relevant ridership, cost, service and staffing characteristics indicated that HSR is performing well given the City's financial and other constraints. The City is receiving good value for the money that is spent on transit. In particular, its:

- Cost recovery is stable and predictable (farebox ratio has averaged 55% since 2000)
- Ridership and revenue increased through 2008, consistent with population growth and rate of service expansion, although ridership declined slightly in 2009 as a result of the economic climate.

One important observation is that the average fare is low ($1.37 in 2007). This negatively affects the City's ability to invest in and expand transit services.

What do Stakeholders Say about HSR?

As part of the study, IBI Group interviewed members of Council, key opinion leaders, major employers and HSR staff. Here is what they had to say:

- HSR is generally regarded as a well-run service.
- Some perceive HSR as a social service and one that caters to students.
- Many decisions in City are made without considering the impacts to transit.
- HSR's routes are difficult to understand if you are not familiar with the system.
- Even though HSR does not have fundamental flaws, it may be time for a major renewal of service design in concert with a commitment to invest in service improvements.
- Looking to the future, most feel that transit will play a greater role as environmental and energy concerns increase.
- All residents benefit from transit in some way, and should pay their share.

What is expected of HSR in the future?

The City's Vision and Transportation Master Plan calls for transit to take on a greater role in the future while policies at the federal, provincial and local level all point towards the goal of significantly increasing the role of transit:

- City of Hamilton
    - Vision 2020 calls for a doubling of transit usage to 100 rides per person per year.
    - Transportation Master Plan has set target of reducing auto vehicle-km by 20% by 2031 – stressed importance of early and incremental improvement
    - New Official Plan embraces transit-oriented development policies
- Federal/National
    - Investing billions of dollars in infrastructure, including rapid transit; rewarding communities that have comprehensive strategies
    - The Canadian Urban Transit Association has set a goal for large cities to increase per capita transit ridership by 1.2% per year over next 30 years (or 50% increase overall by 2040)
- Provincial
    - Have identified Downtown Hamilton as a focus areas for growth

- Have set a target to reduce greenhouse gas emissions by 80% by 2050
- Metrolinx is investing in rapid transit

The City's light rail Rapid Transit program will go a long way to achieving the City's vision for transportation and economic development, however, it will require a supportive bus transit network to ensure success.

How will HSR get there?

Transit ridership is tied to investment levels, population growth, quality of service delivery, affordability and transit supported policies (e.g. downtown parking fees). There are no magic strategies to grow transit ridership without incurring increased costs or sacrificing minimum service standards.

Vision 2020 calls for a doubling of transit ridership from the current level of approximately 50 rides per capita to 100 rides per capita. If this ridership growth was to be generated entirely through service improvements, it would require at least a doubling of transit service hours, and likely more, and associated funding increases. In other words, HSR should be adding a minimum of 15 more buses each year to meet this target by 2021.

Fortunately, there are many ways that the City can leverage investments in transit to maximize growth in ridership. First and foremost, an integrated approach to the planning and operation of public transit is required, including strong links between the City's existing transit services (HSR) and the shaping of land use around major transit corridors. At the same time, there are opportunities to increase service levels, pursue niche markets and reduce revenue leakage by reducing the number and value of discounted fares.

In essence, transit ridership growth needs to be considered in all aspects of City planning and decision making.

Are services being operated in a safe and efficient manner?

One of the key objectives of this study was to assess whether conventional transit services are being operated in a "safe, efficient and effective manner considering the needs of customers, employees and the general public." As guided by the Terms of Reference, several different data items were collected to help assess performance against this comprehensive objective. These include:

Focus area	Data collected to assess performance
Customers (transit riders)	• On-time performance • Bus loadings
Employees (Bus drivers, customer service representatives, mechanics, schedulers, supervisory and management staff)	• Ability to maintain schedules • Bus speeds • Bus loadings • Uncontrolled incidents
General Public (Residents, employees, tax payers)	• Ridership • Cost recovery

Based on the results of the surveys, the following conclusions were identified:

On-time performance: Most routes operate within established HSR guidelines for schedule adherence (+ 1 minute early to 3 minutes late). These policies are consistent with other transit systems. However, there are isolated occurrences where on-time performance is an issue either by route segment or by time of day. Most of these issues are on routes and during time periods where service frequencies are such that passengers are not significantly impacted. There are also many instances of buses running ahead of schedule, which is an issue from the passenger perspective.

Bus loadings (Passenger perspective): Most routes operate within established capacity standards that are consistent with industry standards. Crowding does occur in peak hours and at specific geographic areas (e.g. near McMaster, downtown, other commercial centres, school areas). However, this is common with public transit as well as many other work environments where workloads can vary by time of day and day of the week. On a system-wide basis, the average load (bus occupancy) for all buses in the afternoon peak period (3 PM – 7PM) was 12 people per bus, which is well below the HSR's loading guideline of 53 people. However, there are several routes where 10% or more of the buses are operating over capacity on some segment of the route during the peak period. These include King, Barton, University, Cannon, the B-Line, Upper Wentworth and Mohawk. Accordingly, these routes are the focus of many of the proposed service improvements identified in this report.

Ability to Maintain Schedules: As noted above, on-time performance is generally within industry standards, though there is certainly room for improvement. From an operators' perspective; however, the data indicates that there are several "choke points" within the system which affect the ability for drivers to consistently maintain schedules. There are a number of ways to improve schedule reliability including implementing transit priority, adding more service or adjusting schedules, as discussed in this report. In addition, the recently implemented automated vehicle tracking systems and driver display terminals will serve to provide better data to drivers on whether they are ahead or behind, as well as information to guide HSR on setting schedules.

Bus Speeds: On a system wide basis, HSR's average system speed is 18.7 km/hr, which is below both the national average and HSR's peer group (CUTA 2008 Canadian Transit Fact Book). This figure is influenced by many factors including the travel times built into the bus schedules as well as localized delays. Based on the travel time studies carried out as part of this study, most buses operate at or below 40 km/hr and there were very few observed incidents of buses exceeding the speed limit. Based on the data collected, there does not appear to be any safety concerns resulting from speeding.

Bus loadings (Operators perspective): As noted above, there are isolated incidents of buses with high loads. This can be a challenge for drivers if they sense passengers are frustrated. While some crowding is expected, and planned for, several measures are proposed in this study to ensure it does not escalate further.

Uncontrolled Incidents: Uncontrolled incidents include collisions, construction/road closures, fare disputes railway crossings and a variety of other events. During the passenger survey, uncontrolled events were recorded by location and time of day. On a typical weekday, there were 122 incidents where a bus driver had to navigate around a collision, 194 incidents where construction activity impacted the bus operations or speed, 90 observed fare disputes and 274 railway crossings or delays. Given that there are approximately 175 buses on the road on a given day, this represents an average of one or two of each type of uncontrolled delay per bus per day. Although there are no industry

standards to compare to, the frequency of occurrences suggests that uncontrolled delays would not affect schedule adherence.

In addition to uncontrolled delays, boardings by persons requiring assistance has also been raised as a concern by drivers due to i) the additional time it takes for boarding or ii) if buses are too full to accommodate these persons. Overall, the percentage of boardings requiring special consideration, including bicycles, is quite low as shown below. Nonetheless, when added up, these activities put additional pressures on drivers.

Type	Weekday Boardings	Percentage of all daily boardings
Blind	361	0.3%
Cane\Walker	1,191	1.1%
Wheelchair\Scooter	601	0.55%
Bicycle Rack	250	0.25%
Total boardings	**110,210**	**100%**

Ridership: Fifty per cent (50%) of HSR's ridership comes from the top five routes which are primarily lower east-west services. Generally, routes in the former municipalities outside the former City of Hamilton carry substantially less riders, but also have lower service levels.

Cost Recovery: Most routes are performing well in terms of cost recovery. The top 15 routes (out of 33) account for 75% of HSR's gross operating costs, but at a lower per-passenger subsidy. Eliminating the 5 poorest performing routes would only save 1.3% of HSR's gross operating costs.

Service Plan Characteristics

A new Vision with goals, objectives and services are proposed for HSR in order to meet the municipality's Vision and Transportation Master Plan. HSR services need to be re-structured in the short term and re-aligned in future to meet the needs of the new Rapid Transit services.

With the desire for significantly higher ridership and service levels, there will be changes in the services and costs that, along with the time needed for ridership to respond, will tend to lower overall cost recoveries, especially in the early years of the next five years.

The objectives are to be accomplished by improving route structures, service levels and operations according to the service standards that have been established.

The service plan proposed as part of this study fulfills several key objectives:

- Re-focus the system concept to broaden the customer base for public transit and grow ridership.
- Re-structure the system by straightening route alignments, minimizing redundancies and limiting the number of route branches and exception trips supported on individual routes.

- Improve riders' ability to travel more directly (*i.e.*, in a straight line) between origins and destinations and minimize onboard transit travel times.

- Decrease average wait times for boarding and transferring riders.

- Re-align services in anticipation of future rapid transit services in the A-Line and B-Line corridor.

The system concept is illustrated in Exhibit ES-1 below and requires a transition from HSR's historically radial design favoring travel to/from Downtown Hamilton, to a high-frequency grid design supporting ubiquitous travel patterns comparable to regional auto traffic. The proposed route network will facilitate travel to/from six major regional activity centers rather than the single city center. Service restructuring proposals focus on relocating the terminal points of outbound local routes from disconnected bus loops on the fringe of development areas to the integrated transit hubs, straightening alignments for better onboard travel times, and limiting the number of branches to two per route. Service span and frequency would either improve or stay the same on virtually all routes.

Annual revenue-hours of service will increase by 23% to 806,910 from a base of 655,086 in 2008 along with additional employees (FTE's). The service increases are proposed to be staged over the next 4-5 years.

Transit ridership is projected to increase from 21 million in 2008 to approximately 27 million by 2014 based on the proposed route changes and service improvements.

Exhibit ES-1: Proposed High Frequency Corridors (2015 and beyond)

Key Recommendations

In addition to basic transit service routing and service enhancements, a number of recommendations are proposed to enhance the overall effectiveness of transit in Hamilton while addressing concerns raised by the Amalgamated Transit Union. These include recommendations related to marketing and promotion, transit operations, infrastructure, fare policies and organization and staffing. Exhibit ES-2 presents a summary of these recommendations and how they respond to the overall goal of ensuring public transit services are being operated in a safe, efficient and effective manner considering the needs of customers, employees and the general public.

As shown, many of the recommendations will serve to address the concerns raised by the ATU. For example, increasing service levels in high demand corridors will ease loading concerns, reduce the potential for passengers to be turned away, and increase overall bus travel speeds by reducing stop dwell times. Similarly, implementing transit priority in key corridors will reduce bus delays and increase travel reliability. In turn, this will increase passenger satisfaction and reduce overall costs to HSR because fewer buses are required to provide the same service.

Exhibit ES-2: List of Recommended Actions and Response to Over-arching Objectives

Recommended Actions	Customers	Employees	General Public
1. Adopt this report in principle as the basis for planning, managing and financing HSR services over the next five year period, 2010 to 2014.	✓	✓	✓
2. Pursue new transit markets through the implementation of the following key activities: a. Expand U-Pass program and opportunities for private sponsorship b. Market transit services in conjunction with transit service improvements c. Expand employee pass program and related travel demand management initiatives d. Establish and implement a park and ride program e. Enhance fare products to complement market strategy (eg. Bus buddy pass, annual pass)	✓		✓
3. Develop and implement a comprehensive marketing and corporation communications plan with appropriate budget and staff resources as outlined in sections 3.6.	✓	✓	✓
4. Update the image of the HSR by re-branding with a new identity (name), logo and colour scheme.	✓	✓	✓
5. Adopt the revised transit Mission Statement, Goals and Objectives and Service Standards as outlined in Section 4.1.	✓	✓	✓
6. Implement the 5-year transit service plan as outlined in section 3.2 with the objective of increasing ridership by 28.6% over the 5-year term of the plan through increased service penetration and service levels as set out in section 3.1. The key elements of the service plan are: a. Re-structure the transit route network and service levels to both simplify route structure as well as to improve efficiency and effectiveness, address capacity issues and provide more attractive service for transit users; b. Adjust route running and layover times to better reflect actual operating conditions; c. Provide improved cross-town services between key nodes and to the key travel origins and destinations; d. Prepare for introduction of proposed rapid transit services by increasing service levels in the A line and B line corridors.	✓	✓	✓

Recommended Actions	Customers	Employees	General Public
7. Undertake a transit priority measures study to prepare a suitable strategy for giving transit vehicles priority at traffic congestion points throughout the City.	✓	✓	
8. Adopt the infrastructure plan including the purchase of 31 buses for service expansion and 90 replacement buses over the 5 year term of the service plan.	✓		✓
9. Enhance and expand the role of transit terminals across the city as transportation hubs. Construct transit terminals at McMaster University and in the vicinity of Mohawk College.	✓		✓
10. Upgrade bus stop signage and accessibility features of bus stops including the addition of 147 shelters.	✓		✓
11. Undertake a transit facility needs study to define future needs and facility location strategy.		✓	✓
12. Implement internal organization changes as outlined in section 3.5 including four additional staff resources in operations, administration and marketing.	✓	✓	
13. Adopt the 5-Year operating and capital plan as summarized in section 4.7 and Exhibit 4.13 including approximately 94 bus operator FTEs for the service expansion. The cost of social/ economic fare discounts should be shifted from the transit budget to a municipal “social assistance” budget.	✓	✓	✓
14. Adopt the fare strategy outlined in section 4.7 with the objective of increasing the average fare to improve transit service levels. This includes small annual fare increases and a reduction in discount offered for tickets/passes.	✓		✓

Financial Implications

The 5-year term of the Service Plan has the following operating and financial implications:

- Fare revenues will increase consistent with the proposed fare strategy and annual small increases in fare rates from $32.6 million to $48.6 million by 2014. Purpose of the revised fare strategy is to increase revenues to primarily fund service improvements.
- The cost of social/economic fare discounts should be moved from the transit budget to a municipal “social assistance” budget.
- Direct operating costs will be $93,758,000 in 2014 compared to $63,801,000 in 2008. Revenue service hours will increase from 655,086 (2008) to 806,910. Approximately 98 additional administrative, supervisory and operations FTE’s will be required.
- The net operating cost, or municipal investment, therefore will be $45,212,000 by 2014, an increase of $14,322,000 over 2008 levels.

- The 5-year capital budget will total approximately $65.3 million comprised of $54.5 million for 121 new buses (90 for replacement and 31 for service expansion), $3.0 million for construction of two new terminals, $1.47 million for 147 additional shelters, $300,000 for bus stop improvements, $1.0 million for re-branding of HSR, $5.0 million for transit priority measures and $100,000 for a Transit Priority Strategy study and Facility Needs Strategy study.

Overall Conclusions

Overall, HSR provides cost-efficient fixed route transit services which are well-regarded by transit users. In general, the system is operated in a safe and efficient manner which is consistent with similar sized cities and organizations. There are; however, many opportunities for on-going improvement.

Most of the recommendations that were developed through this comprehensive review are aimed addressing short term needs and deficiencies. While these are significant, even greater steps are required to take HSR to the next level. Clearly, this will require greater and sustained investment in transit. Some of the benefits of this investment will include:

- Reduced transportation costs for all Hamilton residents, drivers and transit users alike.
- Achievement of the goals identified provincial and local growth plans
- Increased potential for funding from senior governments, which is tied to demonstrated progress on ridership growth, local transit and rapid transit
- Increased potential to attract companies seeking to locate in transit-oriented cities

For these reasons, **sustained transit investment** coupled with creative solutions is essential to the City's future economic and social vitality.

1. Introduction

1.1 Background

It has been more than 20 years since the last comprehensive review of transit services in Hamilton was undertaken. That review, entitled 1984 Service Plan – Urban Transit Services, included several major changes to the transit route network based on extensive user surveys. The review also included an extensive review of the management, operations and physical plant of the Hamilton Street Railway and Canada Coach Lines Limited subsidiary. Since the 1984 review, there have been several partial reviews of HSR's services and operations including the Regional Transportation Review – Public Transit Strategy 1994, the Ridership Growth and Asset Management Plan in 2006 and the Five-Year Transit Service Plan and Funding Workshop in 2007.

In addition to these direct assessments of HSR's services over the years, there have been several related initiatives that have, or will, influence the future transit system. Most notably, the Transportation Master Plan (TMP) completed in 2007 outlines a bold plan for increasing the role of transit in accommodating transportation needs within the City. Given the time that has passed since the last comprehensive review of transit services combined with the changing demographics, land use and funding framework in Hamilton, it is timely that HSR has undertaken this major review of its transit services. The TMP calls for a doubling of public transit use over the next 15 years from a daily modal split of 6% today to 12% in the 2021 to 2031 long term time frame. In support of this, public expectations for improved public transit services continue to increase reflecting concerns for the environment, sustainable development and the quality of urban life. Meeting these expectations and the TMP objective of an increased modal split for transit will require a major investment in public transit service levels and infrastructure over the next 10 years. Some of this investment has already started to occur with the recent funding announcements by the province for rapid transit, and more is expected as identified by the Regional Transportation Plan for Greater Toronto and Hamilton. Capitalizing on these funding opportunities will require a commitment on the part of the City to invest in the fixed route transit system, which is essential to supporting the broader regional transportation objectives.

1.2 Study Purpose and Objectives

Notwithstanding these broader transit-related initiatives, which will not likely hit the ground for three to five years, there is an immediate need to address transit service needs and to develop a clear, defensible and financially achievable plan for short term transit improvements. In recognition of this need, the City has established the following objectives for the current review:

- To ensure public transit services are being operated in a safe, efficient and effective manner, considering the needs of the customers, employees and the general public.

- To provide the City with a plan to improve and develop public transit services in Hamilton over the next five years, consistent with the City's vision of sustainable development and the Hamilton Transportation Master Plan. A key part of the study was an comprehensive boarding/alighting survey which helped validate the service planning.

As an operations review, the study was not focused strategic planning.

1.3 Study Approach

In fulfilling the above objectives, the study approach was heavily focused on data collection, but also included traditional research and analysis methods. As described more fully in Section 3.1, the data collection efforts were specifically tailored to address concerns expressed by the ATU regarding bus schedules and the ability to ensure that transit services can be operated safely and efficiently while meeting expectations for passenger and operator comfort. The extensive passenger boarding and alighting and running time surveys conducted were the primary basis for identifying transit service deficiencies and corrective measures.

Over 1 million records on boardings, alightings, travel times and related events were collected as part of this study providing a lasting source of information for HSR to conduct additional studies to improve their on-going operations.

1.4 Outline of Report

Following this introduction, Chapter 2 covers the market assessment, including the results of market analysis and stakeholder consultation and recommendations of key strategies HSR can adopt.

Chapter 3 focuses on HSR's service and operations as they currently exist. This includes the survey methodology; system-level results; a review of HSR's routes with comparisons to HSR's service guidelines; a peer review; and reviews of HSR's staffing and organisation, marketing and outreach and vehicle maintenance; and an infrastructure assessment. Additional details on each of HSR's existing routes can be found in Appendix A and Appendix B.

Chapter 4 looks to the future, with plans for services and operations (including route by route service alteration proposals), transit priority measures, infrastructure, organisation and staffing, marketing and finances.

Chapter 5 provides some overall study conclusions and key recommendations and outlines a possible five year implementation plan.

Supporting analysis and data by route are provided in Appendix A through E.

2. Market Assessment

The analysis and recommendations presented in this chapter are based on a companion report entitled **Market Assessment for the Hamilton Street Railway and Evaluation of the Means to Grow Markets and Ridership (July 2009),** prepared by AECOM as part of this study.

Drawing from the above noted report, this chapter briefly describes characteristics of the existing transit system in the city and compares it to similar transit systems in Canada. It also examines past and current trip-making in the Hamilton area, current transit marketing programs and activities, existing and future development, current fare strategies and passes, current and projected population/employment levels, and school enrolment growth in the city. These key components form the basis for making an assessment of potential future market and ridership increases for the HSR system.

The chapter then conducts an evaluation of individual potential service and fare strategies and marketing programs and presents recommendations for combinations of these strategies, policies and programs that could be applied to the City and which have been successful elsewhere in North America. The evaluation factors include operating and capital costs (i.e., affordability), the ease of implementation, and potential size of the new market, transit mode share impacts, and potential ridership gains.

It is acknowledged that HSR and the City have previously made efforts to or considered implementing some of these strategies, policies and programs in order to increase its customer base and ridership but it has not succeeded for various reasons. These have included lack of funding, other corporate strategic priorities, and a lack of staffing. It is also acknowledged that historical capacity constraints in some corridors led to reluctance on the part of HSR to further market these corridors and risk turning existing customers away.

Despite these past efforts, it is believed that the recommended strategies/programs will be effective in increasing HSR ridership and that further efforts should be made to implement these and other strategies presented at this report.

2.1 Demand and Market Analysis

Key Observations

Population and Employment Growth

Population growth in the City of Hamilton is forecast to occur mainly in suburban areas which traditionally have had lower density and limited mixed development patterns, such as Flamborough, Stoney Creek and Glanbrook, and to a lesser extent, Ancaster and Dundas. The greatest percentage growth in residential population between 2011 and 2031 will be experienced by the Southeast Mountain Urban Boundary Expansion (UBE) area, should the City decide to complete a comprehensive review and secondary plan for the area. In this area, the population size is expected to more than quadruple between the years 2011 and 2021, and grow 8-fold between 2021 and 2031. It is anticipated that the following areas will also have large increases: in Glanbrook there will be an 87% increase in population between 2011 and 2021 and a 41% increase between 2021 and 2031, and in Flamborough, the growth is expected to be 37% between 2011 and 2021 and 43% between 2021 and 2031. In comparison Lower

Hamilton (i.e. Downtown and surrounding area) is expected to grow by 5% over the same period, although this could increase significantly if proposed RT serves to stimulate growth as anticipated.

With the exception of Lower Hamilton, these above-noted areas now have either limited conventional scheduled transit service (i.e., low frequency of service and minimal service coverage) or on-demand TransCab service, whereas the former City of Hamilton areas (i.e., the areas that were contained in the City of Hamilton before the amalgamation in 2001) are served by conventional scheduled services that provide higher frequencies and better coverage. If this future growth can occur in higher density and mixed land use forms, as desired by the Growth Related Integrated Development Strategy (GRIDS) for the City of Hamilton, these areas could present opportunities for increased transit ridership. This will, however, require improvements to be made in the frequency, travel time and reliability of these services to and from these areas to key transit trip destinations such as Downtown and Central, East and West Hamilton.

The fastest employment growth in the City of Hamilton is happening at medical centres/hospitals and the service sector. The current large employment at Hamilton's various medical centres and their potential growth in the future arising from the aging population in the City of Hamilton and surrounding areas present opportunities for increased ridership (for example, employment at St. Joseph's Centre for Mountain Health Care Services will increase from 500 to 1,490 by 2017). This can be achieved by further enhancement to transit services, such as improved frequency and reliability, combined with more aggressive efforts by the City's TDM Coordinator to expand the use of the Employer Pass Program for employees of the Hamilton Health Centres. Simplifying the program application forms and not insisting on financial contributions by the employers to enrol in the program would no doubt serve to increase take-up. Further, employer parking costs will be reduced if more employees travel by transit to work.

A significant amount of employment growth is also forecast for the airport and surrounding areas once wastewater infrastructure capacity has been expanded. This area may provide a large ridership potential in future years. However, currently, the airport and its growth in large night time operations provide limited opportunities for ridership growth unless the City of Hamilton were to start a primary Night Bus Network providing overnight transit service to the airport area. This is not recommended for a city the size of Hamilton.

Modal Share Trends

Over the longer term, there has been a decrease in transit modal share in the City of Hamilton between 1986 and 2006 in peak periods, represented in the AM peak period by a drop from 12% to 8%, and on a daily basis from 10% to 8%. This result is partially explained by the fact that suburban areas with lower transit services levels have increased in population more than the core areas, combined with a lack of growth in transit service during part of this same period. As a long term goal, as identified in the Transportation Master Plan, the City should target to at least get back to 1986 modal split levels, but this will require very aggressive transit strategies.

Auto and Transit Trip Making Patterns

A high level analysis of existing auto and transit travel patterns was undertaken as part of this study to help identify potential untapped transit markets. The analysis, which is presented in more detail in the AECOM Report, was conducted using data from the 2006 Transportation Tomorrow Survey.

To a large extent, the rate of intra-regional AM peak motorized trip generation in the City of Hamilton corresponds with population levels. The three areas with the largest populations, South Mountain, East Hamilton and Stoney Creek, produce the most motorized trips. However, there are noticeable discrepancies in trips generated per person. South Mountain and West Mountain produce around 0.41 motorized trips per person in the morning peak period, more than any other of the superzones. This is due to one or more of the following factors influencing the higher motorized trips: they have a high number of available autos per household and higher household incomes, they have fewer opportunities for walking or biking or using transit; they have higher percentages of intra-regional trips (i.e. to areas outside Hamilton); or they have high percentages of people leaving their home during the AM peak period for work or school trips. In contrast, Downtown residents produce only 0.17 motorized trips per person in the AM peak period. This is likely due to the fact that many can easily walk to work, many do not leave for work or school in the morning peak or they have high levels of transit service.

Unsurprisingly, there are more total motorized trips ending in the Bayfront and Downtown superzones than starting there, as is typical in industrial and downtown areas. The ratios of AM peak arrival trips to AM peak departing trips for West Hamilton and West Mountain are also greater than 1, suggesting that these areas are more of a destination than an origin of trips in the morning. Both of these areas have major institutions (universities and hospitals) which draw a large number of trips. The ratio is close to one for the Central Mountain, Central Hamilton and East Hamilton superzones, suggesting that the travel loads in and out of these areas are evenly balanced in the AM peak period. The Glanbrook superzone has the lowest ratio, suggesting that there is generally an outflow of trips in the morning.

Overall, East Hamilton, Downtown (below the Escarpment), Stoney Creek, West Hamilton and South Mountain attract the greatest number of trips, and with continued transit service and reliability improvements have the potential to attract higher transit ridership. This is not unexpected because significant amounts of industry and employment are concentrated in these superzones.

West Hamilton and Downtown are the two largest transit trip destinations. West Hamilton ridership is driven by McMaster University travel and the hospital, and Downtown is a major employment centre.

The best opportunities for increasing transit ridership are areas of the City of Hamilton where there are now concentrations of mixed and higher density land use with higher and growing employment and population levels, good existing transit service and excellent connections to transit by walking and cycling. This is an objective of the Growth Related Integrated Development Strategy (GRIDS) which proposes to concentrate future City of Hamilton growth in nodes and corridors of high density and mixed land uses with enhanced transit services. The success in implementing this strategy and continuing to improve transit services in those nodes and corridors by enhanced frequencies and implementation of transit priority measures for improved reliability will influence future transit market growth and ridership.

In 2001, approximately 81% of the total trips made by residents stayed within the City of Hamilton. However, this figure has been declining since 1986 when 86% of trips stayed within the City. Part of this trend can be explained by place of residence and place of work trends. Between 1986 and 2001, the proportion of Hamilton's labour force employed outside Hamilton increased from approximately 17% to 28%. This trend has implications on transportation

demand patterns because most trips made by residents to areas outside Hamilton are made by car.

With future potential growth of trips from Hamilton Region to the Greater Toronto Area and visa versa, continued improvements to the HSR operated services to the GO Transit stations in the City of Hamilton and to the Aldershot GO stations (e.g. Route No 18 (Waterdown)) in terms of frequency, travel time and reliability of service, could provide an important market for increased HSR ridership.

Transit and Auto Costs

Transit offers more advantages for longer trips, trips where the available paths are limited, and trips to a location that may have parking constraints. Unfortunately, downtown Hamilton has a significant supply of low cost parking, which limits the potential of this area to attract people to transit. This parking situation should be partially addressed by adopting the recently completed comprehensive city parking management strategy and downtown parking strategy/by-law. This parking strategy could be used to further enhance City policies to improve the market for transit ridership by limiting the parking supply, raising the cost of parking, etc. As a general target, the cost of parking in the Downtown Core should not be less than the cost taking transit, which is not the case for most parking lots today.

An examination of the transit capture rates of the various travel markets verifies that U-Passes, geographical constraints, and long distances coupled with direct, reliable and frequent service, have a positive effect on ridership. Where possible, these conditions should be taken advantage of in order to increase the transit mode share in the City of Hamilton.

Opportunities for Ridership from Elementary and Secondary School Population Growth

In the analysis of future enrolments at City of Hamilton elementary and secondary schools, it is noted that future enrolment growth at the majority of schools will not be a factor that will drive future transit ridership. As well, most demand from new primary schools is now served by school buses because the schools are in newer communities in lower density areas. However, future enrolment at Saltfleet Secondary School is a factor that will contribute to the demand for increased transit service to Stoney Creek, as well as the projected growth in employment and population in Stoney Creek.

Market Segmentation and Branding

The HSR does not have a formal strategic marketing program or plan in place, and does not generally undertake detailed market segmentation work (i.e., regularly conducting telephone or web-based market research surveys or collecting focus group feedback, attitude or customer satisfaction ratings). As well, the HSR does not have a specific and strong HSR branding plan and strategy for its higher order services, such as the existing and proposed BRT/rapid transit services, the B- and A-Lines. The marketing efforts by other transit systems have significantly contributed to the ridership success on their branded BRT services and their overall transit systems. Examples include the iXpress in Waterloo Region, the VIVA service in York Region and Metrolink in Halifax Region. The success stories of these transit systems are outlined in the 2009 Marketing and Branding for Bus Rapid Transit overview paper by Transport Canada.

Financing of Suburban Regional Transit Improvements

Regional transit service improvements and their ridership potential have been limited to a significant extent by the area rating transit service financing system currently used in the suburban areas to fund service improvements. If the City of Hamilton were to move to a regional levy (i.e., a standard regional charge that all city residents pay for having access to the core regional transit system operating in the former City of Hamilton before amalgamation) and local transit levies (e.g. a levy for local scheduled transit service that comes within 450 metres of a development) similar to that employed in the Halifax Region, there would be more incentive and funding for improving the overall regional transit system. As a precedent for this financing, there is now a regional levy for paratransit service in the City of Hamilton.

Key strategies

From an analysis of existing and proposed transit services, past and current trip making, current HSR transit marketing programs and activities, existing and future development, current and projected population/employment growth, current fare strategies and passes, and school enrolment growth in the Hamilton Region, a number of potential strategies, policies and programs were assessed for their ability to increase ridership.

Factors used to conduct the assessment of these policies, programs and strategies included: ease of implementation; level of affordability to the transit operator; potential increase in transit mode share; potential market size; peak ridership growth potential; off-peak ridership growth potential; and long-term growth potential. The highest ranked and evaluated programs, policies and strategies, were then linked in combinations for maximum impact in order to increase the HSR market and ridership.

The five recommended key market-related strategies the City of Hamilton should adopt for HSR are summarised below along with the City and HSR's efforts to date to implement.

1. Expand U-Pass program and private sponsorship for program

HSR should negotiate and introduce the U-Pass program for students, faculty and staff at Mohawk College, and for staff and faculty at McMaster University. For the latter (McMaster staff and faculty), the University would commit to purchasing passes for its staff and faculty as a package and at a reduced rate, similar to the situation with students. Where possible, the University and College should also negotiate private sector sponsorship for the program to offset the cost to the employer and employee. Mohawk College represents a significant market for increased ridership (especially with a new campus plan at West 5th and Fennell) as their new strategic plan promotes sustainability and increased transit use at the campus. Staff and faculty represent a logical extension of the student U-Pass programme.

HSR staff have attempted to negotiate a U-Pass program with Mohawk students in the past, but the program was not approved by students. With the set of transit service improvements outlined in this report, the student body may be more receptive to adopting the U-Pass. (*Note: January 2010 referendum at Mohawk College approved U-Pass to be implemented in September 2010.)*

2. Market transit service to coincide with service improvements

Improvements to service to post-secondary educational institutions and hospitals via branded rapid transit services and increased transit priority measures should be continued. The increased use of transit priority measures will improve the travel times and reliability of these services. This will allow higher frequencies with the same number of vehicles. HSR should also consider working with McMaster University to create an underground bus exchange such as at the University of British Columbia, which may be in line with McMaster's sustainability efforts. Further, to contribute to their success in obtaining higher student ridership and ridership from other market segments, the HSR should develop a strong branding for the A and B lines.

HSR is currently working to proceed on the planning for transit priority measures and other customer focused initiatives on the new A-line, and for enhancing the B-line service as well. It is preparing and implementing investment strategies in this regard. Minimal work to date has been completed on preparing a comprehensive branding strategy for these services.

3. Expand employer pass program, undertake more travel smart initiatives, and introduce modifications to transit funding

The City's TDM Co-ordinator should more aggressively market an Employer Pass to large employers such as the various medical centres and hospitals, research centres and others in the City of Hamilton through the designation of a staff member or team to work more closely with these employers to establish a greatly enhanced program. This could include assistance in filling out simplified documentation; provision training of designated employees at employers to sell the program to fellow employees; and no requirement an employer's financial contribution to the pass. A discounted Employer Pass Program (i.e., 18% HSR discount) combined with the federal transit pass credit program can generate a 30% discount for participants.

Further, HSR should develop TravelSmart Programs in targeted growing communities such as Winona and Glanbrook, coupled with the introduction of enhanced conventional scheduled transit service in these areas. The City should modify the area rating financial system. If the City of Hamilton were to move to regional (such as a standard regional charge that residents pay for having access to the core regional transit system operating in the City of Hamilton) and local transit levies (such as a levy for local scheduled transit service that comes within say 450 metres) similar to that employed in Halifax Region, there would be more incentive and funding for improving the overall regional transit system. As a precedent for this financing, there is now a regional levy for paratransit service in the City of Hamilton.

The City of Hamilton currently has an Employer Commuter Pass for 166 employees and undertook a pilot employer pass program with 132 employees of Hamilton Health Sciences. As well, the City's Transportation Demand Management Coordinator has contacted all employers in Hamilton with more than 100 employees, to determine their level of interest in such a program. Some reasons for not wanting to participate include the requirement for employers to contribute to the cost of the transit passes, the need for payroll deduction (and associated administrative work) and the proposed agreement documentation that would need to be signed.

The city has also used a neighbourhood survey for the Keith neighbourhood to focus its service to that neighbourhood to increase ridership. The area rating

practice is to be reviewed by the City of Hamilton, starting with the establishment of an area rating committee at a yet to be determined date.

4. Establish and implement a transit park-and-ride strategy

HSR should work with other City departments to establish transit park-and-ride lots to attract current bus operators to transit services. Establishing dedicated parking facilities for transit riders near major transit terminals would encourage people from outlying areas to transfer to HSR for the remainder of their journey. Establishing permanent park-and-ride lots at the following locations can provide an opportunity for increased HSR ridership:

- Meadowlands
- Eastgate Square
- Mountain Transit Centre (HSR Facility)
- Elfrida
- Winona

The City of Hamilton is considering establishing a park-and-ride lot at its Mountain Transit Terminal to serve customers wanting to use the A Line rapid and Upper James local transit services.

5. Enhance HSR fare products

HSR should expand on the fare products its offers in order to develop new customers and markets and increase ridership. These fare products include the following:

- Promote the use of HSR Day Pass as a Guest or a Bus Buddy Pass to permit transit advocates to invite potential riders to try the transit system and to train them on how to use the system.
- Develop an Annual Pass for most classes of passengers to enable year-round transit commuters to pre-purchase their travel a year in advance to assist in financial planning and to provide the deepest discount available.
- Provide an Eco Pass/Community Pass to provide a discounted pass to large developments or to distinct communities (i.e., residential or business areas) where in return for a committed number of passes being purchased for a specified term (e.g. one to four years) as part of the development agreement or community agreement. Examples in Canada include the community pass programs developed for specific higher density residential developments in Victoria, British Columbia. Such an implementation should be consistent with the plans for PRESTO and maintain an appropriate cost recovery level.

2.2 Results of Stakeholder Consultation

Meetings were held with a cross-section of community leaders including individual meetings with members of Council and senior City staff as well as transit users and non-users to gather input on issues and opportunities for transit in Hamilton. Additionally, meetings were held with senior transit staff including operations supervisors and scheduling staff. Community leaders included representatives from the education (university, college), healthcare, seniors and transit users groups.

Representatives of the unionized transit staff were members of the study steering committee and as a result they provided input on behalf of bus operators and maintenance staff.

Specific topics for discussion at each of the stakeholder sessions included:

1. Expectations for transit in the community;
2. Public perceptions of HSR's services;
3. Directions on transit in the City and regional links;
4. Value of transit and how it could be improved;
5. Transit specific issues such as funding, service levels, transit-supportive policies like parking policies and development; and,
6. Ideas about marketing and promoting the transit service.

Stakeholders presented views on a wide range of subjects. Their general points can be summarised as follows:

- HSR need to ensure basic features such as customer information and service are done well to provide solid foundation.
- Fares should be simplified, and the cost of a monthly pass should be cheaper relative to ticket prices.
- Although the route network is generally efficient and easy to understand, there are opportunities for simplification (such as the King-Main corridor) and rationalisation.
- Service levels at weekends should be increased to reflect potential demand, particularly to retail centres.
- HSR should increase service on routes at times which suffer from over-crowding and/or introduce limited stop routes to separate out short-distance travel.
- Transit initiatives and HSR's work and generally need to be further integrated with other city departments. HSR currently has no influence over many things that make transit more or less attractive (such as road works or land use planning).
- The City should consider creating a new department entirely for transit similar to libraries and emergency services, and also give HSR more autonomy (for example, through a transit commission).
- Tourism Hamilton believes that a healthy and sustainable transit system translates into an improved city image and increased visitations. They would like to see better connections between HSR and other transit providers, and ensure that key attractions are served.
- Mohawk College and McMaster University are major destinations, and HSR should take advantage of that. However, HSR should be aware of the impact on local environment (such as from idling buses), and ensure part-time students are catered for.
- Hamilton Health Sciences are expanding the General Hospital, and shifting out-patients at the Chedoke facility to the General Hospital.

The Chedoke facility will then be out-patient only. This will result in changes to travel demand.

Overall, HSR is viewed by many as a “social” service, or one that is aimed too much at students. This makes it difficult to market to workers or those making leisure-based trips. There needs to be a fundamental shift in thinking for both the City and the public so that transit becomes a mode as natural as taking the car.

The foregoing feedback has been considered in the process of assessing existing HSR services and preparing the new 5-Year plan. There may be a need for further public surveying in order to obtain more detail on issues and how best to address them.

3. Analysis of HSR Services

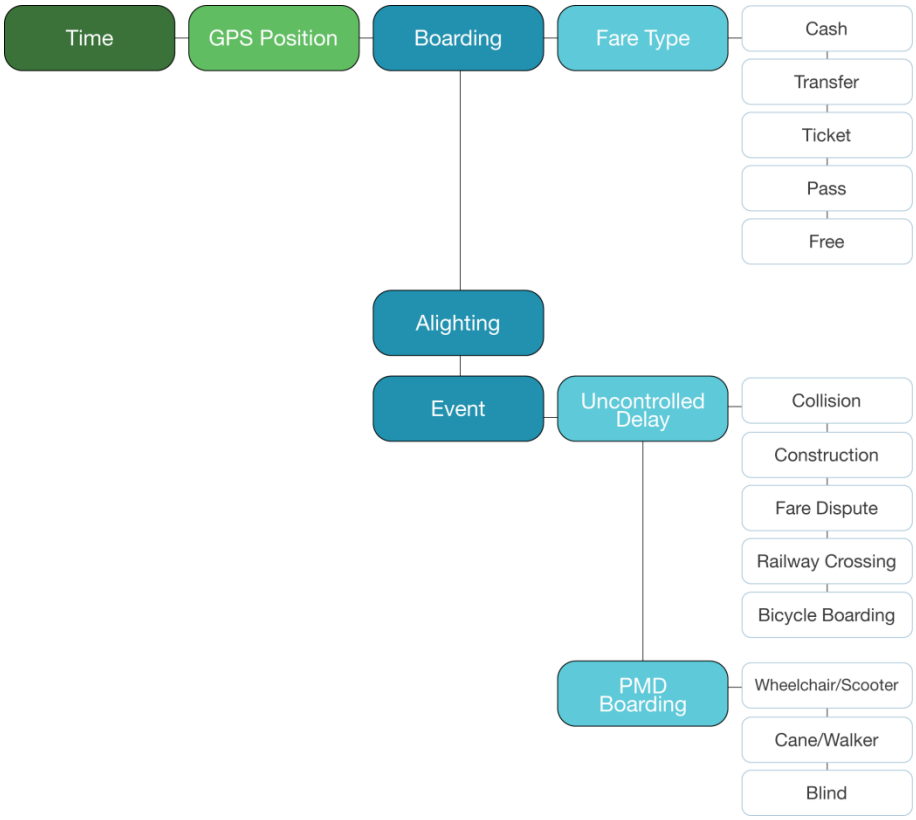
The HSR currently operates a network of 33 bus routes with service levels ranging from 22 hours a day, seven days a week to peak hour (6-9AM, 3-6PM) Monday to Friday only. In 2008, a total of 655,088 revenue-hours of service were operated with a staff of 585 and 217 buses. Almost 21 million trips were taken on HSR services representing a utilization rate (rides per capita) of 45.1. The transit system's annual operating cost was $63.8 million with revenues of $32.6 million for a cost-recovery rate of 51.1%. The City's annual operating investment in transit was $31.2 million.

This section reviews the performance of the existing HSR services to identify strengths and opportunities for improvements. It covers not only the on-road transit service performance but also the organization and staffing and other administrative and support functions such as marketing and outreach, vehicle maintenance practices and infrastructure (vehicles, facilities). The analysis process included an extensive route by route ride check (count of passengers getting on and off buses at every stop), a fare media count using electronic data collection equipment, a review of the established HSR service standards as the basis for assessing the transit system's performance along with a peer review to place the HSR's performance into context with peer municipalities and transit systems. Each of these areas is discussed below.

3.1 Results of Service and Rider Surveys

A comprehensive ridership and operational data collection process was completed as part of this study. On-board observations were conducted over a four month period between October 2008 and January 2009 to obtain data for all routes for one "typical" weekday, Saturday, and Sunday. The data included information on boardings and alightings by stop, running time, and use of personal mobility devices and bicycles. Over 400,000 data points were successfully matched with over 2-million GPS data points to service stops. The breakdown of the database is shown in Exhibit 3-1.

Exhibit 3-1: Survey Results Database Structure



Methodology

The survey was completed with the use of two handheld devices: a netbook equipped with a GPS receiver and a PDA device. A surveyor was equipped at the front of the bus with the netbook and observed passenger boardings and conducted the fare media survey. The surveyor at the rear door was equipped with the PDA and observed passenger alightings, uncontrolled delays, and boardings of personal mobility devices.

The collected GPS and survey data was matched to Hamilton Street Railway's schedules and stops based on the route, block number, time, and anticipated location in an automated process. As such, there is a minimal degree of error that is within an acceptable range, particularly with such a large sample size. Data with unreliable or incomplete GPS coordinates were matched manually in a secondary process that relied on route, block, and time.

Details of the validation procedures are give in Appendix E.

System-wide results

This section looks at some of the key system-wide results obtained from the survey, superficially boardings, transfer usage, wheelchair boardings, bicycle boardings and delay hotspots.

Boardings

The busiest stops in Hamilton are shown in Exhibit 3-2, which lists all stops that were surveyed as having over one thousand boardings (including transfers) on a weekday. The stops listed in the Exhibit at all either in the downtown area (King/Main streets), or at transit terminals. These are all key nodes, and imply that many passengers change between corridors at these nodes.

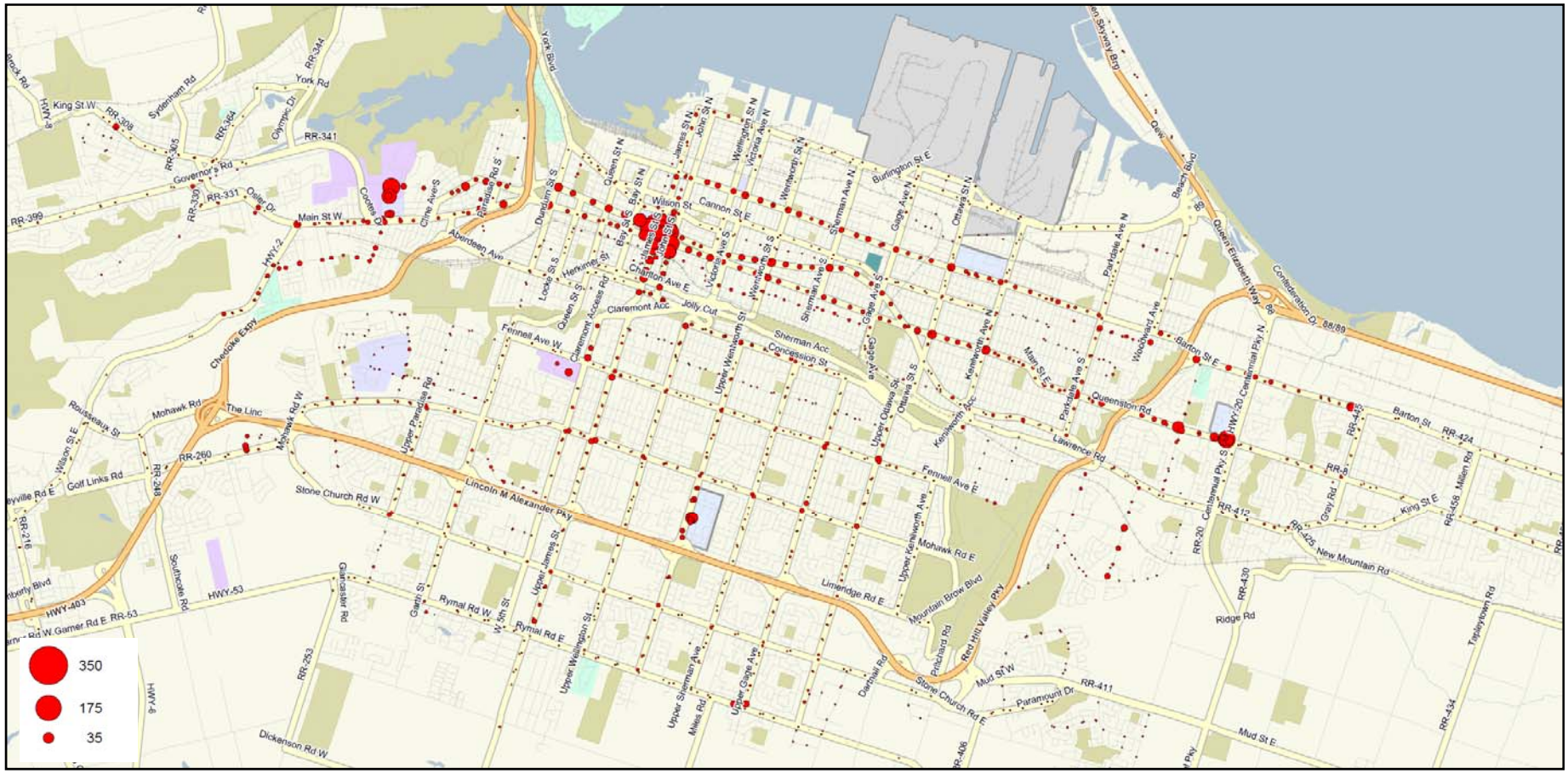
Exhibit 3-2: Stops with over 1000 weekday boardings

Stop name	Weekday boardings
King at Hughson	4,461
King at James	2,924
Sterling at University	2,134
Macnab Terminal	2,042
King at John	1,866
University at Sterling	1,707
Main at John	1,652
James at Main	1,325
Eastgate Terminal South Platform	1,217
Lime Ridge Mall Terminal North West	1,091
Eastgate Terminal Centre Platform	1,059
King at Bay	1,034

Weekday boardings by stop across the city are shown geographically in Exhibit 3-3, with the size of the bubbles being proportional to the number of boardings at that point. The biggest cluster occurs in the downtown area, where many of the routes from the mountain originate, and so any journeys from (or via) the downtown to the mountain must use these stops. The areas around McMaster University and the shopping centres at Eastgate Square at and Lime Ridge Mall also have a large number of boardings, reflecting their nature as both transit hubs and key attractors.

The B Line corridor (King and Main Streets) and route #2 (Barton) have high number of boardings along its routes, as people transfer from local or north-south routes. Along the B Line corridor, the stops served by route #10 (B Line express) also show up as having higher number boardings than the stops served by non-express routes. In the mountain area, higher numbers of boardings show up at the intersection of routes, corresponding to transfers (see next section).

Exhibit 3-3: Total weekday boardings



Transfers

Transfer usage is shown in Exhibit 3-4, with the size of the bubbles being proportional to the number of transfers at that point. The biggest cluster occurs in the downtown area, where many of the routes form the mountain terminate, and this area provides an easy place to transfer between these routes, and routes serving the downtown, Stoney Creek or Dundas. This area is a key hub for HSR. The area around Eastgate Square also has a large number of transfers, where local services meet up with mainline east-west services. Transit priority measures would be particularly beneficial in these areas, as there are many routes concentrated in one point, and the increase in journey time reliability would benefit transferring passengers (who would have greater confidence they could make their connection on time).

In the mountain area, high numbers of transfers show up at the intersection of routes, as people switch between north-south and east-west routes.

The B-line corridor and route #2 (Barton) have high number of transfers along their routes, although this may be a function of the large number of boardings rather than a high proportion of transfer usage and a function of the two-hour transfer-use window.

The number of transfers at these locations indicates that users are fully prepared to take advantage of trips using multiple bus routes providing the transfer is an easy one.

Wheelchair boardings

Wheelchair boardings are shown Exhibit 3-5, with the size of the bubbles being proportional to the number of transfers at that point. Overall, there were 601 wheelchair boardings recorded on a weekday, or around 0.55% of boardings. The biggest cluster occurs around King and Paisley Streets, near Westdale Theatre. The number of wheelchair boardings here is much higher than would be expected if wheelchair boardings were a uniform proportion of boardings.

This location aside, wheelchair boardings follow a similar pattern to total boardings. This implies that, in general, wheelchair users have similar trip distribution to non-wheelchair users.

Exhibit 3-4: Transfer Use

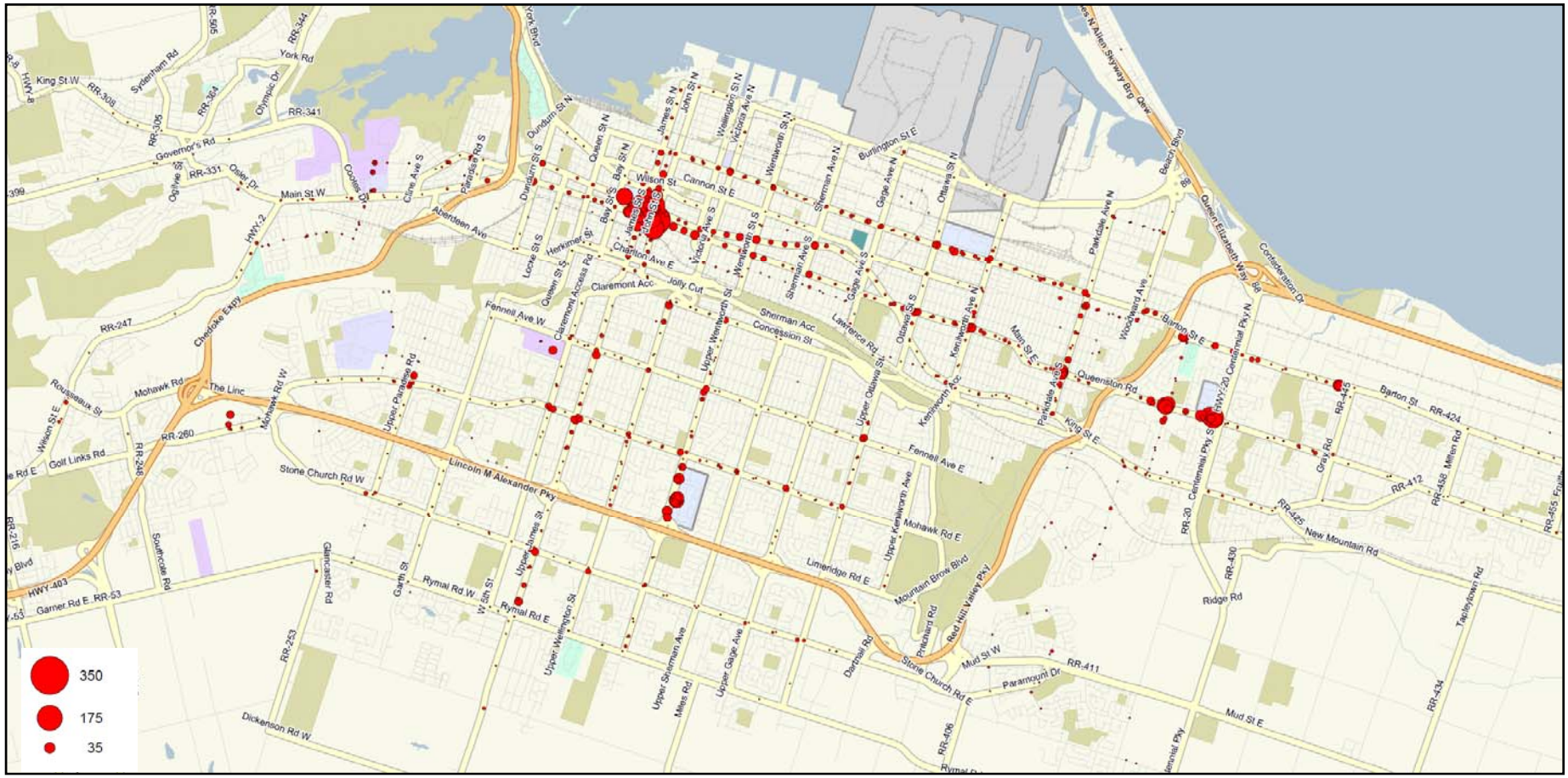
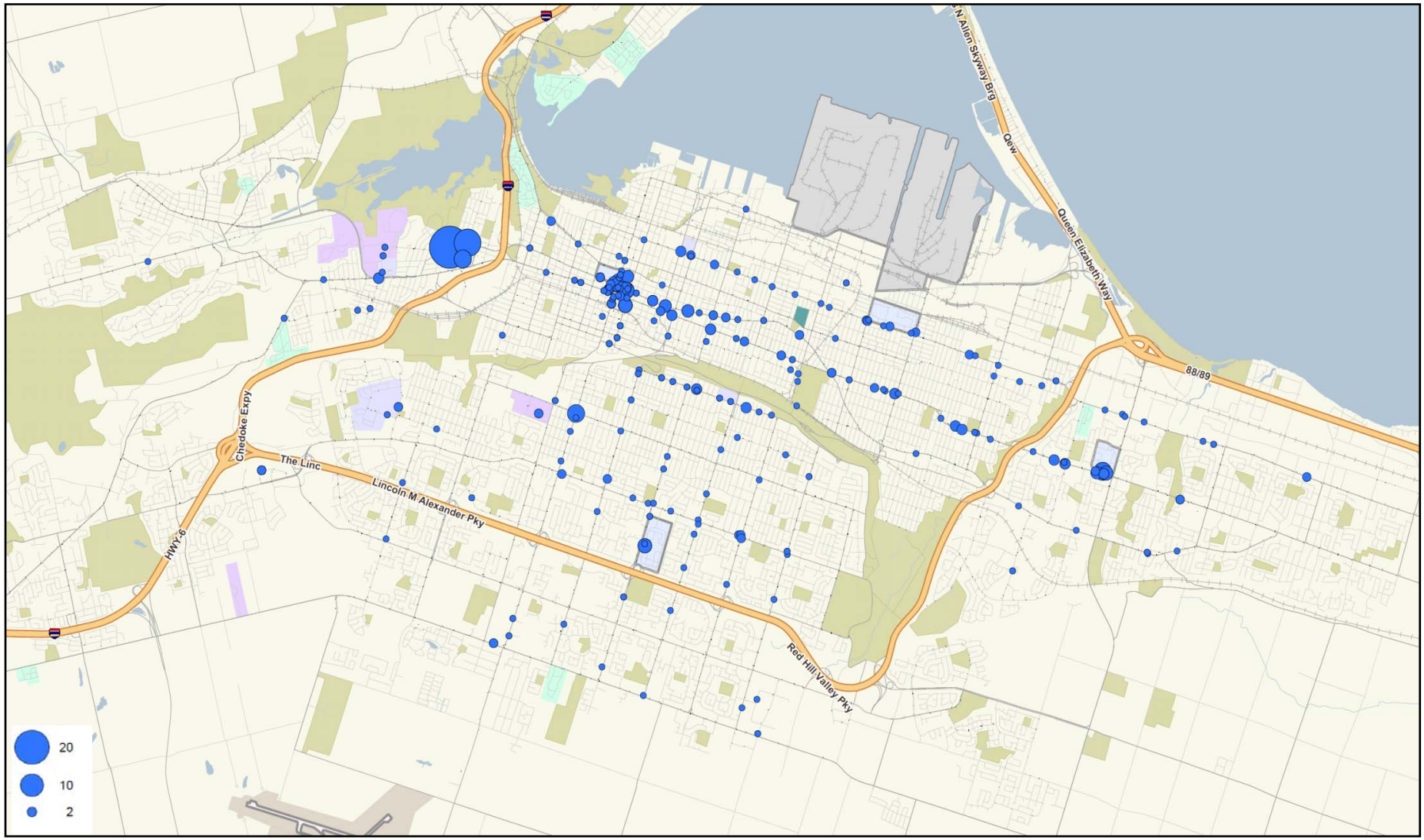


Exhibit 3-5: Wheelchair Boardings



Bicycle boardings

Bicycle boardings are shown in Exhibit 3-6, with the size of the bubbles being proportional to the number of transfers at that point. Overall, the number of weekday bicycle boardings recorded was 264, or 0.24% of all weekday boardings. The relatively low number of boardings makes it difficult to draw system-wide conclusions. However, the data shown in the Exhibit implies that the distribution of bicycle boardings roughly follows that of total boardings. Given the low number of boardings, it is hard to see how bicycle boardings would have a system-wide impact on schedule adherence.

Average speed

The average speed of vehicles in service is shown in Exhibit 3-7. The colour indicates the average speed along each road segment, with blues representing the slowest speed, and reds/yellows the highest speed. The average speed was calculated using the recorded time and distance between two stops to obtain the average speed for vehicles approaching each *stop*. The speed for each road segment was the average of all stops along that road segment. The HSR's acquisition of a new AVL GPS-based system will be available in future for a more detailed analysis of average speed.

The data in the Exhibit shows that HSR service speeds are in almost all cases less than 40km/hr, below the posted maximum road speed of 50 km/hr. Further, most of the downtown area (below the escarpment) has average speeds of under 20km/hr. Overall, HSR's average system speed is 18.7 km/hr, which is below both the national average and HSR's peer group (CUTA 2008 Canadian Transit Fact Book). Given the large number of routes that run through the downtown area, any action that would increase average vehicle speed (such as transit priority measures) will benefit a large number of riders, and potentially lead to fewer vehicles being required.

Delay locations

During the survey, boarding and alighting data was automatically time stamped and had the latitude and longitude recorded with the aid of GPS. This allowed the time that each bus reached a stop to be known and this could be compared with the scheduled time. The next step was to identify the locations which cause delays, so the rate of change in delay along the stretch of route prior to each stop was calculated.

The resulting data is shown in Exhibit 3-8 and Exhibit 3-9. The latter shows the rate of change delay by colour, with red indicating the highest (worse) increase, through pink, orange, yellow to grey (indicating no change in delay), and finally blue indicating a decrease in delay. The rate of change delay is also indicated by the lines thickness, with thicker lines corresponding to higher (worse) increases.

Exhibit 3-6: Bicycle Boardings

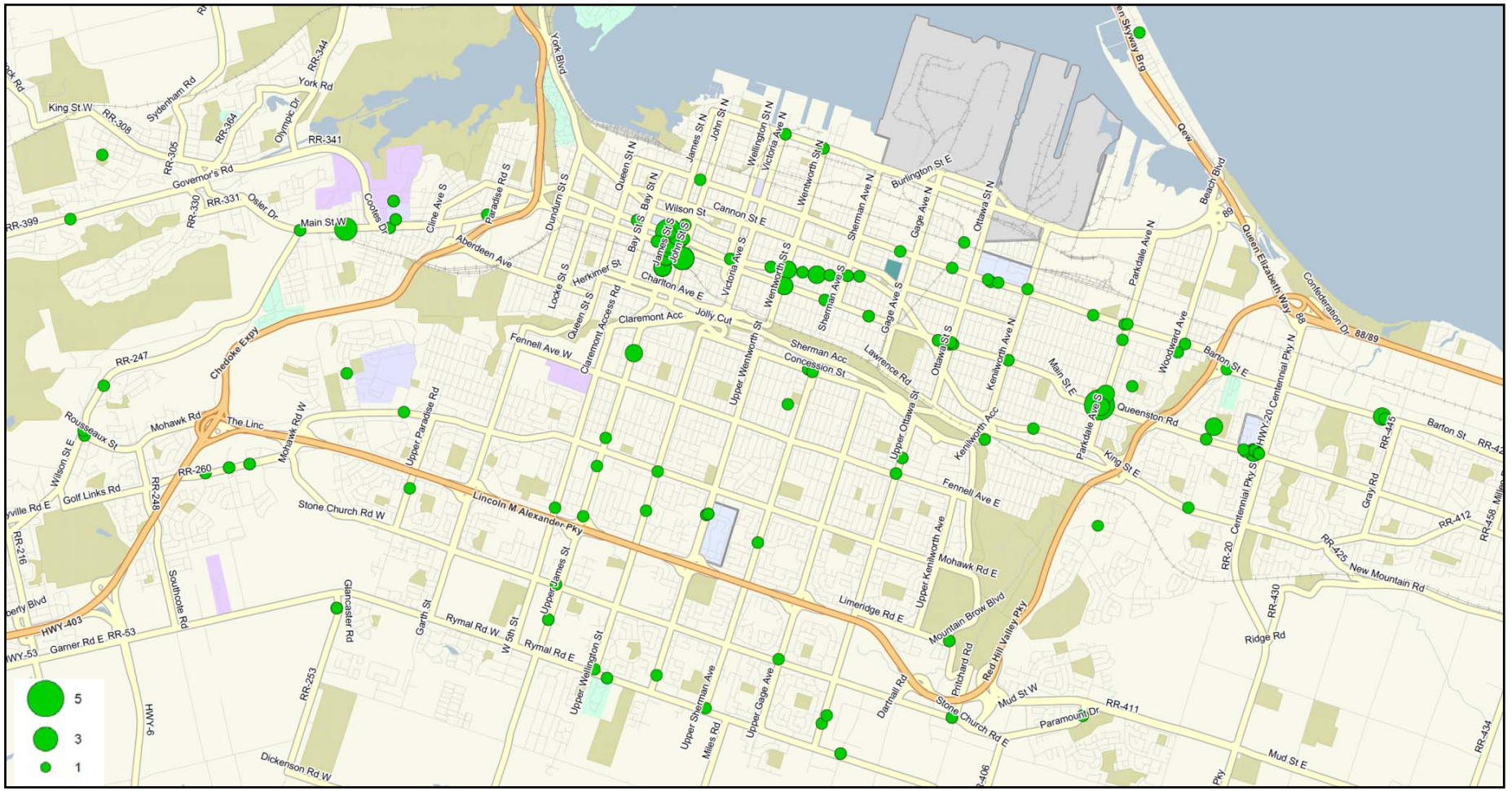


Exhibit 3-7: Average Speeds

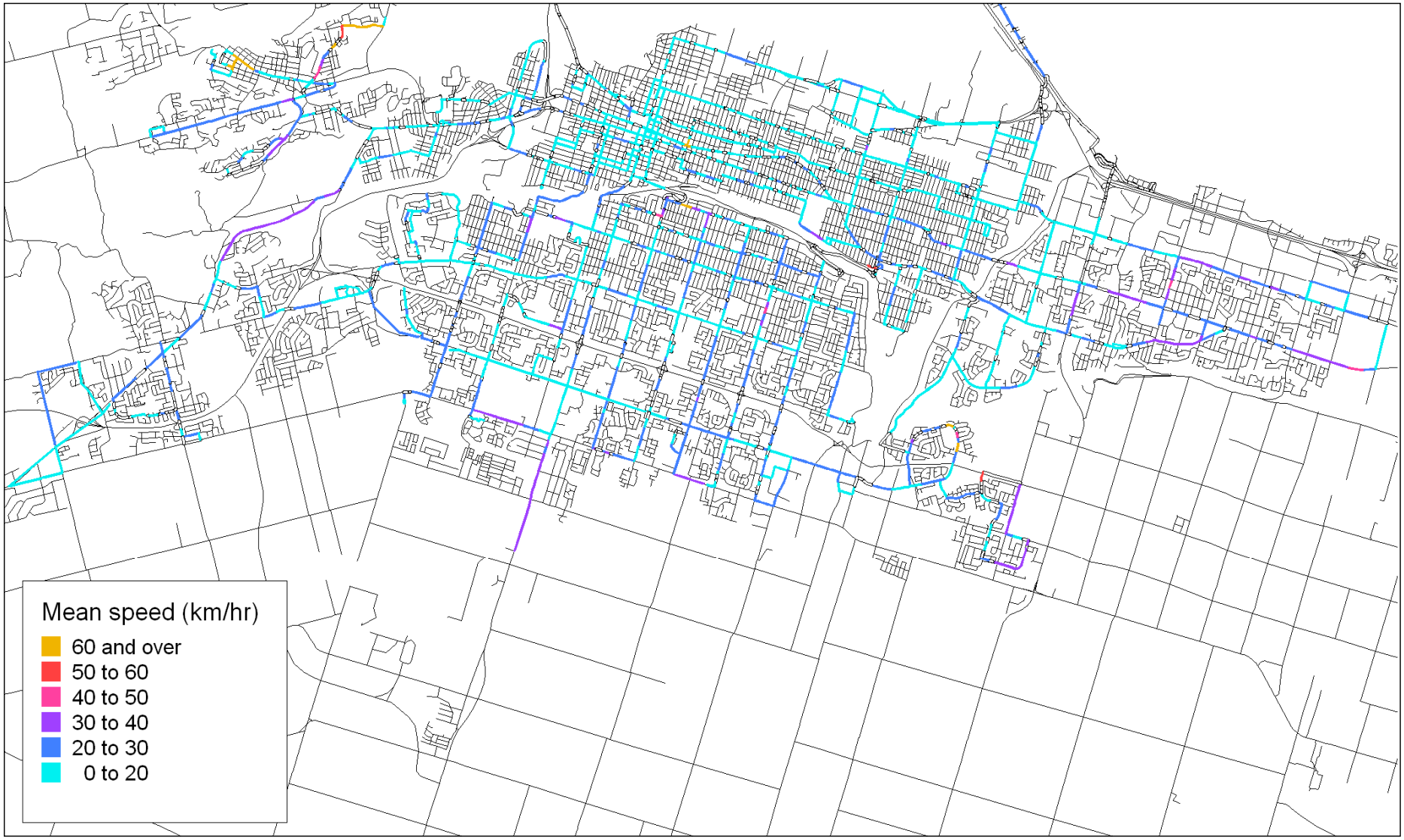
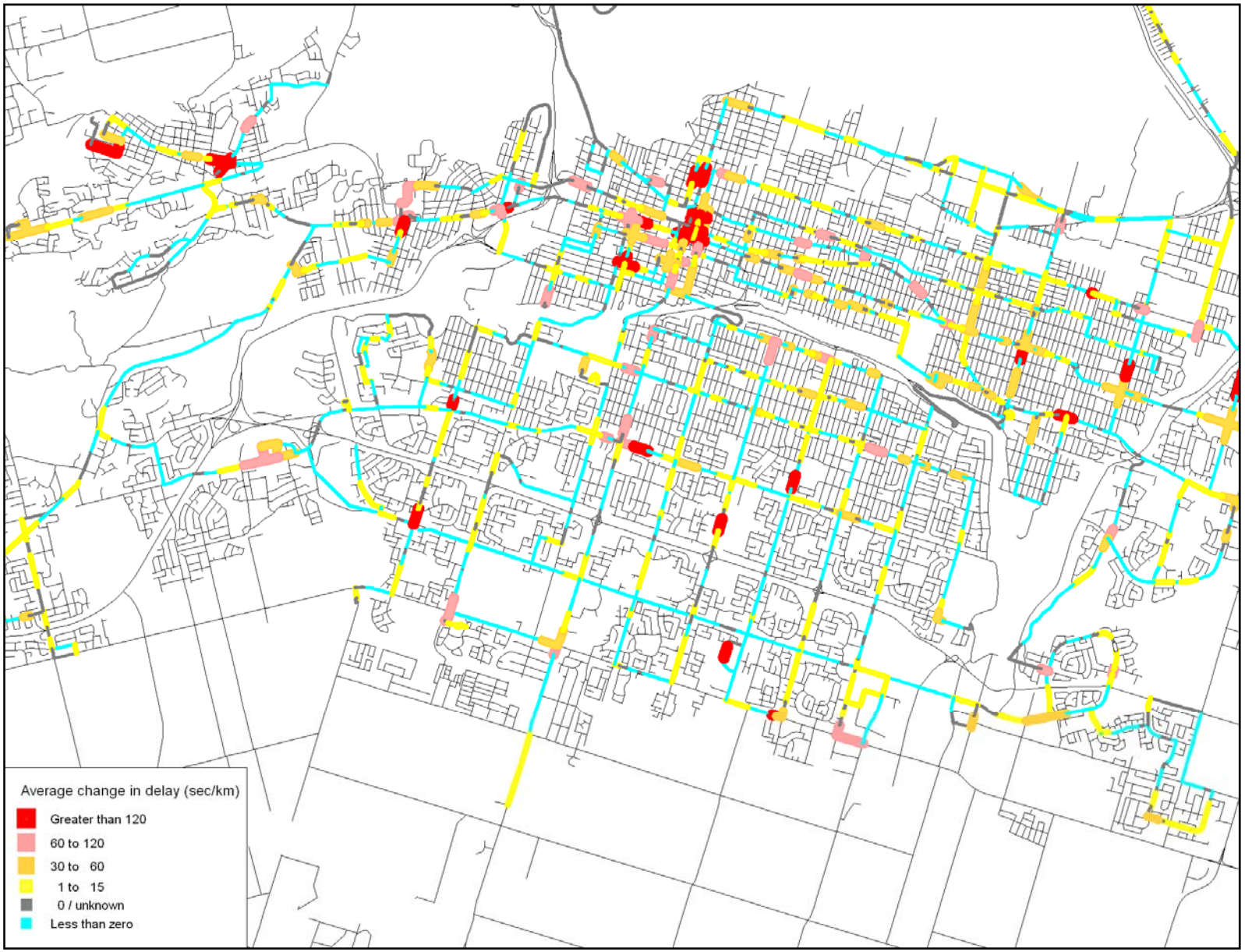


Exhibit 3-8: Locations of Operational Delays (table)

Route	Headway (mins)	Location*	Likely Cause
1	15	875 Main St West	School/Congestion
1	8	25-55 Main St E	Congestion
2	8	40-62 Hughson St N	Congestion (service eliminated, July 2009)
2	8	225-275 James St N	Congestion
2	8	1531 Barton St E	Strathbarton Mall
2	8	1767-1787 Barton St E	Junction of Parkdale and Barton
4	15	101-209 Nash Rd N	Junction of Barton and Nash
4	15	165-209 MacNab St N	Congestion
4	15	28-60 James St N	Congestion
5	30	1-27 Jones St, Stoney Creek	General commercial
5	30	55-57 Wellington St S, Dundas	Tight Streets
5/51	30	15-47 Emerson St	Congestion
5	30	1-49 King St E, Dundas	Tight Streets
5	30	2001-2129 King St E	High-rise
6	20	165-179 Charlton Ave W	Unknown, possibly narrow streets
11	30	1-55 Parkdale Ave N	Buses wait for connections
22	15	2-40 King St East	Congestion
24	15	829-843 Rymal Rd	Sobey's Plaza. Recovery point, rtes 23/24
24	15	141-205 Acadia Dr	School
24	15	787-809 Upper Sherman Ave	County Fair Plaza. Operator washroom location
26	15	46-70 King St E	Congestion
33	15	63-69 James St S	Congestion
34	30	163-191 Main St W	High-rise
34A	30	843-849 Upper Paradise Rd	General commercial
34A	30	375 Upper Paradise Rd	Westcliffe Mall
41	30	970-990 Upper Wentworth St	Lime Ridge Mall
41	30	47-85 Mohawk Rd E	Commercial at Upper James and Mohawk
41	30	9-43 Kenilworth Ave S	Congestion at junction (possibly due to lack of separate phase for left-turning traffic)
43	30	1106 Paramount Dr	Unknown
51	12	51-69 John St S	Congestion

* Street numbers are for indicative purposes only.

Exhibit 3-9: Locations of Operational Delays (map)



The data in the Exhibits shows that delays are higher at major intersections than on the roadway between them. Delays also occur in areas of high demand (such as near commercial or employment centres), and in areas with high congestion levels. In particular, the data in the Exhibit indicates the worst locations are:

- Downtown Dundas;
- McMaster University;
- Downtown Hamilton;
- Apartments and plaza at King St E & Cochrane; (although this may have been caused by construction work taking place during the survey)
- Intersection at Nash & Barton;
- Lime Ridge Mall;
- St. Jean de Brebeuf School; and
- Upper Paradise commercial area/ St Thomas More Children's Centre

As discussed later under schedule adherence, these delays do not necessarily contribute to buses running behind schedule, provided the total scheduled running time builds in a buffer for regular delays. However, addressing these delay hotspots represents a significant opportunity for HSR to reduce running times, and driver and passenger frustration. Improvements could be made by implementing Transit Priority Measures at relevant intersections, and this is discussed in the later section on TPM.

Where regular congestion is causing the delays and schedule adherence is an issue, then schedule adherence could be improved by adjusting the timetable, particularly in those times when congestion is highest (typically the AM and PM peaks). Although this would result in advertised journey times varying during the day, users would benefit from greater confidence in the published times. Congestion-caused delays can also be reduced by making changes to the road layout such as bus lanes (or HOV), to reduce the effect of congestion on buses. The addition of bus lanes or HOV lanes would also reduce journey times. However, changes to the road layout should be targeted at areas where service levels are high. Such measures are discussed further in Section 4.3.

3.2 Review and Assessment of Existing Routes and Service Levels

This section provides an overview of the performance of HSR's services and provides a comparison with the City's established transit service standards. Detailed information on each route is given in Appendix A. For the purposes of this section, the routes are divided up into four groups:

- **Mainline**: 1 (King), 5 (Delaware), 10 (B Line express) and 27 (Upper James)

- **Radial**: 4 (Bayfront), 6 (Aberdeen), 7 (Locke), 8 (York), 21 (Upper Kenilworth), 22 (Upper Ottawa), 23 (Upper Gage), 24 (Upper Sherman), 25 (Upper Wentworth), 26 (Upper Wellington), 33 (Sanatorium), 34 (Upper Paradise), 35 (College) and 51 (University).
- **Crosstown**: 2 (Barton), 3 (Cannon), 11 (Parkdale), 41 (Mohawk), 43 (Stone Church) and 44 (Rymal)
- **Feeder**: 12 (Wentworth), 16 (Ancaster), 18 (Waterdown), 52 (Dundas local), 55 (Stoney Creek central) and 58 (Stoney Creek local).

Existing service standards

HSR's current service guidelines, which date from 1996, are summarized in Exhibit 3-10, and cover hours of operations, maximum headway, walking distance to bus routes, and R/C ratio. The current City of Hamilton (and therefore HSR's potential service area) covers several former municipalities, most of which are outside the main urban area. Consequently, various exceptions to the main service guidelines were created in 2004, and are detailed in Exhibit 3-11.

Exhibit 3-10: Transit Service Guidelines (1996)

Service parameter	Monday to Saturday	Sunday & Holiday
Hours of operation	6:00am to 12:00am	6:00am to 6:00pm
Maximum headway	30 minutes	60 minutes
Walking distance	400 metres for 90% of the population, where permitted by the local street network.	
Revenue/cost ratio (R/C ratio)	Greater than 50% for entire system Minimum 30% for individual routes, otherwise basic Monday to Friday rush hour only service to be provided every 30 minutes	

Exhibit 3-11: Unofficial Service Standard Exceptions (2004) [1]

Community	Headway	Hours of operation
Old City of Hamilton	Monday to Friday 9am-3pm (base period): 20 minutes. Sunday/holiday until 6pm: 30 minutes	Monday to Friday: until 1am Sunday/ Holiday: until 12am
Ancaster	Feeder route operates every 60 minutes in base period	No evening service on Mon/Tue/Wed as of Jan/10 No Sunday/Holiday service
Dundas	Base period: 60 minutes	
Flamborough		No service in Waterdown since 1994*
Glanbrook		No Trans-Cab service after 7pm No Sunday/Holiday Trans-Cab service

[1] These were created to inform Council about service in outlying areas. It was not intended to be an addendum to the 1996 guidelines. They do not have any official status.

Community	Headway	Hours of operation
Stoney Creek	Lower City feeder route operates every 40 minutes in evenings	Evening service in Heritage Green Thurs and Fri only. * No Sunday/Holiday Trans-Cab service

** Since these exceptions were created, route 18 (Waterdown) has been introduced. This operates roughly every 30 minutes during the AM and PM peaks on a weekday only. Further, route 43 (Stone Church) now has evening service on all weekdays.*

The existing HSR service standards are limited compared with those in place for other Canadian transit systems although HSR has targets that are not included in the service standards. Therefore, the City should consider imposing additional standards, including (but not limited to) the following:

- **Performance targets**: currently only one financial target (R/C ratio) is included. Other measures could include service utilization rate (passengers per revenue hour), on-time performance (percentage of arrivals less than 3 minutes late or 1 minute early), or market penetration (rides per capita)
- **Customer experience targets:** aside from the currently defined walking distance, this could include customer satisfaction rate (percentage satisfied with HSR), crowding (maximum occupancy), ease of travel (maximum transfers required) and directness of routing (trip time relative to auto).
- **Service introduction/improvement requirements**: this should set forth the requirements for the trial operation of a brand new or extended service (e.g. would provide service to a certain number of people currently without service), retaining a trial service (e.g. boardings or revenue), and improving an existing service (e.g. maximum loads)

Route assessment

Hours of service

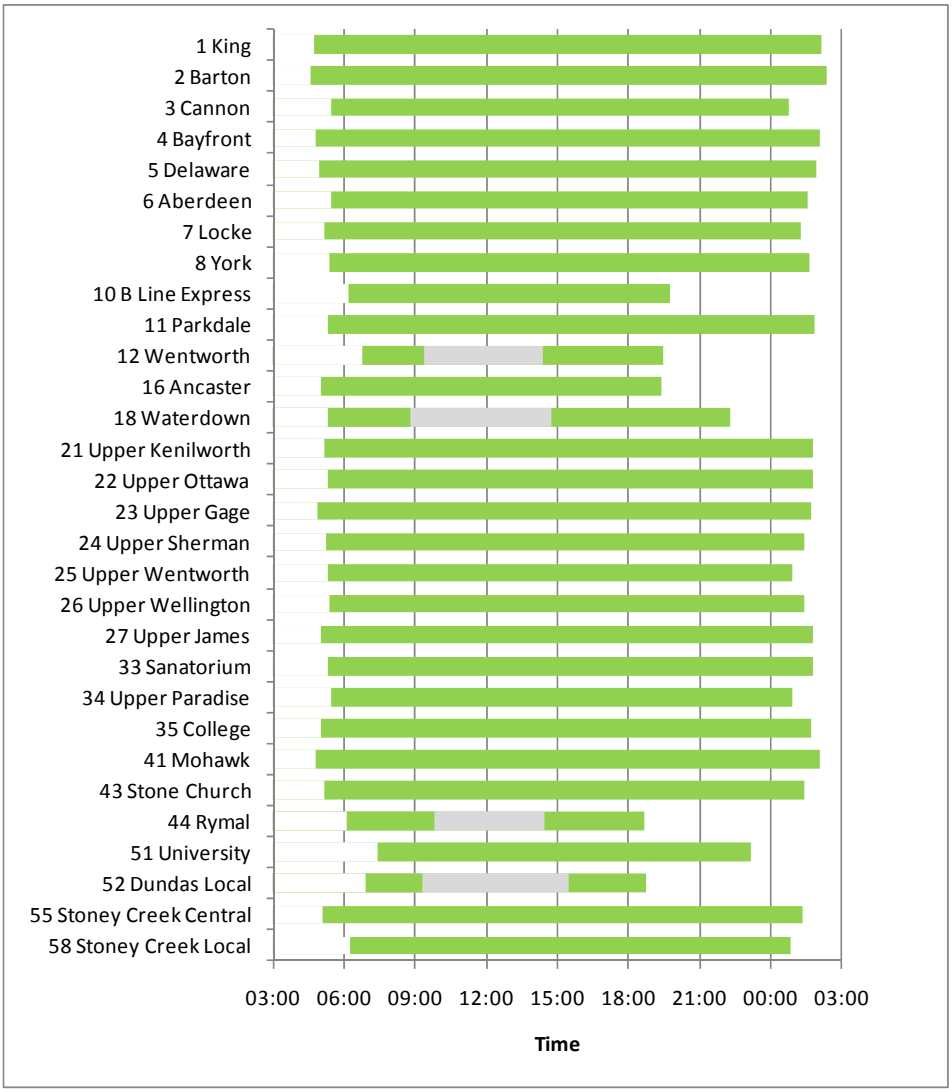
The hours of service for each route are shown in Exhibit 3-12. The horizontal lines run from the time of the first bus to the time of the last. Where a route only operates in the peak hours, the times without service are shown by the grey bars. The service level guidelines state that routes should operate from 6:00 AM to 12:00 AM (1:00 AM for routes in the old City of Hamilton), apart from those routes whose low revenue/cost ratios only justifies peak-hour only service.

Looking at the routes with all-day service, only routes 10 (B Line express), 44 (Rymal) and 51 (University) start service after 6am. Routes 10 and 44 start at 6:08 AM and 6:12 AM respectively, which is very close to the start time stated in the guidelines. Route 51 (University) does not start until 7:25 AM. However, it is aimed at specific market (students), and there are alternative services which operate along the path of this route.

There are six routes with all-day service that finish service before 1 AM, namely routes 10 (B Line express), 16 (Ancaster), 25 (Upper Wentworth), 34 (Upper Paradise) and 58 (Stoney Creek Local). Routes 25 and 34 finish service at 12:55 and 12:56 AM respectively very close to the end time stated in the guidelines. Route 58 (Stoney Creek Local) does not operate in the former City of

Hamilton, and its end time of 12:49 AM meets the 12:00 AM stated in the guidelines. However, routes 10 (B Line express) and 16 (Ancaster) finish at 7:45 PM and 7:22 PM respectively. However, route 16 does operate until 9:59 PM on Thursday and Friday evenings. Although there are alternative services along the path of route 10, this is not the case for route 16. This means that those in the service area of route 16 (Ancaster) do not have any evening service on Monday, Tuesday and Wednesday, which does not meet the service level guidelines, and the Thursday & Friday evening service falls short of the midnight end time guideline.

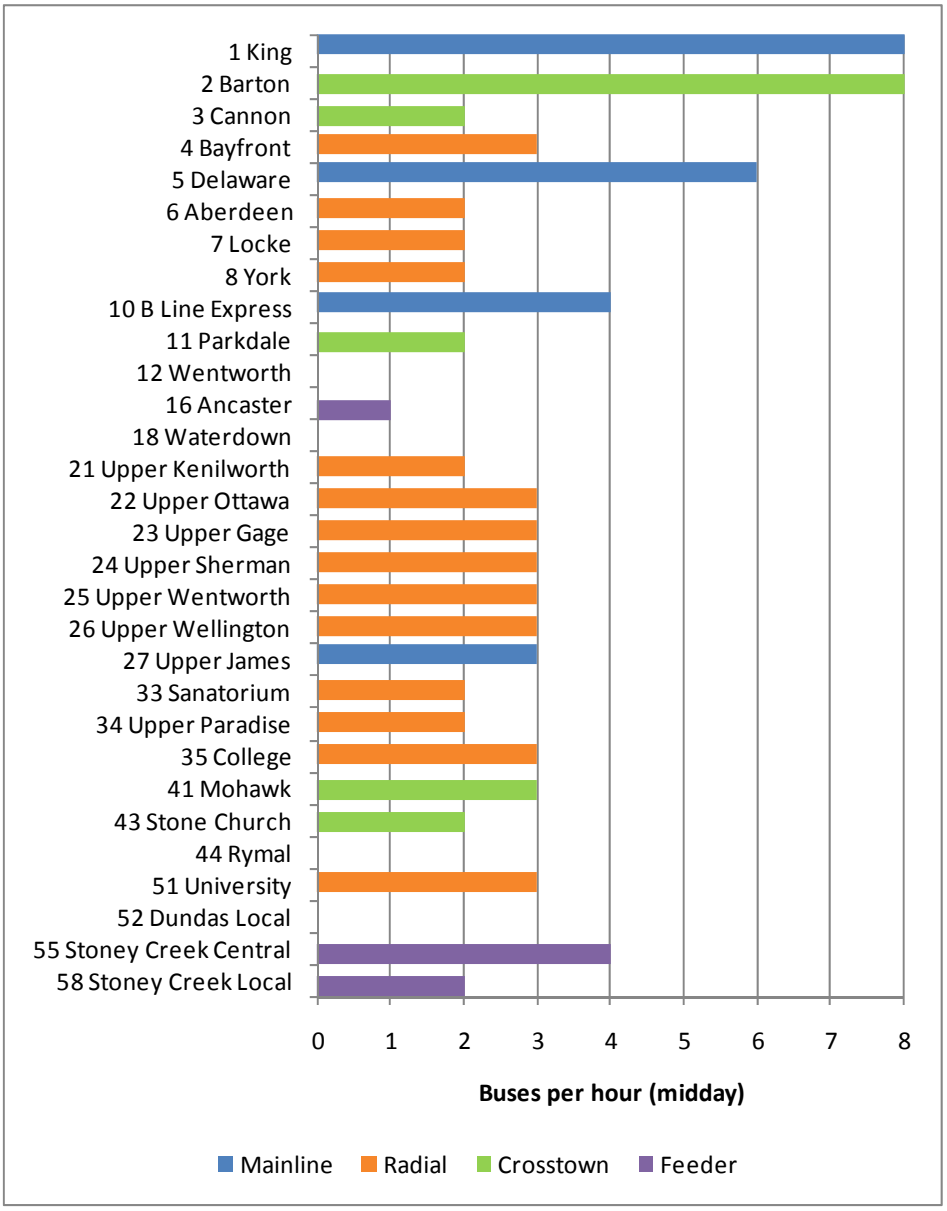
Exhibit 3-12: Hours of Service (weekdays)



Service level (frequency/headway)

The service levels for each route, as measured in buses per hour in the middle of a weekday, are show in Exhibit 3-13. The colour indicates the service group to which the route belongs. Those routes shown as having zero buses per hour only operate during the peak hours. Of the thirty routes shown in the Exhibit, four are peak only routes, one is hourly, ten have two buses/hour, ten have three buses/hour, and five have four or more buses/hour. This shows that most regular routes operating during the daytime have headways of thirty minutes or less.

Exhibit 3-13: Buses per Hour (weekdays, midday)



The four mainline routes operate on frequencies of between three and eight buses per hour. Radial and non-peak only cross-town routes all operate at two or three buses per hour, with the exception of route 2 (Barton). Only three out of five feeder routes operate all day; those that do have frequencies of between one and four buses per hour.

The 2004 service level guidelines set a maximum headway during the day of twenty minutes (three buses per hour) for routes in the former City of Hamilton. Routes 3 (Cannon), 6, (Aberdeen), 7 (Locke), 8 (York), 12 (Wentworth), 21 (Upper Kenilworth), 33 (Sanatorium), 34 (Upper Paradise), 43 (Stone Church) and 44 (Rymal) all lie within the former City of Hamilton, but have a headway of thirty minutes (two buses per hour). These eight routes therefore do not meet the current service standards.

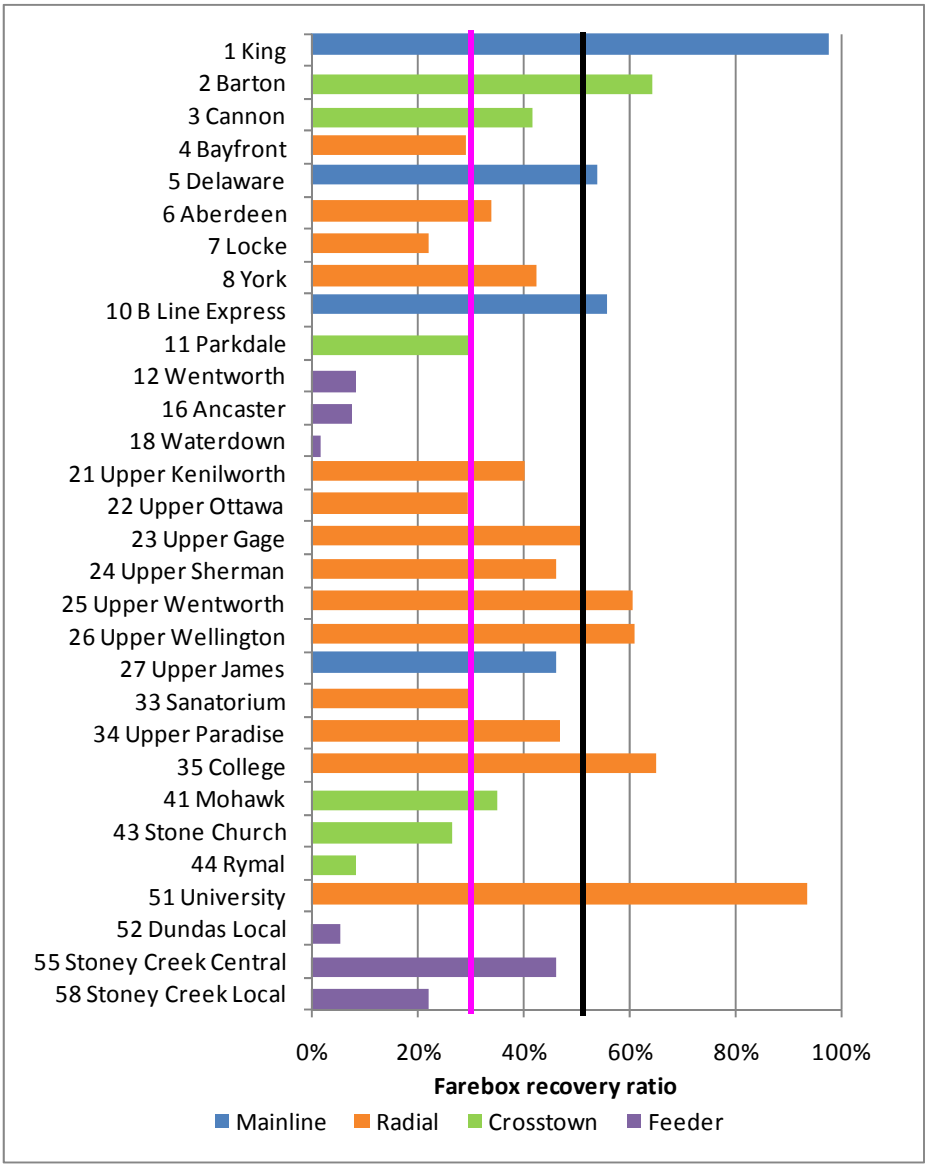
There are five routes which operate entirely outside the former city of Hamilton, namely Routes 16 (Ancaster), 18 (Waterdown), 52A (Dundas Local), 55 (Stoney

Creek Central) and 58 (Stoney Creek Local). Routes 16 (Ancaster) and route 52A (Dundas Local) are required to operate at least every 60 minutes during the base period. All do, apart from route 52A (Dundas Local) which only operates during weekday peaks. Routes 11 Parkdale, 55 (Stoney Creek Central) and 58 (Stoney Creek Local) are required to operate at least every 30 minutes (two buses per hour), which they do.

Revenue/cost Ratio

The revenue/cost ratio for each route is shown in Exhibit 3-14. The thick black vertical line shows the revenue/cost ratio for the entire system (51.1%), and the thick pink vertical line shows the 30% minimum set by the service standards (which is 62% of the average). The worst (lowest) R/C ratios are for routes 18 (Waterdown) and 52 (Dundas Local) at 1.6% and 5.4%. Three other routes also have R/C ratios of less than 10%. However, despite their high subsidy rates, these five routes account for just 3.5% of HSR's weekly operating costs. At the other extreme, route 1 (King) comes close to breaking even, with an R/C ratio of 93%.

Exhibit 3-14: R/C ratio by route



The mainline routes all have subsidy levels at or below the system average, while the feeder routes are a mixture of below and above average. Crosstown and feeder routes all receive a higher subsidy level than average, with exception of route 2 (Barton).

A total of thirteen (out of thirty) of HSR's routes do not meet the service level guideline of 30%. Of these thirteen, four follow the guidelines by only providing rush hour service, but the remaining nine do not – roughly a third of all routes. Within any transit system there will be wide variations in R/C ratios, and so the provision of normal service even though the R/C ratio is nominally somewhat below the system average is to be expected. Further, the high number of transfers between routes implies that routes with lower R/C ratios provide passengers who then travel on routes higher with R/C ratios. This shows the importance of having multiple criteria to assess routes, rather than one financial measure.

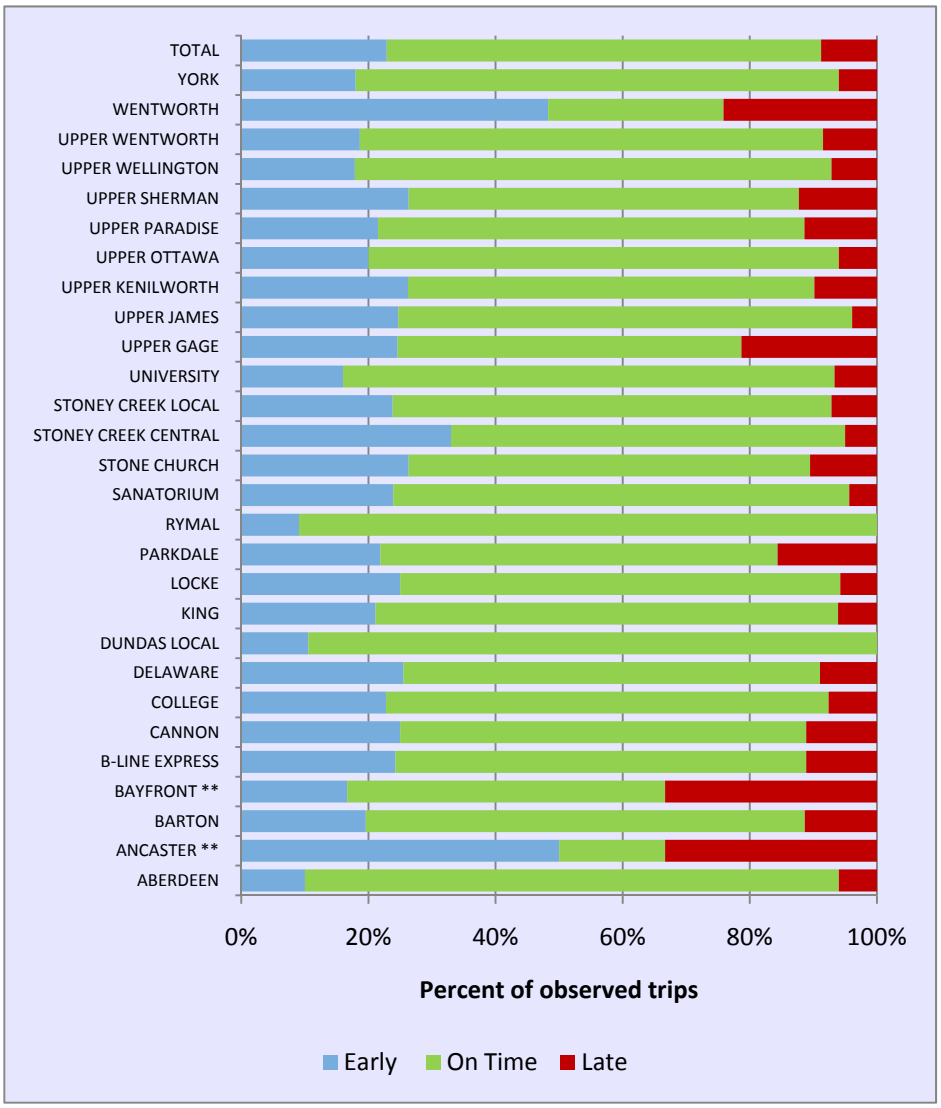
Schedule adherence

The schedule adherence performance for each route is shown in Exhibit 3-15. HSR defines "on time" as arriving between one minute before and three minutes after the scheduled time, but does not appear to set any target for the percentage of arrivals that are on time. In most transit systems, a level of 85-90% of arrivals on time is considered acceptable. For a user who commutes every weekday using HSR's services, 90% on time equates to one bus a week not being on time. Routes 4 (Bayfront) and 16 (Ancaster) had insufficient data collected to form any statistically significant conclusions.

The Exhibit indicates that most routes have less than 10% arrivals recorded as being late. However, most routes had approximately 20% of arrivals as being *early*. Early arrivals can be a greater source of frustration to users than late arrivals, especially on low frequency routes where an early arrival will result in a long wait for the next bus. With the exception of routes 4 (Bayfront) and 16 (Ancaster), the poorest performing route is 12 (Wentworth) where nearly half of buses arrive early and approximately 25% arrive late. The performance of route 23 (Upper Gage) is also poor with less than half of arrivals classified as being on time.

HSR has recently installed a GPS-based automatic vehicle location tracking system on its vehicles. This will greatly enhance both driver information and performance monitoring.

Exhibit 3-15: Schedule Adherence

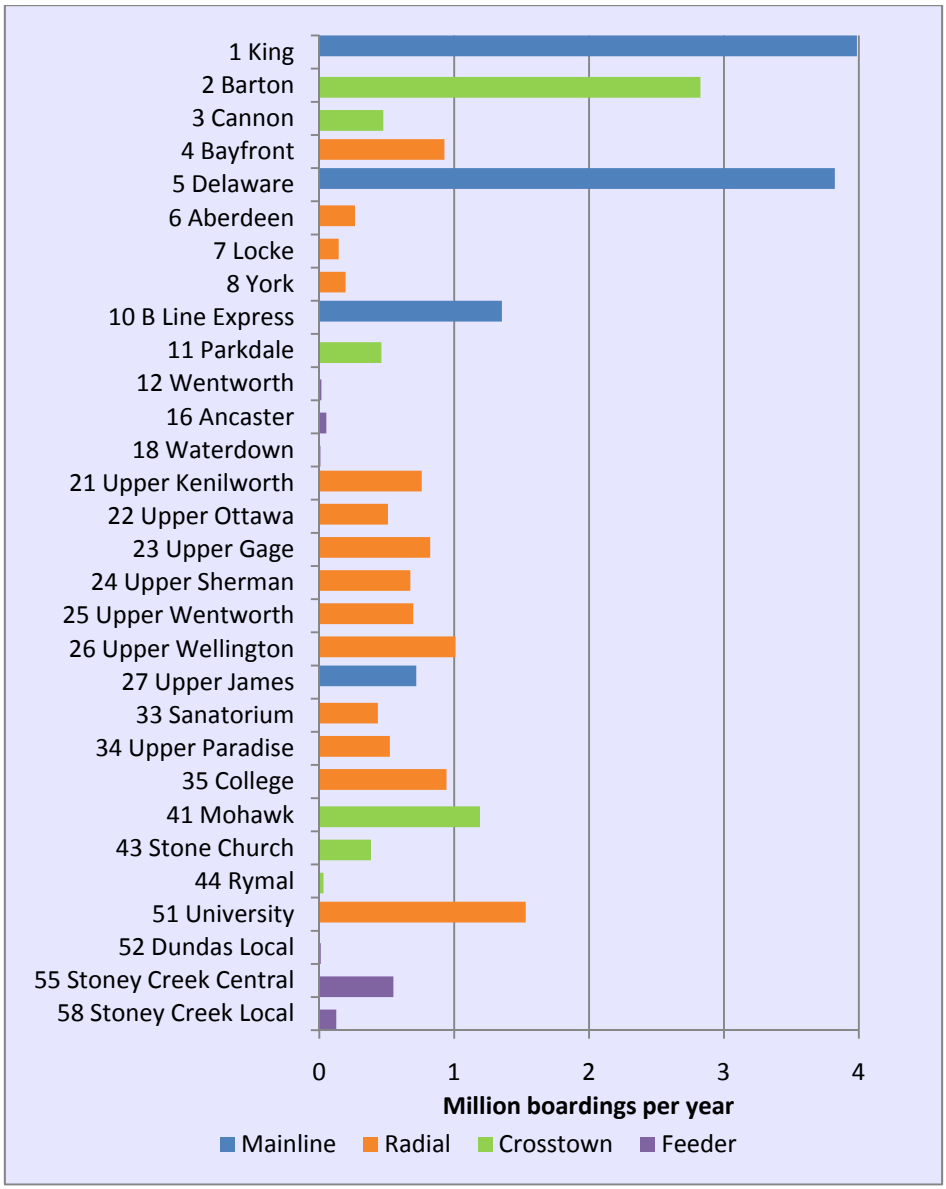


Ridership

HSR carried some 21 million passengers in 2008 with average service productivity above 31 passengers per revenue vehicle hour. HSR ridership draws heavily across much of the Lower City and from McMaster University and Mohawk College student communities. Fiscal Year (FY) 2007 annual boardings by route appear in Exhibit 3-16, and service productivity by route appears in Exhibit 3-17. Observations on ridership by general route category are as follows:

- **Crosstown** service includes five routes running primarily east-west across the Upper City and north-south in the Lower City. These routes are distinct because they do not serve Downtown Hamilton directly. The cross-towns include a combination of "L"-shaped routes linking Lower and Upper City neighbourhoods directly, and east-west routes traversing the Upper City suburbs. Routes within the group are characterized by a range of ridership volumes and service productivity. Collectively they accommodated eight percent of total weekday ridership, and seven percent of Saturday and Sunday ridership.

Exhibit 3-16: Annual Passenger Boardings by Route, FY 2007

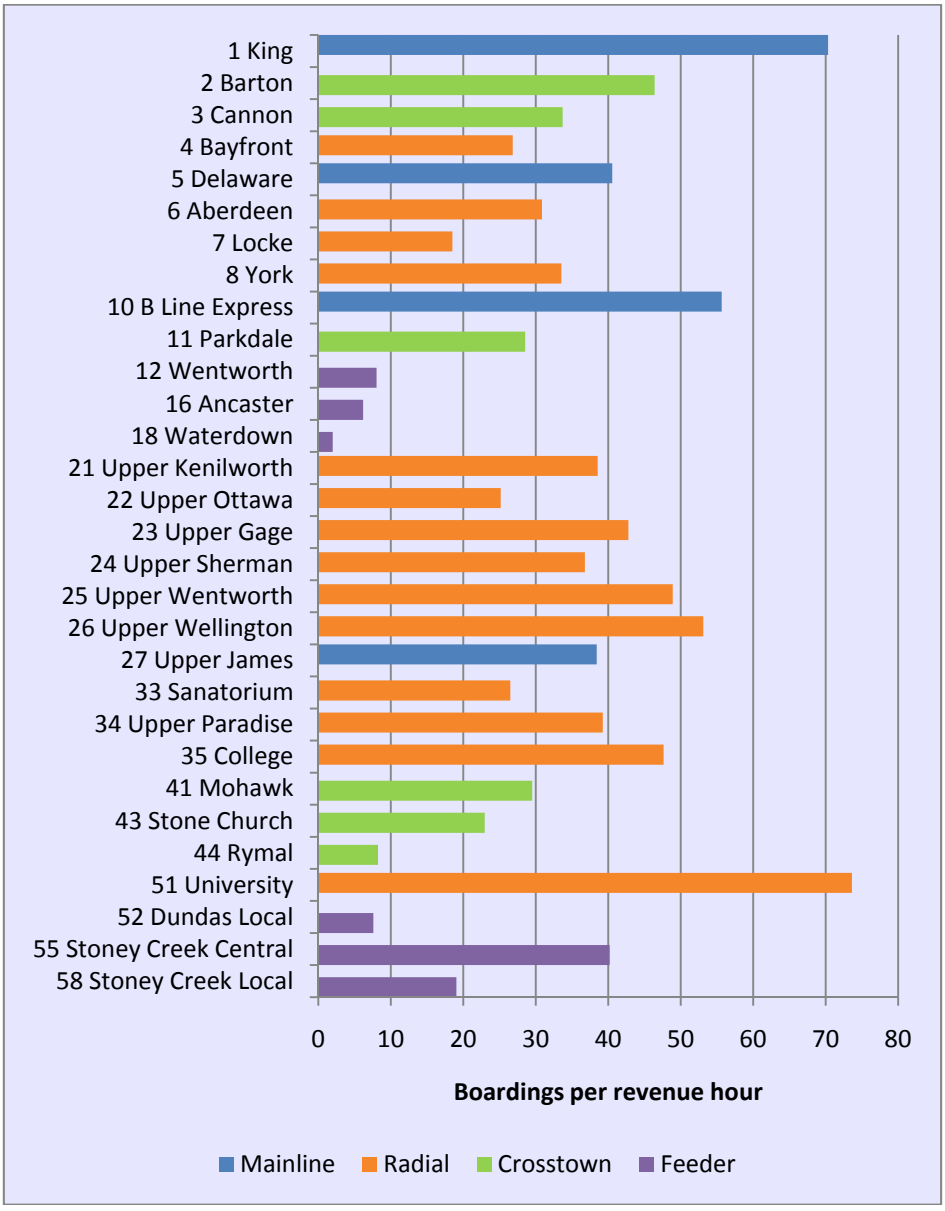


- **Feeder** service includes five routes primarily serving the outlying communities of Ancaster, Dundas, Flamborough and Stoney Creek. These routes provide relatively short distance trips within the communities they serve, including transfer connections to radial and cross-town routes. Most are lower ridership and productivity services. Collectively they accommodated just three percent of total weekday and Saturday ridership, and less than one percent of total Sunday ridership

- **Mainline** service includes the two largest local routes (1/1A and 5) running east-west across the Lower City, and the B-Line rapid transit corridors. The mainline routes are characterized by high service levels, passenger volumes and service productivity. Collectively they accommodated 36% of total weekday ridership, 37% of total Saturday ridership, and 44% of Sunday total ridership on the conventional transit system.

- **Radial** service includes 17 local routes running primarily north-south on Upper City arterials and east-west on Lower City arterials into Downtown Hamilton. These routes are characterized by moderate to high service levels, ridership volumes and service productivity. Collectively they accommodated 53% of total weekday and Saturday ridership, and 49% of Sunday total ridership on the conventional transit system.

Exhibit 3-17: Service Productivity (Weekday riders per revenue service hour)



Bus Loadings

Bus loadings are highly variable throughout the system. Generally, loadings increase as buses travel towards the downtown core and key attractors such as McMaster University. A detailed profile of the loadings for each route is provided in Appendix A.

As shown on Exhibit 3-18, on a system wide basis, the average load (bus occupancy) for all buses in the afternoon peak period (3 PM – 7PM) was 12 people per bus, which is well below the planning guideline of 53 people for a

modern low floor bus. However, there are several routes where 10% or more of the buses are operating over capacity on some segment of the route during the peak period. These include King, Barton, University, Cannon, the B-Line, Upper Wentworth and Mohawk. As can be seen from the detailed route profiles, the incidents of high loadings are generally isolated. The high loading on the Cannon route is due to Cathedral High School for a short period during the peak period. During the rest of the peak period, average loads are below the system average. It is also noteworthy that the planning threshold is 53 persons per bus whereas the maximum crush capacity for a low floor bus is well over 65 persons and many systems in larger cities experience such loads on a regular basis.

Exhibit 3-18: Service

Route	Boardings	Average load	Percent of buses over capacity in highest peak (at any point on route)
1 King	4,506	15.0	12.50%
2 Barton	3,461	16.4	16.67%
3 Cannon	1,056	15.1	50.00%
4 Bayfront	1,168	6.6	0.00%
5 Delaware	3,587	13.2	0.00%
6 Aberdeen	207	2.3	0.00%
7 Locke	197	3.2	0.00%
8 York	380	3.2	0.00%
10 B-Line Express	2,844	13.8	11.11%
11 Parkdale	535	5.7	0.00%
12 Wentworth	34	1.1	0.00%
16 Ancaster	109	1.4	0.00%
18 Waterdown	5	<0.1	0.00%
21 Upper Kenilworth	639	12.5	0.00%
22 Upper Ottawa	1,056	7.1	0.00%
23 Upper Gage	1,018	8.8	8.33%
24 Upper Sherman	952	9.2	0.00%
25 Upper Wentworth	1,639	16.7	20.00%
26 Upper Wellington	1,387	8.7	0.00%
27 Upper James	977	10.5	0.00%
33 Sanatorium	359	7.4	0.00%
34 Upper Paradise	696	9.7	0.00%
35 College	1,578	9.5	0.00%
41 Mohawk	1,599	16.3	50.00%
43 Stone Church	690	7.4	0.00%
44 Rymal	80	2.8	0.00%
51 University	2,342	20.6	15.38%
52 Dundas Local	23	0.9	0.00%
55 Stoney Creek Central	535	6.1	0.00%
58 Stoney Creek Local	137	4.3	0.00%
System	**33,796**	**12.1**	**7.77%**

Summary

The following conclusions were made about route performance:

- **Hours of service**: Routes generally either met or came very close to meeting the standards in the service level guidelines. In the three cases where the standards were not met, two were routes where alternative routes exist. However, route 16 (Ancaster) finishes far earlier than the standard states, leaving an area without evening service on Monday, Tuesday and Wednesday. (Note: as of January 2010, evening service was added Mon., Tues., and Wed.)
- **Service level:** There are eight routes with daytime headways of thirty minutes which the service guidelines suggest should operate on headways of twenty minutes or better. The remaining routes meet this aspect of service level guidelines.
- **R/C ratio:** nine out of thirty routes do meet the guidelines, because they have R/C ratios under 30% (often substantially), but still operate on an all-day schedule. This implies the use of the R/C ratio alone to measure route performance is flawed, and that multiple criteria should be used to assess routes, rather than one bald financial measure.
- **Schedule adherence:** Most routes have less than 10% arrivals recorded as being late, which is reasonable. However, most routes had around 20% of arrivals as being *early*, a significant issue. The performance of route 23 (Upper Gage) is particularly poor, with less than half of arrivals on-time.
- **Ridership:** The majority of HSR's ridership comes from the core Mainline routes operating in the lower city east-west corridor. Generally, routes in the former municipalities outside the former City of Hamilton carry substantially less riders, but also have lower service levels.
- **Bus Loadings:** Most routes operate within established capacity standards that are consistent with industry standards. Crowding does occur in peak hours and at specific geographic areas (e.g. near McMaster, downtown, other commercial centres, school areas).

3.3 Fare Media Utilization Analysis

The detailed on/off ridership survey conducted as part of this study included collecting data pertaining to fare media (ticket, pass, transfer) use by transit riders to determine rates of use of each fare media type by fare category for the purpose of up-dating previous HSR assumptions. This section summarizes the results of the analysis of this data.

Exhibit 3-19 summarizes the HSR's current use factor by pass type. These pass types have been grouped to correspond with the categories collected during the fare media use survey as set out in the survey methodology prior to data collection.

Exhibit 3-19: HSR Base Pass Use Factors (PUFs) by Pass Type

Pass Fares	Base PUF (Trips per Month)	Fare Media Survey Category
Adult	56	Adult Pass
Affordable Transit	56	
Daypass	6	Day Pass
Senior Annual	32	Senior Pass
McMaster Undergraduate	13	U-Pass
McMaster Graduate	13	
Mohawk IAHS	13	
Redeemer University/College	13	
GO Transit	56	Other Pass
Employer Commuter	56	
Hamilton Health Sciences	24	
Columbia College - Type A	18	Student Pass
Columbia College - Type B	18	
Columbia College - Type C	56	
School Hour Only	38	
School Plus	56	
Special	56	

In addition, HSR currently uses a transfer rate of 30% to estimate the number of total passengers based on their cash, ticket, and pass sales:

$$P_{total} = P_{revenue} + T$$

where

$$P_{revenue} = Cash + Ticket + Pass$$

and

$$T = P_{revenue} \times 0.30$$

The transfer rate of 0.30 (30%) has been constant for over a decade and is based on historic route-by-route rates from the HSR's last fare review in 2001. It should be noted that the HSR moved from a point-to-point uni-directional transfer to a time-based transfer in 2002 with no change to the transfer rate assumed. The effect of this policy change is unknown, as several additional fare structure changes, such as the implementation of the U-Pass were subsequently introduced and would affect the number of pass-based boardings and the number of transfers issued. These factors, among others, would affect the transfer rate.

Expansion of Fare Media Survey Results

During IBI Group's fare media and ridership survey, passenger boardings by fare type were recorded on every route and vehicle for one weekday, one Saturday, and one Sunday. A total of 189,578 boardings were recorded, as summarized by fare category and day in Exhibit 3-20.

Exhibit 3-20: Observed Passenger Boardings by Fare Type

	Weekday	Saturday	Sunday
Cash	9,130	5,502	3,476
Ticket	22,420	10,449	6,700
Transfer	17,922	9,114	4,904
Adult Pass	18,668	8,989	6,248
Student Pass	8,430	2,388	1,855
Senior Pass	6,234	3,684	2,179
U-Pass	18,504	5,901	3,755
Day Pass	364	321	193
Other Pass	1,515	645	479
Free (Child)	2,616	1,704	1,039
Free (Mobility)	1,480	811	454
Free (Other)	771	415	319
Total	108,054	49,923	31,601

Sales of passes are recorded on a monthly basis. As a result, the results in Table 2 need to be expanded to reflect one month of ridership. The expansion formula is as follows, where P = boardings:

$$P_{monthly} = \left(P_{weekday} \times 21\right) + \left(P_{Saturday} \times 4\right) + \left(P_{Sunday} \times 5\right)$$

There is one extra Sunday in the expansion formula as there is an average of one holiday per month, where ridership would reflect Sunday levels. Applied to the observed data, the expanded ridership for the month is shown in Exhibit 3-21.

Exhibit 3-21: Boardings by Fare Type, Expanded to Monthly Total

	Weekdays	Saturday	Sundays	Total
Cash	191,730	22,008	17,380	**231,118**
Ticket	470,820	41,796	33,500	**546,116**
Transfer	376,362	36,456	24,520	**437,338**
Adult Pass	392,028	35,956	31,240	**459,224**
Student Pass	177,030	9,552	9,275	**195,857**
Senior Pass	130,914	14,736	10,895	**156,545**
U-Pass	388,584	23,604	18,775	**430,963**
Day Pass	7,644	1,284	965	**9,893**
Other Pass	31,815	2,580	2,395	**36,790**
Free (Child)	54,936	6,816	5,195	**66,947**
Free (Mobility)	31,080	3,244	2,270	**36,594**
Free (Other)	16,191	1,660	1,595	**19,446**
Total	**2,269,134**	**199,692**	**158,005**	**2,626,831**

The bulk of the ridership survey was conducted in November 2008 and as a result, for the following analysis, the calculations are based on pass sales in that month. In general, month-to-month pass sales do not fluctuate during the core ridership periods, that is, between September and November, and January and April. Ridership surveys were concentrated during these periods.

Pass Use Factors (PUF)

The existing Pass Use Factors (PUF) or trips-per-month used by HSR in its financial analyses is found in Exhibit 3-19 (the 'Base PUF'). The PUF for the observed data (the 'Observed PUF') was calculated based on the total trips observed by pass group, divided by the units sold during the month of November, 2008. These calculations are identified in Exhibit 3-22.

It should be noted that there are two discrepancies in the pass groupings. First, under "Other Pass", the Hamilton Health Sciences employee pass has a lower Base PUF than the other two passes in the category. Second, various passes in the Student Pass categories carry different Base PUFs. As a result, these two categories should be compared to a weighted Base PUF, which is based on the number of trips expected based on the number of passes sold, then divided by the total number of passes sold.

Based on this calculation, the comparative base PUFs for "Other Pass" and "Student Pass" are **44.8** and **38.9**, respectively.

Exhibit 3-22: Observed Pass Use Factor by Pass Type

Pass Fares	Fare Media Survey Category	Base PUF (trips per month)	Passes Sold (Nov. 2008)	Boardings Observed	Observed PUF (trips per month)
Adult	Adult Pass	56	7,115	459,224	**62.3**
Affordable Transit		56	255		
Daypass	Day Pass	6	870	9,893	**11.4**
Senior Annual	Senior Pass	32	4,182	156,545	**37.4**
McMaster Undergraduate	U-Pass	13	19,138	430,963	**18.1**
McMaster Graduate		13	2,584		
Mohawk IAHS		13	1,334		
Redeemer University/College		13	794		
GO Transit	Other Pass	38.9*	441	36,790	**28.5**
Employer Commuter			160		
Hamilton Health Sciences			690		
Columbia College - Type A	Student Pass	44.8*	848	195,857	**37.5**
Columbia College - Type B			187		
Columbia College - Type C			89		
School Hour Only			1,054		
School Plus			99		
Special			2,949		
**Weighted Base PUF for comparative purposes*					

In general, the observed pass use factor is higher than the base assumptions, meaning that pass holders are using their passes at a greater frequency than expected. *It should be noted that the observed student pass use factor is not reliable as the IBI Group on-board survey did not include school-only trips, which account for a significant proportion of all student pass trips. The addition of ridership numbers on these trips may provide more reliable results.*

Transfer Rate

As noted earlier, HSR's current assumption for the system's transfer rate is 30% based on an estimated number of transfers in comparison to revenue ridership. Since the use of transfers was explicitly observed in the fare media utilization survey, this figure can be used to calculate a new transfer rate. The calculation and observed transfer rate is identified in Exhibit 3-23.

Exhibit 3-23: Total Observed Revenue Passengers and Transfer Rate

	Observed Boardings
Cash	231,118
Ticket	546,116
Total Cash & Ticket Boardings	777,234
Transfers Observed	437,338
Transfer Rate	**56%**

The observed transfer rate of 56% is significantly higher than the historical rate of 30%. This difference is most likely attributable to changes to the HSR fare policy change to introduce time-based transfers which allow for unlimited travel within 90 minutes. In addition, added services on trunk routes such as the B-Line encourage additional transfers.

Comparison to HSR Internal Data

Exhibit 3-24 compares the IBI Group expanded data to HSR's internal data for November 2008. The IBI data represents an approximate 8% higher number of total revenue trips and 5% higher total boardings. The main variance is a higher observed use of passes which is a reasonable expectation considering their pricing and convenience. In contrast, the IBI Group survey noted a significantly lower level of transfer use. However, the on-board survey results are based on observed data, while the HSR estimates for transfer use are based on an historical lower transfer rate.

Exhibit 3-24: Comparison of Results to HSR Internal Data

All Fares - Actual	HSR Data (Nov. '08)	IBI Data (Expanded)	Variance
Cash Fares	224,142	231,118	+3%
Ticket Fares	550,370	546,116	-1%
Pass Fares	1,147,803	1,289,272	+12%
Total Revenue Trips	**1,922,315**	**2,066,506**	**+8%**
Transfers	581,068	437,338	-25%
Free fares	-	122,987	-
Total Boardings	**2,503,383**	**2,626,831**	**+5%**

Summary

In summary, HSR has experienced a shift in fare payment such that passes now make up over 60% of revenue trips in large part due to the implementation of the U-Pass, which added over 23,800 active passes each month to the transit system. Furthermore, not only is there an increase in the number of active passes, the number of times a pass is used each month is higher than previously assumed. The effect is an increase in the overall number of revenue trips and HSR ridership.

Exhibit 3-25: Summary of Revenue Trips and Total Boardings, Observed Data

Fare Category	Revenue Boardings	Non-Revenue Boardings	Total Boardings
Cash Fares	231,118		231,118
Ticket Fares	546,116		546,116
Pass Fares	902,490	386,782	1,289,272
Transfers		437,338	437,338
Free fares		122,987	122,987
Total	**1,679,724**	**947,107**	**2,626,831**

3.4 Peer Review

HSR was compared to other Canadian transit systems to provide a sense of how transit performs in Hamilton relative to peer communities. Eleven systems were selected as peers on the basis of service area population. The selected systems have a service area population of between 300,000 and 700,000 (compared with 443,000 for Hamilton), and include four transit systems in Ontario, three in Quebec, and one each from British Columbia, Manitoba and Nova Scotia.

Data for FY 2007 is summarised in Exhibit 3-26, ordered by service area population, along with three broad indicators of transit system performance:

- Active vehicles per 100,000 service area residents (fixed route only)
- Annual net direct operating cost per service area resident
- Total rides per capita

Exhibit 3-19: Comparative Characteristics of Selected Canadian Transit Systems

Transit System	Service area residents	Active Buses	Active buses per 100 thousand residents	Net Direct Operating Cost	Net Cost per Resident	Regular Service Riders	Rides per Capita
Mississauga	704,000	349	49.6	52,328,824	74.33	30,128,691	42.8
Winnipeg	622,200	535	86.0	52,928,069	85.07	41,201,317	66.2
Durham Region	548,093	149	27.2	25,807,855	47.09	7,616,116	13.9
Quebec	517,921	516	99.6	78,444,419	151.46	41,261,160	79.7
Brampton	429,437	195	45.4	25,824,905	60.14	11,063,837	25.8
Waterloo Region	427,743	208	48.6	35,146,791	82.17	14,387,870	33.6
Longueuil	388,210	361	93.0	69,975,345	180.25	30,970,996	79.8
Laval[2]	381,614	225	59.0	55,251,582	144.78	19,275,222	50.5
London	345,700	178	51.5	21,152,300	61.19	20,831,500	60.3
Victoria	343,676	189	55.0	37,534,973	109.22	22,386,391	65.1
Halifax	312,400	222	71.1	30,723,251	98.35	18,736,915	60.0
Hamilton	**443,000**	**197**	44.5	30,148,378	68.06	21,067,027	47.6
Rank (1=best)	5	8	11	4	4	6	8
Peer mean	456,454	284	62.3	44,101,665	96.62	23,441,820	51.4
% difference	-3%	-31%	-29%	-32%	-30%	-10%	-7%

Source: Canadian Urban Transport Association (CUTA) 2007 Fact Book

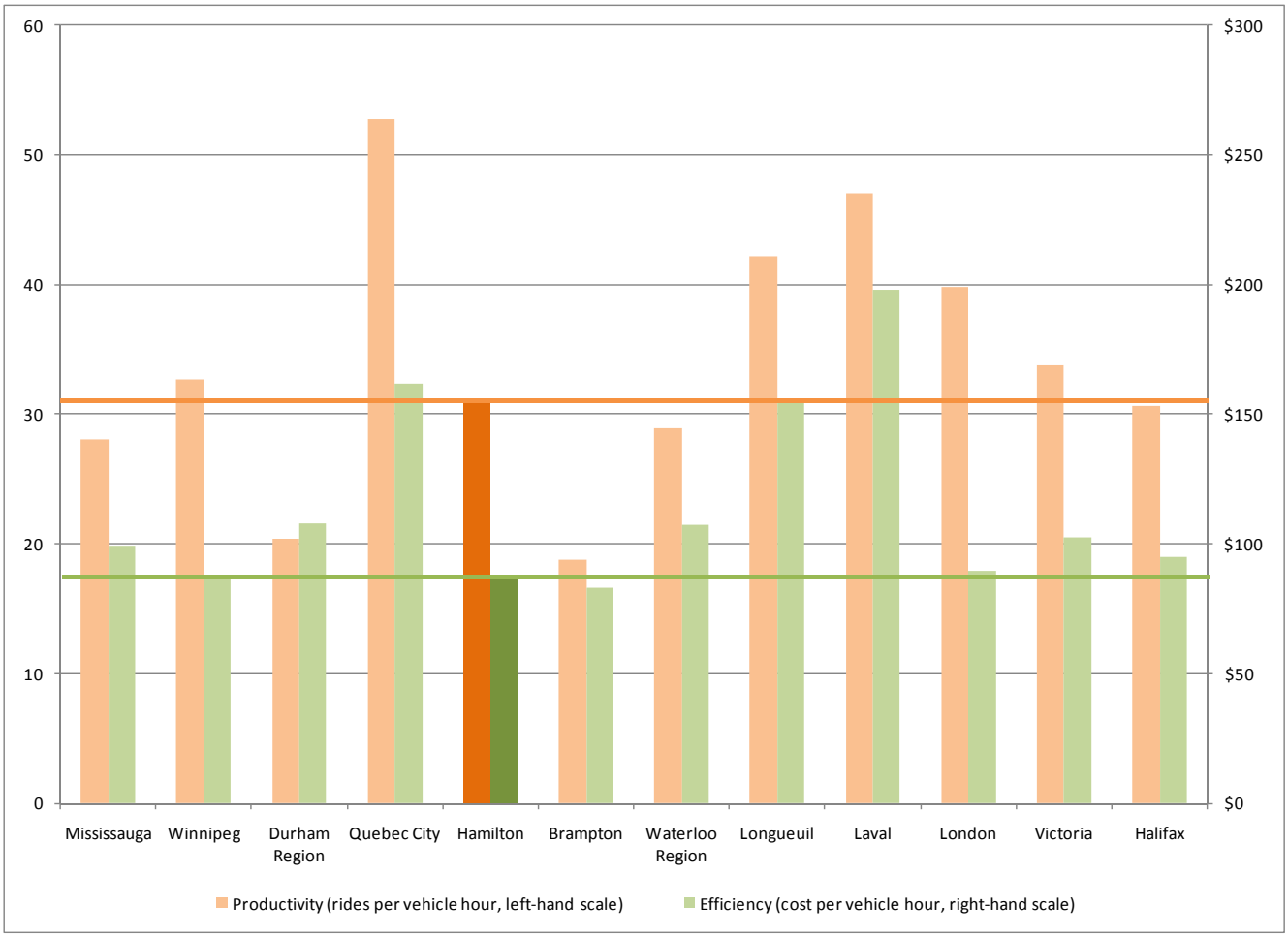
[2] Laval's transit ridership was boosted in 2007 by a mode shift following a major bridge collapse. However, its 2008 ridership showed a further (small) increase, implying that 2007's ridership was not a one-off.

The Exhibit also shows where Hamilton ranks amongst its peers (with 1 being best, and 13 being worst); gives a mean of Hamilton's peers, and gives the difference between Hamilton and that mean.

Compared to the average of the twelve peer systems, Hamilton serves about as many residents at a 30% lower average cost per resident, but has around 29% fewer buses per resident. HSR also has 7% fewer rides per capita than the average for its peers, ranking 8th out of 12.

Two ways of comparing vehicle utilisation are shown in Exhibit 3-207, namely productivity (rides per vehicle hour shown in left-hand orange bars using the left-hand scale) and efficiency (cost per vehicle hour, shown in the right-hand green bars using the right-hand scale). In terms of productivity, HSR is mid-range compared with its peers. However HSR has the second best efficiency (lower cost per vehicle hour is better), exceeded narrowly by Brampton. The overall conclusion is that HSR is good at keeping its vehicle costs down, but should be have higher ridership.

Exhibit 3-20: Productivity and Efficiency of HSR and peers

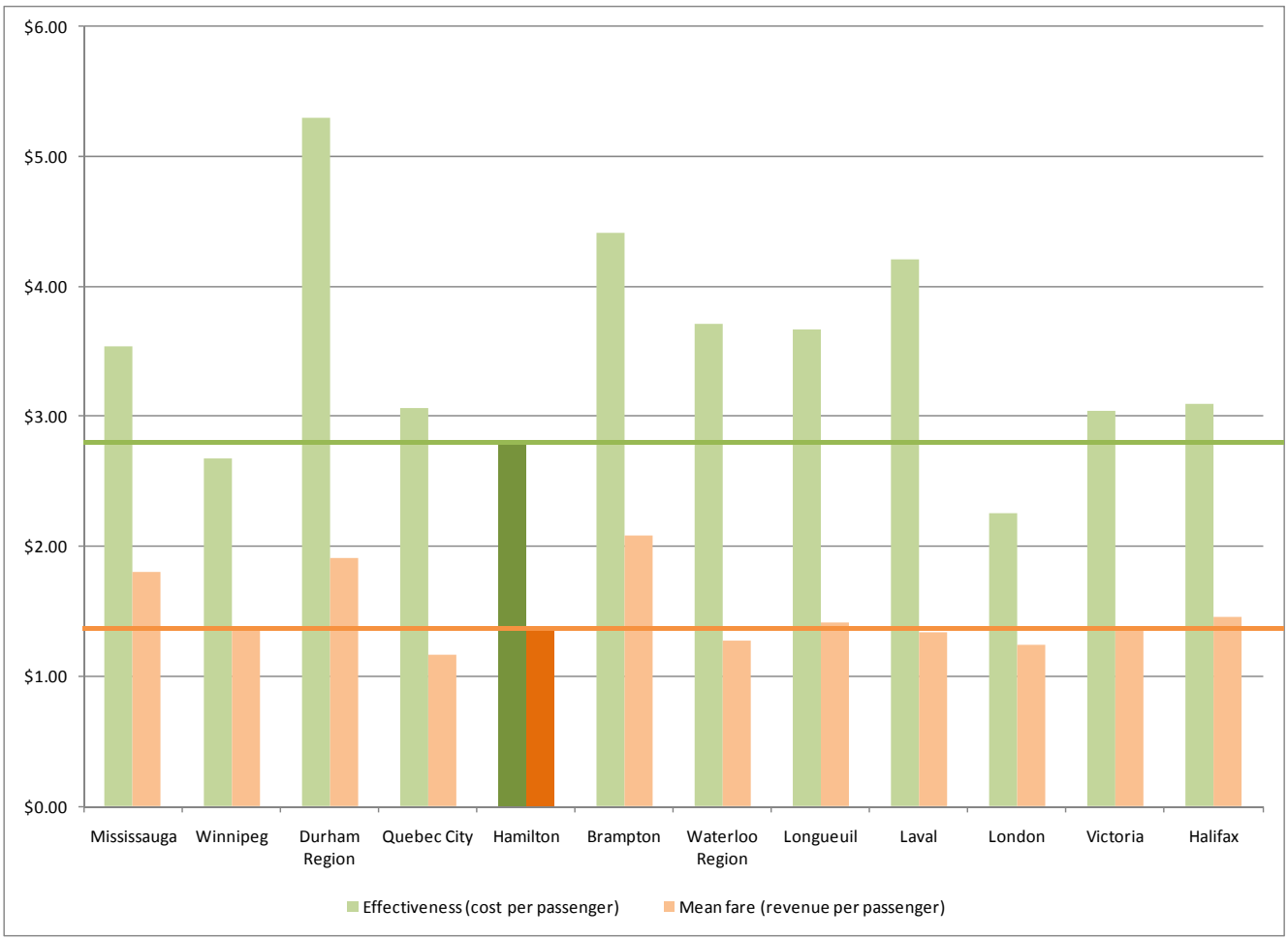


Source: Canadian Urban Transport Association (CUTA) 2007 Fact Book

Turning from vehicles to passengers, two passenger-related measures are shown in Exhibit 3-218, namely effectiveness (cost per passenger, shown by the green left-hand bars) and mean fare (revenue per passenger, shown by the orange right-hand bars). The Exhibit shows that HSR has the third-lowest (and

hence third-best) cost per passenger at $2.80 per passenger, but it has one of the lowest (and hence worst) mean fares at $1.37 per passenger. HSR's adult cash fare ($2.40) is below average for its peers, although the monthly pass multiple (32.9) is mid-range. Ways to raise the average fare (revenue per passenger) are discussed in section 4.7.

Exhibit 3-21: Cost and revenue per passenger for HSR and peers



Source: Canadian Urban Transport Association (CUTA) 2007 Fact Book

The weakest area of HSR performance relative to its peers is in terms of transit market share, or modal split. There is a weak positive correlation between service area population density and market penetration (measured in transit rides per capita), because transit typically is more productive in dense urban areas than in lower density suburban areas.

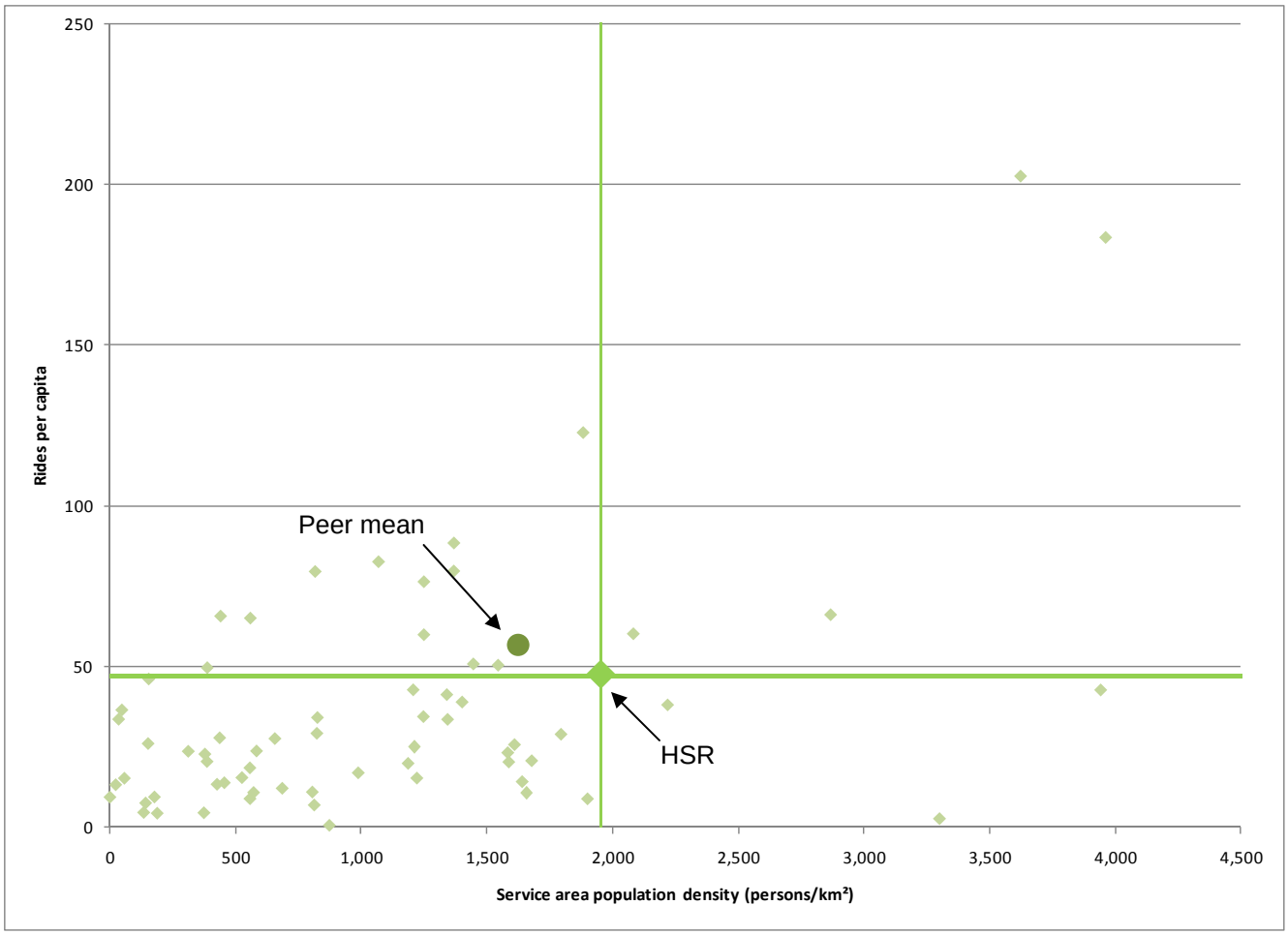
However, it should also be noted that many of these systems of similar size (e.g. Halifax) have recently implemented forms of rapid transit as a means of increasing ridership and modal split. Nevertheless, HSR's market performance also reflects lower service levels, a low peak to base ratio of service.

Exhibit 3-22 shows a scatter plot of population density versus transit rides per capita for municipal transit systems in Canada (not just the peer group). HSR's data point is the large diamond with crosshairs; the large dark dot corresponds to the averages for the peer group.

The crosshairs divide the scatter plot into four quadrants. Data points in upper left quadrant have higher transit usage than HSR (47.6 rides per capita), despite having a lower population density (1,951 persons per km²). There are thirteen transit systems here, including five (out of eleven) of the peer group. Conversely, there are just three transit systems in the lower right quadrant (including just one of the peer group), which contains transit systems with lower transit usage than Hamilton, despite having a higher population density. If HSR was at 78 rides per capita (63% higher than at present), then the number of data points in the two quadrants would be equal. Similarly, HSR's service area population density would have to be 1600 persons per km² (18% lower) for the number of data points in the two quadrants to be equal. (Equal number of data points in each quadrant would imply that HSR has the expected number rides of person given its population size.)

All this suggests that HSR has a significantly lower transit ridership per capita than would be expected of a system serving an area with HSR's population density. However, it should also be noted that many of these systems of similar size (e.g. Halifax) have recently implemented forms of rapid transit as a means of increasing ridership and modal split. Nevertheless, HSR's market performance also reflects lower service levels, a low peak to base ratio of service.

Exhibit 3-22: Market Penetration of Canadian Transit Systems



Source: Canadian Urban Transport Association (CUTA) 2007 Fact Book

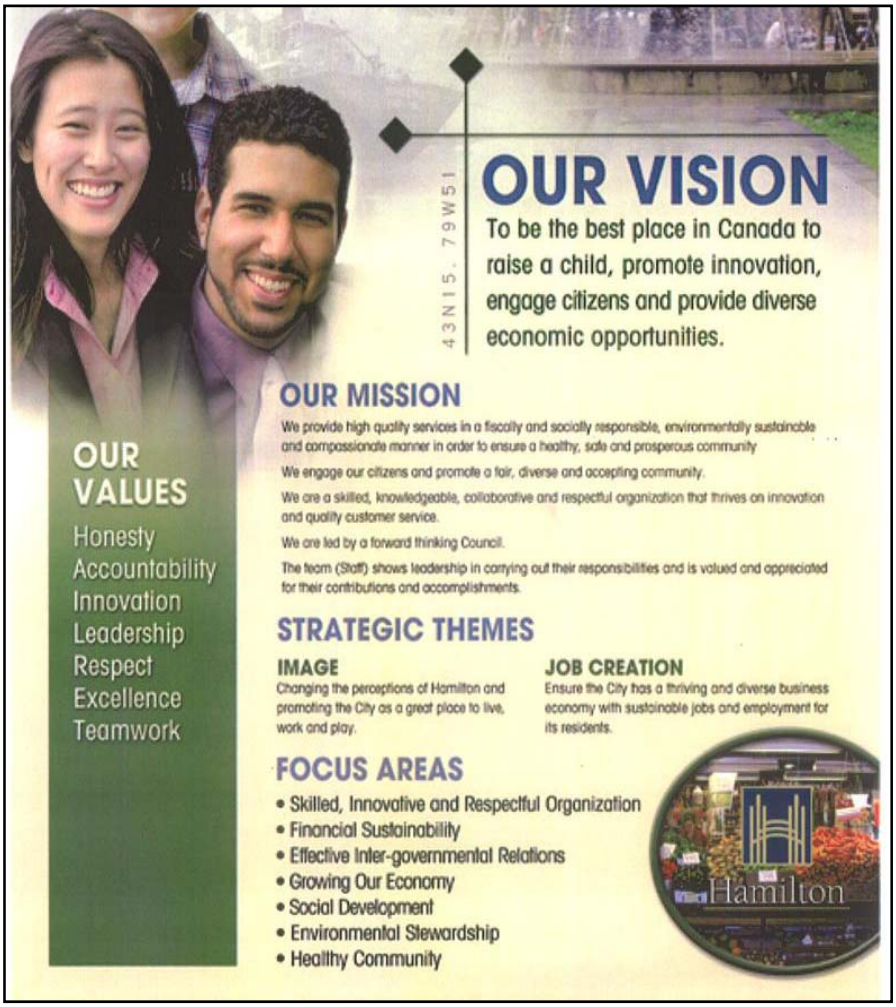
3.5 Review of HSR Organization and Staffing

This section reviews the internal HSR organization structure, reporting relationships and staffing levels with the objective of identifying opportunities to ensure the effectiveness of the organization in support of the objectives of the 5-Year Operations Plan.

Background

A key element associated with this review is the opinion expressed by stakeholders at all levels (Council, transit employees and users and non-users) during the consultation process that transit is a highly important public service and fundamental to the achievement of the City's Vision and related corporate objectives. The HSR is a major public responsibility of the City with multiple operational dimensions and accountabilities that are expected to strategically support both social and economic development objectives throughout the City in support of the City's corporate Vision, Mission Statement and Objectives including environmental stewardship and economic growth. These are presented in Exhibit 3-23 below.

Exhibit 3-23: City of Hamilton Vision Statement

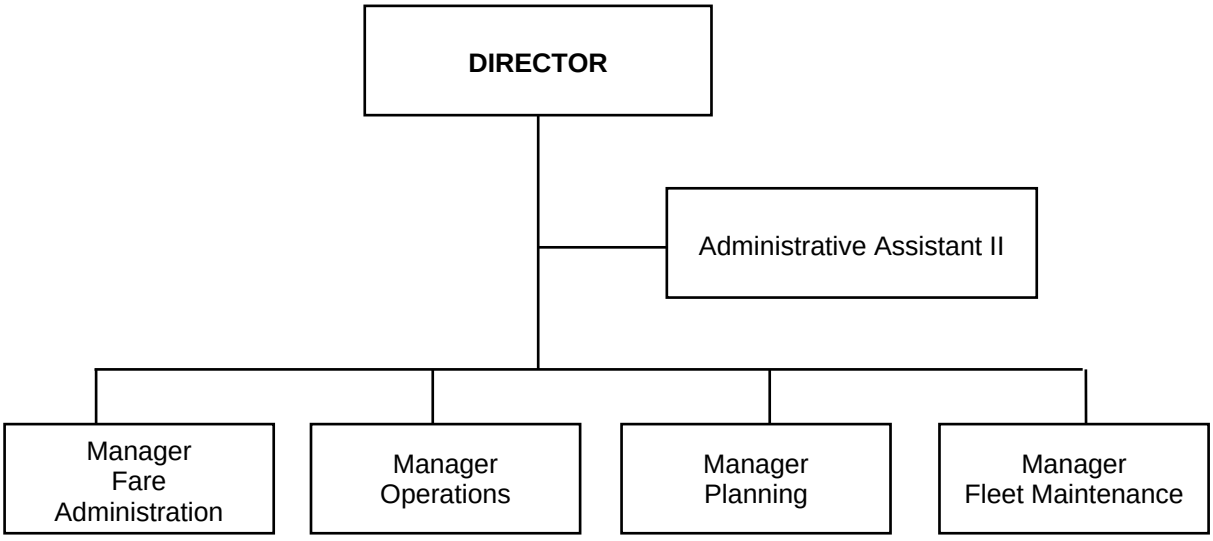


Accountabilities extend from the provision of conventional and specialized transit services that provide fully accessible links to employment, education, community and health services through to emergency and disaster response capabilities, the promotion and adoption of new environmentally-friendly technologies, and the management of horizontal linkages and collaborative working relationships with other public investment strategies.

Upon municipal amalgamation in 2001, the City of Hamilton organization was structured on the basis of "shared services" wherein similar functions were grouped together to support the key services being delivered by the municipality. As part of this organizational philosophy, the HSR was positioned within the new Public Works Department which brought together various "public works" functions under one General Manager. The Transit organization was also segmented with the important fleet maintenance function aggregated under a "Fleet Services" department together with other municipal vehicles. Marketing and communications, planning and certain purchasing and human resource functions were also relocated to other departments under the "shared services" concept. Within a few years, it was realized that this approach did not function effectively, particularly with regard to fleet maintenance, and these functions were largely re-united with transit operations under the Director, Transit which remains in effect today.

The current organization structure for the HSR is illustrated in Exhibit 3-24.

Exhibit 3-24: HSR Organization Structure



Within the Transit Division there are approximately 585 employees. The Director, Transit, has responsibility for all of the key functions associated with the delivery of transit service in the City – conventional and specialized transit service operations, vehicle maintenance, planning, administration, marketing and communications, customer service, and revenue administration. At the same time, in order to "deliver" the transit service, the Director arranges for the support of functional areas outside of the Public Works Department in other, separate departments within the City such as Human Resources, Finance and Information Technology by working through the General Manager, Public Works. The Director, Transit, defines Transit's needs and provides direction to these other departments.

The HSR's organization structure is typical for a transit system of its size and is a proven, effective structure. It is simple and clearly defines the key functions of the transit system, responsibilities and reporting relationships. Each of the four functional areas is overseen by a Manager who reports to the Director, Transit. The responsibility for each of these areas is as follows:

Operations Service Delivery – transit operations, driver training, accident investigation - 430 employees

Fleet Maintenance – cleaning, servicing, minor and major repairs to transit fleet – 117 employees

Planning & Scheduling – short term (< 5 years) service planning and analysis of transit service performance, capital planning and project implementation, bus stop and shelter administration, customer service and marketing - 22 employees

Fare Administration, ATS – fare revenue monitoring and reconciliation, fare administration, administration of the Accessible Transit Service (ATS) including eligibility criteria and trip reservation – 9 employees.

General management and administration of the department includes the Director of Transit and support staff totalling 5.5 employees.

The **Operations** section appropriately combines driver training, operations employee support functions with service monitoring and service delivery. A review of supervisory resources for transit service monitoring, employee support and response to service issues indicates that additional resources in terms of on-road supervision is desirable during the daytime, evenings and on weekends. Currently there are 3 supervisors on the road during the daytime and two in the evenings and weekends. The scope and complexity of the transit services operated as well as the size of the service area make it increasingly difficult for two or three individuals to respond to the needs of the system, particularly in emergency situations. In HSR peer transit systems, such as Waterloo, London, Mississauga and Brampton, supervision of the specialized transit service is the responsibility of another agency.

The **Fleet Maintenance** section is responsible for ensuring that all transit vehicles are well-maintained, clean and up-to-date in technology. The garage functions include nightly cleaning, fuelling and emptying of fareboxes for each bus, regular safety inspections, maintenance of vehicles according to a preventative maintenance schedule, overhaul of all mechanical components (engines, transmissions, air conditioning, etc.), body damage repairs, and vehicle refurbishing and painting. The garage operates 24 hours a day, 7 days a week, 365 days a year. The maintenance section is also responsible for the stockroom and parts stocking functions in co-ordination with the City's purchasing department.

The **Fare Administration and ATS** (Accessible Transit Services) section is an unusual grouping but reflects the experience and strength of the section manager. The core responsibility of this group, revenue analysis and reconciliation, does not include fare revenue counting and sorting. This function was out-sourced some 15 years ago to a security firm to minimize risk and improve security. This company collects the fare revenue each day, counts it and provides detailed information back to the HSR. HSR fare administration staff then reconcile the receipts against the ridership counts provided each night by the electronic fareboxes to track revenue trends. HSR maintenance/vehicle

servicing staff continue to empty the fareboxes each night into a secure vault and download data from the electronic fareboxes. While many transit systems continue to process fare revenues in-house, an increasing number of systems are contracting this function out to security firms such as Brinks, Securitas, etc. to minimize risk and exposure to theft. Contracting out tends to reduce the opportunity to conduct audits of the fare revenue on a route by route basis since the money is aggregated when collected each day. Transit staff rely on the revenue reports generated by the electronic fareboxes to understand ridership and revenue trends on a daily basis. While this is useful, it does rely on the accuracy of the farebox data. Selected audits of fare revenue, whereby selected fareboxes are emptied each evening and the revenue isolated for separate counts, can and should still be undertaken to verify the accuracy of the farebox data.

The Finance and Administration and ATS sections are responsible for the sale and accounting of fare media (tickets, passes) which includes the network of fare media agents across the city and for administering the various reduced fare programs. With the introduction of smart card technology ("Presto") to replace tickets and passes, the responsibilities of the ATS section in the area of fare media will transition to administering and managing the smart card system together with the private firm that will provide the smart card.

The Fare Administration and ATS section is also responsible for administering the City's transit accessibility program and family of accessible transit services (Disabled and Aged Regional Transit Service – DARTS), the taxi scrip program (use of local taxis by persons unable to use regular transit) – which includes administering the eligibility criteria and trip reservation system. The ATS services are delivered by DARTS a not-for-profit organization with 150 employees and 86 vehicles including the use of local taxi vehicles. 660,023 trips were taken on the services in 2008.

The Marketing and Customer Service functions are included within the Planning and Scheduling section which provides a useful link between these areas. However, this reduces the profile of customer service, marketing and communications which is compounded by the limited resources for this important area of public interface. Consideration should be given to separating the marketing, communications and customer service function and establishing it as a direct report to the Director, Transit together with additional resources as noted in the marketing audit below.

In peer transit systems, oversight and management of special projects, either capital or operations, are the responsibility of the **Planning** section within the Transit department or division. For this purpose there are "transit technologist" positions. These individuals then have a good communications link to all key functions within transit as well as having a solid understanding of transit needs and dynamics. In Hamilton, however, this responsibility rests with a "Capital Planning & Implementation" division within Public Works. Communications links and responsibility protocols between the CP&I division and Transit in terms of developing projects and priorities and transition from project development to implementation (ie. operations) are unclear although it is understood that the Director, Transit and the Manager, Planning, participate in relevant transit project discussions. It should be revisited to establish a unified approach to planning and operating public transit in Hamilton.

Review of Peer System Organization Structures

To place the organization structure and staffing of HSR into context, a review of the conditions in three peer systems was undertaken. The systems are Grand River Transit (Waterloo Region), Metro Transit (Halifax), and Brampton. Organization charts and staffing arrangements were obtained and are included in Appendix D. Exhibit 3.32 provides a summary of the data collected together with summary information for HSR.

The key findings from this review indicate that HSR's organization structure is consistent with the three systems although with some variances:

- Brampton is not responsible for specialized transit service delivery as it is a regional responsibility. In the other systems, specialized transit is a separate functional area with a dedicated manager reporting to the director of transit;

- Waterloo, Brampton and Halifax each handle fare revenue counting in-house although in Halifax, it is not a direct transit responsibility, instead being under the corporate finance department;

- Customer information services (telephone) in Halifax and Grand River are part of a "call centre" and directly "transit department" employees;

- All transit systems receive general support and direction from other city departments with respect to human resources, accounting and finance, legal and labour relations;

- Transit planning functions, including long range, short range and route and operator scheduling, are generally the responsibility of the transit department although in Waterloo short and long range planning is part of the regional planning function. Halifax has recently changed its organization structure to integrate long range transit planning with its short range and operator/scheduling and project management function. This is designed to promote a greater sense of consistency and common purpose.

Notably, Halifax has also, in its recent organizational change, returned responsibility for fleet maintenance to the transit portfolio. As such, each of the peer systems is comparable in terms of responsibilities to HSR, except for the absence of specialized transit in Brampton.

In terms of resources and resource utilization, there is a wide range in values reflecting local conditions and history although these are also highly influenced by individual municipal/transit initiations to expand and improve transit. Each of Waterloo, Brampton and Halifax are actively expanding their transit services with the result that the data presented is changing. Exhibit 3-33 based on 2008 data, indicates overall resource utilization for HSR and the peer systems.

Exhibit 3-32: Organization and Staffing – HSR and Peer Systems

	HSR	GRT	Metro Transit	Brampton
CUTA Statistics 2008				
Service Area Population	465,000	422,211	312,400	474,554
Revenue Buses	211	218	284	227
# of Fixed Routes	31	64	57	36
Revenue Vehicle Hours	655,086	532,091	698,121	616,094
Revenue Vehicle Kms	12,230,372	10,885,687	12,956,026	12,489,707
Ridership	20,952,826	15,810,871	19,531,986	12,324,717
Total Direct Operating Expenses	$63,800,752	$58,208,443	$56,171,500	$59,148,428
Organization Charts				
Management	5.5	8.5	2	9
	1 (Director)	1 (Director)	1 (GM)	1 (Director)
		1 (manager, F&A)		1 (manager - AdminServ)
	1 (admin. assist) 1.5 (other staff) 2 (transit IT)	6.5 (other staff, F&A)	1 (admin. assist)	1 (office coord.) 6 (staff)
Fleet & Facilities Management	42 + 70 Mechanics	20 + *49 mechanics*	*49 + 58 mechanics*	18.5 + 65 Mechanics/OthrMnt
	1 (manager)	1 (manager)	*49 (other mntn) *CUTA*	1 (manager)
	9 (foreman)			5 (foremans)
	3 (supervisors)	9 (supervisors)		4 (supervisors: 2 fleet, 2 fac)
	3 (staff: clerk, design tech)	3.5 (clerks, others)		2.5 + 1 (maint. Clerks, admin)
	7 (stores / stockkeeper)			5 (stockkeepers/buyer)
	19 (Serviceline & fuel)			
	3 (equipment maint.) 70 (mechanics)	6.5 (technicians, attend.) *49 (mechanics) *CUTA*	*58 (mechanics) *CUTA*	34 (mechanics) 31 (other staff)
Service Planning	8	5	11	11
	1 (manager)	1 (asst. director)	1 (manager)	1 (manager - Strat. Business)
	1 + 1 (supervisor, prgm. mng) 5 (staff)	1 (supervisor) 3 (staff)	1 (supervisor) 9 (staff)	1 + 3 (sr. sprv., supervisor) 6 (staff)
Operations	28 + 402.3 Operators	27 + *379 Operators*	13 + 35 + 492 Operators	11 + 28 + *443 Operators*
	1 (manager)	1 (manager)	1 (manager - Serv. Delv)	1 + 1 (sr. manager, manager)
	2 (prog. mngr)	4 + 22 (asst. mngr, supervisors)	5 + 2 + 5 + *22* (mngr, sr. supervisors, emp. serv. suprv., serv. supervisors)	2 + 4 (sr. sprv., supervisor)

	HSR	GRT	Metro Transit	Brampton
	25 (staff – 7 supervisors, 14 Inspectors)		13 (staff)	3 (staff)
				28 (transit coordinators)
	402.3 (operators)	*379 (operators) * CUTA*	492 (operators) *(from previous org chart)	*443 (operators) *CUTA*
Fare Admin.	8			19
	1 (supervisor)			1 (supervisor)
	7 (staff)			2 (coordinators) 32 (PT clerks)
Specialized Transit	13	3.5	9 (* + *48 operators)*	*Operated by region*
	1 (manager)	1 (asst. mngr)	1 (manager)	
		1 (supervisor)	1 (service supervisor)	
	12 (staff)	1.5 (dispatchers)	3 + 2 (dispatcher, scheduler/dispatcher) 2 (staff - admin, scheduler) 48 (operators) *(assume counted in 492 operators)	
Customer Service & Marketing	8	11	4	15
		1 (manager)	1 (manager)	
	2 (coordinators)	1 (supervisor) 3 (coordinators)	2 (coordinators)	1 (supervisor - marketing) 2 (Coordinators:CS, Marketing)
	5 (information clerk) 1 (other staff)	6 (other staff)	1 (advisor)	20 (PT Information clerks) 2 (staff - FT Cust. Serv. Clerk)
Other		7.5	12 + *21 captains/mates*	8
		1 (Asst. Manager - Pass. Facilities)	1 + 3 (manager, supervisor/officer)	1 (Project Director - Acceleride)
		1 (Supervisor - Security) 1 (Ops. Designer) 4.5 (Terminal Clerks)	21 (captains + mates) 8 (engineers)	7 (Acceleride staff)
Total Staff	112.5	82.5	135	118.5
Total Operators + mechanics	472.3	*428*	*550 + 21 captains/mates*	*508*
Total	**584.8**	**510.5**	**706**	***626.5***

This summary indicates that while HSR has marginally more employees per vehicle than its peer systems, its productivity in terms of Revenue-Hours per Employee and Revenue-Passengers per Employee are significantly higher as is the number of Rev-Hr per Bus Operator and the number of Rev-Hr per Supervisor. Also, vehicle utilization (rev-km and rev-hr/vehicle) is higher than the peer systems. These values indicate good resource utilization although the high number of Rev-Hr per Supervisor indicates that additional coverage, specifically on-road supervisor, is warranted.

Exhibit 3-33: Resource Utilization - HSR and Peer Systems

Measure	HSR	Grand River	Metro Transit	Brampton
Employees/Bus	2.76	2.34	2.49	2.75
Rev-Hours/ Employee	1,121	1,043	988	983
Rev-Km/Employee	20,941	21,344	18,351	19,952
Passengers/Employee	35,878	31,002	27,666	19,688
Rev-Hr/Bus Operator	1,630	1,404	1,419	1,391
Rev-Hr/Supervisor	23,396	19,707	19,946	22,003
Bus Operators/ Supervisor	14.4	14.0	14.6	15.8
Rev-Km/Vehicle	57,964	49,934	45,620	55,021
Rev-Hr/Vehicle	3,105	2,441	2,458	2,714
Rev-Km/Rev-Hr	18.7	20.5	18.6	20.3

As noted previously, HSR's average speed (Rev-Km/Rev-Hr) is lower than its peer group including Grand River and Brampton although on a par with Halifax (Metro Transit). However, Metro Transit's average speed is influenced by its unique geography which limits vehicle productivity as can be seen by the low revenue-kilometres per vehicle. With regard to running times and recovery times, most systems design schedules based on all but the most unusual operating conditions and average speeds for urban routes of approximately 20 to 22 km/hr (12 – 13 mph) which provides allowance for recovery in the event of normal delays. The determination of overall running times is also a product of both the target frequency of service and the running time. Some systems do consider a specific allowance for recovery time in addition to the planning running time of 5% to 10% but this is also influenced by the target frequency of service, the running time and overall operating cost considerations.

Overall, it can be concluded from this analysis that HSR's resource utilization is better than the peer systems. From an organization and resource standpoint, HSR's staffing is consistent with its peer group except in the areas of general management, customer service and marketing, service planning and operations supervision where the revenue-hours per supervisor is high.

3.6 Marketing and Outreach Audit

This section reviews and assesses the HSR's current "Marketing and Outreach" program and identifies opportunities for improvement. It is based on meetings with HSR and City staff and a review of marketing materials, relevant reports and other documents.

Marketing can mean different things to people. For the purposes of this report, marketing is defined as "Communications and Outreach". While this may include

some traditional advertising, it also includes a wide variety of outreach programs, meetings and even policy changes which can affect communications and outreach. Additionally, outgoing and incoming communication (often referred to as "feedback") can be conducted in any number of forms, including phone, electronic, print and "in-person" contacts.

In a larger system, markets are ideally targeted to audiences that would potentially be open to using or to supporting public transit. The targeted markets can include transit employees, employees from other city departments, city councillors, transit riders, the general public, businesses (including retailers), education centres, non-profit agencies and government organizations, including municipal, regional, provincial and federal entities.

Current Situation

Overall, the HSR does not have a formal marketing strategy and work plan nor a program of annual outreach. Although existing outreach activities are numerous, there is no strong and clear focus to these efforts. Much of the work is being done because it has been part of the marketing work history over time. A variety of efforts, such as involvement in events, are carried out as a result of requests made by key opinion leaders, be they local government, business leaders or as a result of alliances with transit and environment organizations and associations.

HSR's marketing and outreach program in terms of staffing and activities is much reduced from previous initiatives. Into the latter 1990s, the HSR had eight full-time and six part-time staff dedicated to Marketing, Outreach and communications which included:

- A Supervisor of Marketing & Customer Service who oversaw all HSR marketing efforts
- A Communications Officer, responsible for writing press releases, speeches and copy
- A Graphic Artist
- Two Customer Service Representatives, responsible for requests and complaints of a non-operational nature (*e.g. fares options, requests for stops to be moved*), for updating timetables and for staffing public information centres
- Six Information Clerk positions (some full-time, some part-time)
- One Receptionist

Ten years ago, the two top positions (Supervisor; Communications Officer) were moved to City Corporate Communications where they took on responsibilities for other City Departments as well as continuing to represent Transit. The remaining group was down-sized and the Information Clerks and Receptionist were moved into the Operations Section and the Customer Service staffing reduced to one position. Following this change, the City's Corporate Communications Department was then disbanded in the early 2000s. Even at the time the Department had no budget of its own (the Departments who were initiating the marketing ads or campaigns had to provide their own budgets).

Only two staff remained within the HSR's Marketing section, a Marketing Coordinator who performs the majority of the marketing duties previously handled by the Supervisor, the Communications Officer and the Graphics Artist, and the other a Customer Service Representative who responds to customer complaints and requests. The Customer Service Representative was changed to a Customer Service Coordinator and now oversees the Call Centre and the Complaints System. The Customer Service Coordinator and Information Staff have since been moved into the Transit Planning and Scheduling section along with the Marketing Coordinator.

The Manager of Service Performance, the head of Transit Planning and the Supervisor of Fare Revenue all work well with each other and with the Marketing Coordinator, however, staff indicate that they are not formally linked which can contribute to a lack of direction and missed opportunities.

Within the Public Works Department, a Public Affairs Coordinator is responsible for overseeing the Marketing of the Parks, Waste, Cemeteries, Forestry, Roads and Transit departments. The Coordinator is responsible for media and government relations, which includes organizing certain key event dates, speech writing and providing media releases. However, the details required to carry out the events are the responsibility of the staff in each of the departments – in the HSR's case, it is the Transit Marketing Coordinator's responsibility. "Details" can include ensuring that new, clean buses, informed bus operators and staff are at the event locations in a timely manner and that print and electronic materials relating to the event are prepared and are in place. The Coordinator meets with various City department teams on a regular basis although the meetings serve more as "round table' updates rather than to jointly coordinate new activities. As a result, communications, marketing and outreach efforts can be disjointed and lack focus. The City's transit system, as a major, high profile public service, receives limited support or priority in the City's overall corporate communications activities.

The HSR brand, both in the eyes of Council and of the public, appears to be one of a social service organization. It will be important for the Director of Transit and the transit staff to be proactive at educating City Councillors about transit. Unless Council understands the complexity of operating transit and begin to see the real value of transit to the community, the transit system is in danger of never receiving the support that it requires in order to flourish and to improve its image across the city. Additionally, if transit staff can work with the Media to obtain understanding and support, this can serve to positively influence both Council and the public.

Marketing Plan

An effective marketing, outreach and communications program should include the following activities:

- analyze existing market data, including customer feedback, to determine trends, strengths and weaknesses as they pertain to marketing;
- collect new data where required;
- reach out to the non-riding public to determine perceptions and opportunities;

- develop a brand which helps to elevate council, media and public opinion of transit;
- develop and focus efforts and resources upon specific target markets;
- minimize the distractions from competing media that target these specific markets;
- develop education programs and/or materials to help key decision-makers understand the complexities of running an efficient and trusted public transit system;
- partner with pertinent city departments, public, not-for-profit and private organizations to market to target audiences in common;
- develop mechanisms for regular and effective interactions with media, partners and supporters of transit;
- determine, on an on-going basis, which types of programs and projects are most efficiently carried out by staff and which are best carried out through contracted organizations or though partnership arrangements; and
- measure marketing efforts (e.g. through ridership and the complaints system).

All of these areas could be improved with the help of a strong Marketing Plan to focus and prioritize activities. At the same time, appropriate resources (financial and personnel) need to be provided both for the short and the long term.

There is a high degree of pressure placed upon the limited marketing human resources to meet a high level of demand with new programs being introduced. For example, Council approved a pilot project to roll out an Employee Pass Program for 166 City employees and for 132 Hamilton Health Sciences employees. Additionally, people over 80 years of age can receive free transit service. New photo IDs must be taken periodically and the set-up work for this is expected to come from the existing transit staff.

From a general staffing standpoint, there is no back-up in place (succession planning) for marketing/customer service staff which leaves areas such as the complaints system vulnerable if staff are on holidays or off sick. Transit staff resources may be better used if some of the marketing work can be out-sourced such as map production and artwork for electronic and print materials. Market research can also be out-sourced. Contractors can help to develop and to carry out surveys and can compile and analyze the feedback.

The Marketing Plan should have a five year vision, but should include Work Plans for each year that accommodates political, legislative and economic changes, as they occur. It will be essential that there is a direct tie-in between the level of the transit service and the marketing. It will be important not to over-promise, but to indicate that the HSR is in the process of making changes to further benefit the community.

Annual Work Plans will be essential to ensuring that the Marketing work needing to be done is:

- Budgeted for;
- Assigned adequate human resources, both internally and contracted;
- Measurable;
- Reviewed for changes - as reality will dictate that unexpected topics and issues will affect marketing needs.

Marketing Budget

The current Marketing Budget includes $30,000 annually for all ads and promotions and $152,000 annually for all printing (maps, brochures, etc.) which represents approximately 3% of the annual operating budget. This is consistent with industry guidelines for marketing. However, the budget could be utilized more effectively through a more focussed approach.

Human Resources allocated to Marketing

The HSR lacks a structured Marketing Division. HSR should create a Marketing Division, which would include staff to:

- keep the Director of Transit informed on marketing issues
- develop an annual Work Plan from a five-year Marketing Plan
- analyze trends that affect marketing
- update the Marketing Plan, as needed
- prioritize and implement the activities within the Marketing Plan
- organize and implement new activities, as required
- coordinate with and keep the Public Works Public Affairs Coordinator informed of issues
- coordinate with the Operations and Planning staff within Transit
- coordinate with other City Departments, such as Capital Planning
- liaise with the marketing staff at neighbouring transit systems and with Metrolinx
- oversee marketing projects that have been contracted

The following is a review of the current situation relative to the HSR's corporate image and marketing activities.

Advertising Revenues

StreetSeen Media has the contract for interior and exterior bus advertising. StreetSeen has just signed a new contract with the HSR for 5 years, ending in 2014. ViaCom (CBS Outdoor) has the contract for bus shelter advertising. Its

contract with the HSR ends in 2015. Creative Outdoor Advertising has the contract for bench ads.

Brand/Corporate Image

The Hamilton Street Railway name and logo, while constant and historic, may confuse those who are not already familiar with the system. Where is the "railway" in the Hamilton Street Railway? The City encourages the HSR to brand under the Public Works logo as much as possible. This unfortunately, further blurs the image of transit in the community and within the City organization.

In contrast, there appears to be strong public interest in Rapid Transit. As plans for the new Rapid Transit System are developed, there is a danger that any new design and/or logo for Rapid Transit (be it bus or rail) could overshadow and/or conflict with the HSR logo and brand.

For the City's transit system to move into the future, now is the time to review the HSR brand from all perspectives, corporate and community. An outreach program to obtain feedback about the HSR could include surveys, focus groups, media articles and targeted advertising (such as on buses) with the Hamilton public, and especially with non-transit riders, to determine:

- what the Hamilton Street Railway name means to them
- what the role and value is of transit in the community
- how they view the HSR as compared to other available travel modes
- how they view the HSR as compared to other transit systems
- what changes they would like to see, if any, to make the system feel like a modern, relevant and a desired aspect of Hamilton.

Partnerships

The HSR currently partners with a wide variety of organizations; however, not all of the partnerships may serve the HSR to best advantage, especially given limited human and budgetary resources. In the recent past, the HSR has participated in the annual Public Works Week (May), Earth Day, Clean Air Day, Environment Week, Commuter Challenge Week. The HSR also participates in the Green Venture School Program, in Community Food Share and in other charitable events. As well, the HSR offers free shuttle service to the Hamilton Tiger Cats games, on a contra basis.

Additional partnerships include various contra promos with McMaster University (including a promo with McMaster to walk, bike or take transit), various contra promos with the seven different local BIAs along with joint campaigns with the Waterfront Trust, Environment Hamilton and Smart Commute. A previous partnership also included an employer pass program with Hamilton Health Sciences, but is no longer in place.

Most of the events have a strong transit orientation, but each one requires administrative time.

A further dilemma being faced by the marketing/public affairs staff is that they receive a high number of requests for free bus service for various events, but

that they cannot all be accommodated. They are looking for a solution to finding a balance and to being able to cover the costs.

A Marketing Plan, with a focus upon specific target markets and with a direct link to a strong HSR brand will help staff to determine which partnerships and events will offer the HSR maximum public and political outreach. Such a plan would also help to determine which partnerships are missing.

Fares

The HSR offers discounted fares on a social service basis. The overall fare structure is varied and complex. Unfortunately, this may lead the public and decision-makers to view transit as a social service program and not as a core service to the City of Hamilton. HSR staff have noted that because there are so many different types of fares and different conditions that apply to each fare, bus operators often have difficulty administering and enforcing the fare policies. This may in part be due to their uncertainty about the exact fare conditions and in part because they may not feel that they have the time to enforce all of the fares at all times.

Marketing Outreach through Print Materials

ROUTE MAPS
The HSR Transit Guide presents all of the routes. It is created in-house (although in 2008, it was contracted out to help create new areas on the map). The map is printed externally. The Transit Guide is updated every 18-24 months depending upon how often changes are made. Approximately 40,000 copies are printed and if a re-print is required 10,000 are generally re-printed at once.

The map is distributed both in-house through the HSR ticket office as well as through HSR fare media vendors, McMaster University, Mohawk College and other colleges, malls and information centres. Schedules with individual route maps are posted at some bus stops as well as on the HSR web site. It is also mailed out, upon request. There is no city-wide or targeted mail out of the map as this has not been included in the budget. It is also posted on the website.

INDIVIDUAL ROUTE MAPS
The HSR currently has 34 individual route maps. They are updated on an individual basis and are printed with the date. These are also created in-house and are distributed in the same manner as the Transit Guide, but are also distributed at shopping malls and to the Wards that are pertinent to each route (this is done by Canada Post on a postal code basis when there is a significant change or upgrade to the route). The individual maps are also available on the buses in the “take one” slots if operators fill them at the beginning of their shift. Buses are not designated specifically to one route. If the slots are filled with the HSR Customer newsletter, some bus operators hand them out directly to customers. However, there is no policy that requires bus operators to do this. They are also posted on the website.

BROCHURE
A “Bus News” bulletin is produced primarily at schedule time changes (“Board Changes”). Items such as changes in policies, fares, etc. are included. These brochures are distributed on buses and at the HSR ticket office. The copy and the artwork are created in-house while the printing is done externally. It is also posted on the website.

Brochures for the fare vendors, for bike and bus riders, for seniors on how to travel safely, for environmental themes and for a variety of other items are created on an “as needed basis”.

An internal newsletter for employees is prepared three to four times per year. They are produced in-house but printed externally and are distributed by being placed on employee desks, in boxes in bus operators and maintenance areas (for pick-up) as well as mailed to retirees. The purpose of this newsletter is to provide employees with a regular updates on plans, changes and activities concerning the HSR.

BUS ADVERTISING CARDS

Bus Cards are produced on an “as needed basis” and are created to let riders know of changes in policy. Only unsold card space is used. The panel behind the driver’s seat is also used to share information about changes in the fare structure or for events such as Earth Week. As for most of the other printed materials, these are designed in-house and are printed externally.

External Bus Cards are produced on an “as needed basis” if there is available unsold space. Other city departments may also use the space, if it is available. Street Seen is the agency which handles the Bus Board and card sales.

SHELTER MATERIALS

HSR does not use shelter ad space, but does include copies of their full route maps on the walls of the shelters.

POSTERS

Posters are created and are distributed for special events. Both the artwork and the printing are done in-house, as the quantities are usually not large.

TICKETS AND PASSES

These are designed in-house on an annual basis. The printing is done externally.

INTERNAL PRINTED NOTICES

These are produced for bus operators whenever changes are made as well as for general information regarding issues or events affecting HSR and employees.

PRINT ADS

Newspapers where the HSR posts ads include the Hamilton Spectator in the “At Your Service” section on Fridays and in the Community News newspapers in Hamilton, Stoney Creek, Ancaster, Binbrook, Dundas and Flamborough on an “as needed” basis.

Magazine ads include “View Magazine” an entertainment magazine targeting the 18 to 35 year old market; the “Seniors’ Review” which is free to people 50 years of age and over; the “Waterfront Trust” annual edition; magazines which are distributed in hotels and one-off publications which are produced for special events.

SIGNAGE

Some bus stops include info posts with schedules. Some of the schedules are specific to each stop while others are more generic to the entire route. These are designed and printed in-house and are installed by a student. Occasionally, special signage is created for services such as the A Line, B Line and the Waterfront Shuttle.

Marketing Outreach through Electronic Materials

WEB SITE

The HSR pages are hosted within the City's web site. Transit staff update the HSR portion of the site in-house (updates are made approximately every other day). A staff member has the ability to create live updates without needing to go through a separate department to do this. The site includes a Trip Planner which gives scheduled time, but HSR staff would like to see the Trip Planner become a live, "real time" tool. The public can access the Trip Planner through Google Maps; however, the timeliness of this information is of concern. There are a number of ways to find information about HSR service. The site called www.myhamilton.ca is apparently not the official city site, yet it is the first site that comes up on Google searches when the keyword "HSR" is entered.

The City designed the CITY site, including the pages for the HSR. HSR staff noted that they do not like the current layout and would like to have the opportunity to change it for a new look. If the HSR decides to re-brand itself, the web site could be a good area to test new ideas with the public.

TELEVISION

The HSR forwards information to the local stations, but does not have budget for ads. Press releases may or may not make it onto the screen, so staff would like to have budget for paid Public Service Announcement (PSAs). HSR has had air time, in partnership with Public Works, on the local community station.

RADIO

The only HSR marketing conducted on radio is through the occasional free PSA. Staff indicate that they would like to have a budget to pay for PSAs when really needed.

RECORDED PHONE MESSAGES

Generally, the only recorded messages are for changes resulting from inclement weather. The Call Centre staff are responsible for looking after the recordings.

E-BULLETINS

The HSR does not produce e-bulletins for customers. It was stated that this was due to the lack of resources. However, no other City Department produces Customer E-Bulletins, so it may be seen that Transit would be going against a general, if unwritten policy, to do so. However, E-bulletins are created for HSR employees with internet access. The bulletins are printed and posted for those employees that are not at desks.

CUSTOMER CONTACT FOR ONE-ON ONE INFO & COMPLAINTS

Some information comes from customers and from councillors; other information arrives in the form of e-mail messages. The Customer Service Coordinator looks after these, along with phone and fax messages which relate to complaints. She enters the information into a database by date and decides upon which section will receive the information, in order to respond. Sections have ten days to respond and to send the info back to the Customer Service Coordinator, who, in turn, responds to the originator of the complaint.

The Manager of Service Performance uses the complaints database to report on up to 30 types of complaints for each department. The Trapeze system allows him to quickly look at complaints by topic, such as by driver, for example. The reports on bus operators are sent to the Operations heads. All reports are also sent to the Director of Transit.

The capabilities to use the information for future planning are in the new system, but the human resources have not yet been sufficient to allow for time to do this. For the time being, the Manager of Service Performance meets bi-monthly with the Director of Transit to review the reports.

There is no back-up person to take, enter or look after complaints in the absence of the Customer Service Coordinator on statutory holidays and during non-office hours. On these occasions this work goes unattended. Additional staff resources are needed in this area.

The Ticket Office Staff at the GO station on Hunter St. can also answer customer questions. Bus operators vary in how comprehensive they are at answering customer questions. Information notices are posted for bus operators, but there are no driver meetings scheduled with administrative staff to share information in an "in-person" format. Staff ensures that students have good HSR info during McMaster Orientation Week.

CALL CENTRE

The Call Centre is open 365 days of the year, from 7:30 AM to 8:00 PM, with the exception of Christmas Day, when the Centre is open from 9:00 AM to 5:00 PM. The Centre averages 600 calls per week. There are 5 full time staff and 4 part time staff for the Call Centre. After closing hours, the Dispatcher can take calls, but this option is not promoted since this would detract from the primary responsibilities of the dispatcher. The City does have a Customer Contact Centre and the option of transferring transit customer information calls to the City's Call Centre should be considered provided there are effective lines of communication, consultation and feedback between transit and the call centre staff. Additionally, call centre staff would need to receive extensive training and familiarization on transit services and policies and staff utilization should be confined to a specific group in order to ensure information consistency.

Summary

In summary, while the HSR's marketing and outreach section undertakes a wide range of activities, the range of activities is overly extensive for the available human and financial resources. A more focussed approach to marketing, outreach and communications is required as well as additional staff resources to ensure the program is effective. At the same time, more attention should be given to increasing the level and methods of communicating with employees, such as e-mail bulletins and the design of employee notice boards to highlight recent and time-sensitive information items.

3.7 Vehicle Maintenance

Maintenance of the HSR conventional bus fleet consists of two main activities:

- Daily cleaning and fuelling, exterior washing and periodic, more comprehensive, cleaning of each bus; and
- A scheduled maintenance and repair program.

The *daily vehicle cleaning* activity consists of exterior washing, interior cleaning and sanitizing, removal of garbage, sweeping floors, wiping seats, interior fittings, fuelling, checking and replenishing fluid levels, emptying fareboxes and downloading electronic data. The periodic, comprehensive interior cleaning consists of washing walls, floor, ceiling, doors, fittings, windows, seats, bus

operator's compartment and removal of graffiti. This activity is intended to maintain a reasonable standard of cleanliness and hygiene. General industry targets are to undertake this level of cleaning a minimum of every 3 months, depending on the operating conditions and levels of ridership as well as the quality of cleaning carried out each evening. HSR schedules this work on a monthly basis. Maintaining a high level of vehicle cleanliness is important in attracting users to transit.

The *maintenance and repair program* consists of *pre-scheduled service/inspections*, "Vehicle Service Checks" (VSC), that are based on time in service. These are undertaken monthly and tracked through a maintenance management system, Avantis, and consist of a complete inspection of the vehicle with engine oil and filters changed and defects corrected as necessary. Required repairs identified through the VSC are documented on an inspection summary sheet and undertaken following the VSC. An MTO inspection is conducted every 6 months in accordance with MTO requirements. All work undertaken, time spent and parts and materials used is recorded on a work order which is then entered into the computerized information system. This system is used to determine and prompt the maintenance staff when to bring buses in for service and inspection. While the Manager, Fleet Maintenance oversees the maintenance functions, a Maintenance Foreman assigns work to the staff, monitors the quality of work undertaken and reviews the work orders and related timesheets completed by the maintenance staff.

The *service/inspections* generally follow the vehicle manufacturer's recommended procedures as well as adhering to MTO testing and reporting requirements.

Apart from the service/inspection program, buses are brought in for repair as a result of a breakdown or serious defect reported while in service in which case the bus is "changed off" (replaced), or as a result of a defect reported by the bus operator at the end of the operator's shift. Defects found by the bus operator are recorded by the operator at the end of their shift on a vehicle condition card which bus operators are required to fill out at the beginning of their work shift. This information is then provided to the vehicle service staff and a work order is set up to cover the work and retained by the Maintenance Clerk.

The maintenance department provides the Operations department with a daily summary and explanation of known vehicle defects and actions pending or under way, to correct them. This is a good strategy and helps to promote transparency in the vehicle maintenance process

Purchasing/Parts Stock-keeping: Transit parts and supplies are maintained at the transit facility in a secure parts stock room. Parts and supplies are ordered and retained under the overall control of and in co-operation with the City's purchasing department. Until recently, the City purchasing department was responsible for purchasing all parts including sourcing parts, issuance of Purchase Orders (P.O.), receiving parts and issuing invoices for payment. This resulted in a duplication of effort between transit and City staff as well as difficulties in the areas of parts sourcing, re-ordering, prices and communications. There was no dedicated buyer at the City to handle transit needs which often forced transit staff to source and order parts on their own to meet immediate needs. However, recent changes have transferred all but bulk buying and tendered purchases to the Transit Division. The transit stockroom clerks now purchase and stock parts in addition to issuing parts to mechanics,

while the senior clerk issues P.O.'s and tracks shipping receipts, invoices and payment.

Regarding the size of the spare parts stock, the current inventory totals approximately $2 million, or $9,000 per vehicle, which is consistent with industry experience of $7,000 to $10,000 per vehicle. To reduce the cost of stocking parts and to improve the timely availability of parts, HSR maintenance staff are working with the vehicle manufacturer and other Ontario transit systems to establish a local parts supply depot and to arrange to have parts stocked at transit on a consignment basis. This latter approach means that parts would not be paid for until withdrawn from inventory.

Staffing: A total of 117 people are employed in vehicle maintenance activities in the following areas:

- Mechanics and skilled trades 52 employees
- Body shop/component rebuilds 25 employees
- Service lane (vehicle washing, fuelling, servicing) 19 employees
- Building/facility maintenance 3 employees
- Stockroom 7 employees
- Clerical 2 employee
- Supervisors 6 employee

As discussed previously, the ratio of staff to vehicles is slightly higher than industry norms essentially due to less contracting out and maintenance of CNG buses, but this will decrease when the size of the fleet is increased and as the CNG fleet is retired. It should also be recognised that many of the employees are approaching retirement and this period of transition will ensure knowledge transfer.

Performance Measurement: Documentation and control of vehicle repair costs is thorough. The maintenance department tracks all repairs, defect patterns, parts usage and labour productivity through its work order/Avantis system. Monthly summarizes of maintenance costs by vehicle and repair functions are produced and used both as a benchmark for measuring performance as well as for predicting future vehicle repair requirements. This information is also used to prepare the annual budget and to predict major repair cost activities such as brake relines, engine and transmission overhauls and vehicle refurbishing.

For the annual transit budget, a summary of work to be undertaken during the year is developed, as the basis for the preparation of the maintenance budget justification. This details such items as the expected number of labour hours, fuel, oil and lubricant consumption and the number of vehicle inspections, brake relines, engine and transmissions overhauls, component overhauls, and bus refurbishing for the year. This information is carried forward as the basis for measuring the activities undertaken by the maintenance department during the year against budget. Such benchmarking serves as an effective management tool to determine performance and productivity.

3.8 Infrastructure Assessment

This section reviews the current infrastructure of the transit system and identifies areas of need and opportunities for improvement to renew the City's transit assets and respond to the ridership growth and service plans set out in the ***5-Year Transit Operations Plan***. The transit assets include: vehicles, garage and administrative facility, terminals, bus stops and shelters, fare collection equipment and IT systems. Each of these is discussed in the sections below.

Fleet

The City's conventional transit (HSR) vehicle fleet consists of 217 buses as well as support vehicles for operations and maintenance. There are a further 66 buses for the specialized transit service (DARTS) although they are not included in this review since the DARTS operation is not part of this study. The conventional transit fleet is listed in Exhibit 3-2534. All buses are low-floor and have air conditioning.

Exhibit 3-25: City of Hamilton/Hamilton Street Railway Public Transit Fleet List

Fleet #	Qty	Manufacturer	Model	Length	Seats	Year	Notes
70-71	2	Dupont	Champlain 1608	10.7 m	28	2007/08	Bluebird Ultra LF chassis
9601 – 9625	19	New Flyer	C40LF	12.2m	36	1996	CNG, less 9617/18/ 19/23/24/25
9701 – 9720	19	Nova Bus	LFS	12.2m	31	1997	Less 9718
9801 – 9810	10	New Flyer	C40LF	12.2m	36	1998	CNG
9901 – 9925	24	Orion	06-501CNG	12.2m	31	1999	CNG. Less 9905
0201 – 0215	15	New Flyer	C40LF	12.2m	35	2002	CNG
0301 – 0320	20	New Flyer	C40LF	12.2m	35	2003	CNG
0401 – 0414	14	New Flyer	D40LF	12.2m	35	2005	
0501 – 0520	20	New Flyer	D40LF	12.2m	35	2005	
0601 – 0605	5	New Flyer	DE41LF	12.5m	35	2007	Hybrid diesel-electric
0610 – 0616	7	New Flyer	DE60LFR	18.1m	52	2007	Hybrid diesel-electric
0701 – 0722	22	New Flyer	D40LF	12.2m	35	2007	
0801 – 0822	22	New Flyer	D40LF	12.2m	35	2008	
0901 – 0917	(17)	New Flyer	D40LF	12.2m	35	2009	On order – Fall/09
0920 – 0937	18	New Flyer	DE60LFR	18.1m	52	2009	Hybrid diesel-electric
1001 – 1017	(17)	New Flyer	D40LF	12.2m	35	-	On order – June/2010 delivery
Total Active	**217**						

As at September 1, 2009

The fleet largely consists of 12.2m buses (190) which are all of the low-floor, accessible design. There are also 25 18m low-floor articulated buses used on the high density routes and two 10.7m buses for a seasonal tourist shuttle service.

The average fleet age is approximately 5.7 years (to the end of 2009) which is low by industry standards but is consistent with the 12-year vehicle replacement cycle adopted by the City. The average age has been reduced significantly over the past 5 years as the result of the purchase of a large number of new buses. To maintain this standard, a total of 18 buses need to be purchased annually.

The fleet is generally in good physical and mechanical condition and presents a clean, positive image of not only the transit system but of the City. A new colour scheme and identify has been adopted for the articulated fleet and high density services, such as the B-Line, which enhances the image of the system.

88 of the vehicles are fuelled with CNG, the remainder are diesel. The CNG vehicles are being phased out in favour of clean diesel vehicles. Elimination of

the CNG vehicles will allow deferral of scheduled major repairs to the CNG fuelling station.

A total of 177 buses including extras are required in peak hours for fall 2009 service commitments. This leaves a balance of 40 vehicles in the fleet for maintenance and operations back-up purposes, a “spare” ratio of 18.4%. This is within the industry guideline for a fleet the size of Hamilton of 18% to 20%.

Future vehicle replacements should continue to be 12.2m buses although additional 18m articulated buses should be purchased to provide additional capacity for existing services. The estimated per unit cost for a 12.2 m bus is $450,000 and $650,000 for an 18m articulated bus, all clean diesel.

The City has recently acquired hybrid drive (diesel-electric) vehicles on a trial basis. These vehicles have a cost premium over standard clean diesel vehicles of approximately $225,000 for a 12.2m vehicle and $250,000 for an 18m vehicle. Although five 12.2 m and 25 18m hybrid vehicles have been purchased on a trial basis, the city is intending to continue to purchase clean diesel vehicles as the most cost-effective approach to meeting environmental targets at a reasonable operating cost. The experience with hybrid drive vehicles has been less than satisfactory in several jurisdictions with the vehicles failing to achieve projected fuel savings or corresponding reductions in emissions levels. Also, with the latest round of emissions standards taking effect in 2010 which significantly reduce nitrous oxides (NOx) and particulate levels for standard clean diesel engines, the difference in emissions levels between pre-2010 clean diesel vehicles and hybrids is narrowed considerably. As a result, it is difficult to justify the significant added capital cost and maintenance complications associated with the hybrid vehicles. Instead, increasing the transit modal split and reducing auto use are more effective tools for reducing emissions levels.

Facilities – Transit Centre

All of HSR’s administrative; operations, planning and vehicle maintenance functions are centralized in the Mountain Transit Centre located at 2200 Upper James Street. The specialized transit (DARTS) fleet and operations is now located in a separate facility at 330 Wentworth Street North.

The Transit Centre was opened in 1983 and is approximately 250,000 square feet in size with indoor storage capacity for 200 12.2m buses. There is outdoor storage space for a further 20 vehicles. The Maintenance area includes sections for vehicle servicing (fuelling, washing, cleaning), inspections, component overhaul and major body repairs. There are a total of 22 maintenance bays. While the facility is comprehensive in scope, it is under-sized in the areas of

administration (insufficient office space and meeting rooms) and vehicle storage. There is also insufficient parking for employees.

With regard to vehicle storage, the facility is in fact over-capacity at the present time particularly when considering the 66-vehicle DARTS fleet. As a result, over 20 vehicles are stored outdoors which has long-term negative implications on vehicle condition and maintenance. Even after relocation of the DARTS fleet to a separate facility, the Mountain garage will still be under-sized for the existing fleet. With 25 articulated buses representing an equivalent space requirement for 37 12.2m buses, the actual vehicle space requirement of the current fleet is 229 equivalent 12.2m buses which exceeds the design capacity of the garage. In order to not only accommodate the existing fleet but to provide room for future expansion, additional office, vehicle storage, servicing and maintenance capacity and employee parking will be required. This could be achieved in one of two ways: either by expansion of the existing facility to more than 250 buses on the existing site; or by constructing a second, satellite garage. A suitable location for a satellite facility would be below the escarpment close to downtown Hamilton. Expansion of the existing facility is constrained by the topography of the site. As well, operating a fleet of more than 250 buses from one facility is undesirable. To fully address the City's future transit facility needs, a separate fleet facility needs study should be undertaken to both define the future needs as well as identify the more appropriate facility and location strategy.

Terminals

There are currently five major transit terminals in Hamilton in addition to the GO centre terminal, located at:

- Gore Park
- Lime Ridge Mall
- Eastgate Square Mall
- MacNab Street
- Meadowlands

The MacNab street terminal is currently under reconstruction.

The Eastgate and Lime Ridge terminals are internal to the shopping malls and consist of loading bays, shelters, information signage and benches.

Consideration has been given to establishing a terminal on or adjacent to the McMaster University, a major trip generator and focal point for transit services. However, the University is not supportive of the establishment of a terminal on the campus which is unfortunate given the high level of transit use by students and faculty members. In contrast, transit terminals are a key feature at other universities such as York (Toronto), Windsor, Brock (St. Catharines) and Carleton and Ottawa.

In addition to the five transit terminals, there are also five "loops" or route end points where several routes come together. As such, they serve as key transfer points or "terminus" points for routes.

Bus Stops and Shelters

Bus Stops

There are currently 2,100 bus stops located throughout the city. Bus stops are the sole method of accessing transit service for users. The stops and related signage serve three important functions in the operation of a transit system. They:

- "Advertise" to users where transit services exist;
- Indicate where users are to stand to access the transit service; and,
- Designate the spot where the bus operator is to stop.

Accordingly, careful attention must be given to stop placement as well as the design of the stop sign, marker or "flag". HSR has generally followed a "near side" (before the intersection) policy in stop placement as opposed to a "far side" (after an intersection) location placement. While there are pros and cons to stop placement, industry experience favours "nearside" placements for four primary reasons:

- **Safety** – users are protected by traffic signals, where they exist; the bus operator has better view of intending passengers since they are more likely to approach the bus from the front as opposed to the rear; users are less likely to cross the road behind the bus away from an intersection; stopping "far" side is unexpected after clearing an intersection and thus could lead to rear-end accidents;
- **Convenience** – at intersections, the bus need only stop once; users can more readily transfer to a connecting bus with signal protection;
- **Time saving** – the bus can make use of the stop phase to board passengers;
- **Curb space** – less space is required. The bus stop area can take advantage of an existing right turn lane or the intersection for its departure compared to a far side stop.

Independent of any preference for a "far side" versus a "near side" stop placement, the actual stop location must take into account other factors such as the location of the travel destination or trip generator, and available curb and sidewalk space for stopping and boarding. Mid-block locations are also common and occur where a travel origin/destination is between intersections. In the final location selection, the stop sign should be precisely installed and be readily identifiable. All signs should be two-sided and be visible from any direction for the benefit of passengers looking for the stop sign from any directions or side of the street. Further, the bus stop area should be designated and protected by "No Stopping/Parking" signage. HSR has followed these practices along with other criteria in selecting stop locations and installation of stops.

At key stop locations such as transfer points and terminals, an "info post" displaying a route map and route schedule information for the routes serving the stop are mounted on the stop pole. At a number of locations, combined litter containers and bench fixtures are provided, usually on a request basis. Some of these fixtures are provided by an advertising contractor, Creative Outdoor

Advertising, with the revenue from the advertising going towards the installation of the bench/litter container.

Bus stop locations, signage and infoposts are selected by HSR planning staff in consultation with Traffic Engineering Section and utility companies and installed by City of Hamilton Traffic Operations maintenance staff.

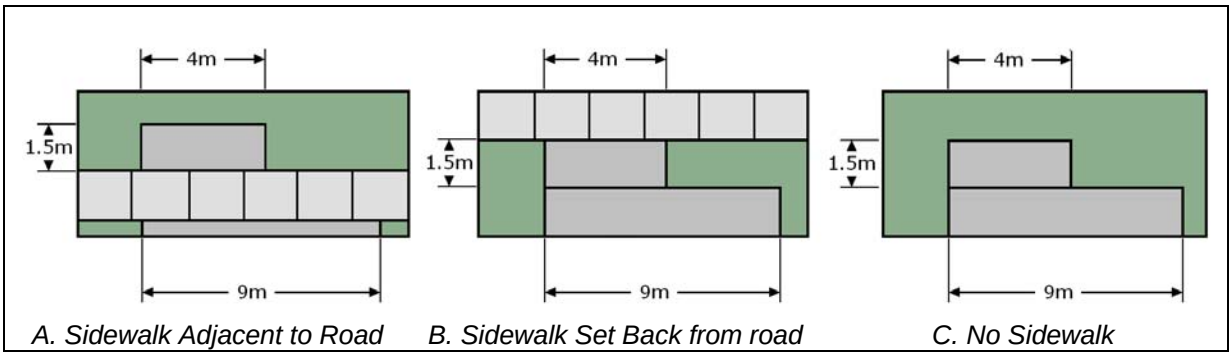
On an on-going basis, the HSR is involved in road reconstruction plans to identify needed physical improvements at bus stops which could include sidewalk extensions, widening of landing pads, placement of urban Braille systems or tree planting.

In reviewing bus stop signage around the city, a wide variety of sign designs and installation methods have been noted, ranging from the round, cylindrical variety used for stand-alone installations to flat panel signs bolted to U-channel posts, hydro poles and street signs. For the cylindrical sign, there are several sizes and methods of installation. While some variation in stop sign design and installation are necessary due to the needs of specific locations, the number of sign variations existing today appears unnecessary. The resulting image is one of inconsistency. Greater care and attention should be given to the image projected by this very prominent and important element of the HSR's interface with the public and its infrastructure.

Accessibility

To promote greater accessibility for all residents, the City has adopted an "accessible bus stop design" guideline with the objective of up-grading bus stops to include concrete pads extending a minimum of 9 metres long (the width between the front and centre doors of buses) and between the road edge/curb and sidewalk (if applicable) or, if no sidewalk, a minimum of 2.1 metres back from the road edge/curb. All bus stop areas are to be level with a maximum height from the roadway of 18 cm. Exhibit 3-26 illustrates typical bus stop accessibility standards which may be modified to meet Hamilton/HSR's specific needs.

Exhibit 3-26: Typical Shelter and Landing Pad Accessibility Designs



A. Sidewalk Adjacent to Road *B. Sidewalk Set Back from road* *C. No Sidewalk*

The cost to upgrade bus stops to meet these accessibility designs is approximately $1,500 depending on the location and condition of the existing stop. It is to be noted that in many areas, where sidewalks do not exist, upgrading bus stops may not be practical.

Passenger Shelters

Passenger shelters are located at bus stops based on a needs basis, which factors in ridership levels, exposure to the elements, nature of the trip generator near the stop, and availability of land. There are 543 shelters at bus stops throughout the transit service area. Most shelters are 1.28 meters wide by 3.1 meters long with a doorway width of 1.47 meters. The City has an arrangement with an advertising firm, CBS Outdoor, to have 15 shelters installed per year over a 10-year period in return for the rights to sell advertising space. The contractor cleans and maintains the shelters. The City does not have a program of its own to install shelters.

The current number of shelters represents a coverage rate of approximately 26%. With the addition of 150 more shelters over the next 10 years, the rate will increase to 33%. Municipalities and their transit systems are generally moving to increase the bus stop/shelter coverage rate as part of a strategy to enhance the attractiveness of using transit, which recognizes the need to limit user exposure to the elements, regardless of the level of usage at a particular stop. The target coverage percentages range between 30% and 50% in some cities. In this regard, the City's coverage rate is commendable. However, the City should target a higher coverage rate for shelters of 40% in the short term with a target rate of 50% in the long term. This would represent in the short term, the installation of 147 additional shelters by the City over the next 5 years. At an estimated purchase and installation cost of $10,000 per shelter, including necessary accessibility features (concrete pad), the total capital cost would be $1.47 million.

The HSR has created a detailed inventory of its roadside infrastructure using GPS technology that permits the creation of computer-based maps of the location of all bus stops. This database also helps manage stop amenities such as shelters, benches, signs and waste receptacles.

Fare Collection Equipment

The City, in collaboration with the Cities of Burlington and Brampton, recently purchased new electronic, registering fareboxes (Cents-a-Bill models from GFI) to replace their outdated equipment. Smart card equipment for the new regional "Presto" card will be installed starting in 2010.

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4. Update of Five-Year Transit Service Plan

4.1 Guiding Vision

This report sets out the recommended strategic operations and service plan for transit in Hamilton for the five year period 2010 to 2014. It defines the key directions and actions HSR and the City of Hamilton will need to take to achieve higher levels of transit use over the next five years as a continuing step towards the goal of 80 - 100 annual transit rides per capita by 2031 defined in the city's May 2007 Transportation Master Plan Class Environmental Assessment report, more than double the current level of 48 rides per capita.

To accomplish this goal, HSR will have to continue to improve its service levels in terms of improved service coverage, more direct and timely routes, increased frequencies, and faster, more reliable services. It will need to provide frequent and high quality Rapid Transit services in the King/Main and Upper James corridors, plus a limited stop cross-town express service. The objective is to build on HSR's strong base by increasing use by the population who have a choice of mode, particularly to major attractors such as educational facilities, business parks, medical facilities, and major shopping centres in Hamilton. The service plan features:

- Further enhancement of the B Line (and recently introduced A Line) routes to BRT standards, plus a cross-town express limited service.
- A comprehensive revision of current routes and recommendations for alterations to paths and service levels, including the introduction of new routes
- Possible locations for transit priority measures, including the type that should be adopted, and will need to include major dedication of road space to transit use (bus only lanes, transit only roadways) as well as transit-only signals, queue jump and by-pass lanes and transit priority turn lanes.

In addition, it is important to note that this strategic target cannot be achieved by HSR alone, and will require a paradigm shift in the way transit is viewed, planned for and funded in the City. All decisions regarding land use, finances and transportation generally will need to be viewed from the perspective of improving transit. And, to meet the City's vision and key community goals, more funding will be needed for higher service levels.

To realize the new vision for transit, there will need to be a significant shift in policy; a shift from a cost-driven to a market-driven service policy with less emphasis on cost-recovery. The following goals, objectives and service standards address this vision.

Goals and Objectives

To realize its mission over the next five years, HSR will need to increase ridership by improving the level of the transit services it provides in the urban and rural areas of the municipality. The City of Hamilton will need to establish the necessary foundation of service levels, transit infrastructure and customer-first organizational culture in order that HSR can continue to increase ridership and become a significant contributor to the municipality's quality of life and

sustainable development. Accordingly, Five-Year goals and objectives have been established for the conventional transit services of HSR.

Goal 1: To Improve Ridership and Mode Share

Future ridership growth needs be in the 7% range annually over the next five years if HSR is to double ridership to 100 rides per capita within ten years. There is significant potential for ridership growth of this magnitude as transit's main markets are experiencing growth, including the student, seniors and commuter markets, and higher parking and energy cost over the next five years should cause a switch to transit for the choice markets who are currently auto users. As well, new higher-order BRT and urban express services should be attractive to the choice markets, and improving service levels along the lines suggested in section 4.2 should increase transit ridership. Also, service reliability and travel times will be improved with the implementation of more targeted transit priority measures in choke/congestion points which should have a positive effect on ridership. To successfully attract these markets and get ridership growth, an aggressive program of service improvements will be required over the next five years.

The objectives of this ridership goal are as follows:

- ***Service penetration*** *– increase service use from 40 rides per capita in 2006 to 50 rides per capita in 2014*. This would move towards the long term goal of 80-100 rides per capita as identified in the Transportation Master Plan.

- ***Ridership*** *– increase annual revenue passengers from 21.8 million in 2008 to 27.8 million by 2014.* Allowing for a 7.1% population increase[3], this would achieve the service penetration goal, and equals a 5.7% increase per year.

- ***Service Levels*** *– increase annual vehicle service hours by 23.2%, from 655,086 in 2008 to 806,910 by 2014.*

The objectives are to be accomplished through improved route structures, particularly outside downtown Hamilton; higher frequencies; faster high order services (BRT/RT and urban express routes) on major travel corridors; improved service in underserved areas (especially Waterdown and Ancaster); targeted marketing to universities, large employers and the major activity centres; and the use of fare media that can encourage the greater use of transit (i.e. Presto smart card).

While these ridership goals are aggressive, they are consistent with the goals set by other communities across Canada in response to the public's desire to address existing and future social, economic, environmental and energy cost challenges.

Goal 2: To Improve Service Quality and Customer Satisfaction

In order to become more competitive with the convenience of the automobile, HSR will need to continually improve the level and quality of service it provides customers. This effort will enable it to retain and increase the frequency of use by current riders and attract new riders.

The objectives of a service quality goal are as follows:

[3] Population was 518,181 in FY 2006 (CUTA); forecast population of 555,000 in 2014 based on linear interpolation between the *Provincial Places to Grow Plan* forecasts of 540,000 in 2011 and 590,000 in2021.

- ***Schedule Adherence*** *- improve schedule adherence so that buses are on-time 95% of the time.* Buses should never operate more than one minute ahead or more than 3 minutes behind schedule at identified time points.

- ***Service Reliability*** *– achieve or maintain bus availability so that 99.9% of the scheduled service is delivered as a minimum.*

- ***Service Interruptions*** *- improve bus maintenance so that on-road service interruptions due to vehicle breakdowns do not exceed a maximum of 2 per 100,000 vehicle kilometres.*

These objectives are to be accomplished by increasing on-road monitoring of schedule adherence, improving route and schedule design, and vehicle maintenance relative to breakdowns.

Goal 3: Maintain Good Productivity and Cost-Effectiveness

Maximizing the efficient use of resources including personnel, equipment and vehicles, facilities and systems will enable the HSR to be functionally effective and fiscally prudent.

The objectives of a productivity goal are as follows:

- ***System Financial Policy*** *– attain an overall cost recovery of 50% exclusive of capital and debt costs by 2014.* The current revenue/cost rate for conventional transit services is 51.1%.

- ***Fare Policy*** *– adjust the fare structure to reduce the discount of non-cash fares; and adjust rates annually according to the inflationary increases in operating costs.*

- ***Service Utilization*** *– improve overall transit system service utilization to 28 revenue passengers per service hour and 40 boarding passengers per service hour*. The current service utilization figures are 24.6 revenue passengers per service hour and 38.6 boarding passengers per service hours. (Boarding passengers include transfers; revenue passengers does not).

With the desire for significantly higher ridership and service levels, there will be changes in the services and costs that, along with the time needed for ridership to respond, will tend to lower overall cost recoveries, especially in the early years of the next five years.

The objectives are to be accomplished by improving route structures, service levels and operations according to the service standards that have been established.

4.2 Service and Operations Plan

This section presents a five-year improvement plan for the HSR consistent with prevailing and projected future land use patterns, community planning objectives, and the needs and expectations of transit users and the public. The service plan fulfills several key objectives:

- Refocus the system concept to broaden the customer base for public transit and grow ridership.

- Simplify the system by straightening route alignments, minimizing redundancies and limiting the number of route branches and exception trips supported on individual routes.

- Improve riders' ability to travel more directly (*i.e.*, in a straight line) between origins and destinations and minimize onboard transit travel times.

- Decrease average wait times for boarding and transferring riders.

- Implement high speed Rapid Transit service in two priority high capacity corridors initially (B Line and A Line) and subsequent corridors identified in the City's BLAST Rapid Transit Concept Plan.

The system concept is illustrated in Exhibit 4-1 and requires a transition from HSR's historically radial design favoring travel to/from Downtown Hamilton, to a high-frequency grid design supporting ubiquitous travel patterns comparable to regional auto traffic. The proposed route network will facilitate travel to/from six major regional activity centers rather than the single city center. Service restructuring proposals focus on relocating the terminal points of outbound local routes from disconnected bus loops on the fringe of development areas to the integrated transit hubs, straightening alignments for better onboard travel times, and limiting the number of branches to two per route. Service span and frequency would either improve or stay the same on virtually all routes.

Exhibit 4-1: 2015 System Concept

Transit Hubs – The proposed network focuses on six major destinations where enhanced transit service levels will be concentrated to increase network connectivity, reduce wait times, and upgrade facilities for HSR customers. Existing routes will be extended or realigned to better serve the hubs, creating new direct linkages outside of Downtown with the potential for reverse direction bus ridership. Transit hub locations include:

- Downtown Hamilton

- Eastgate Square

- Lime Ridge Mall
- McMaster University
- Meadowlands Centre
- Mohawk College.

Rapid Transit – Consistent with the City's Transportation Master Plan and Rapid Transit Initiative, it is recommended that existing express bus services on Main/King (Route 10/B Line) and Upper James (Route 20/A Line) be upgraded to BRT operating standards in the next five years. Like most BRT systems that develop from a series of coordinated improvements in mixed-traffic conditions rather than as a fixed guideway capital project, the City will need to invest in facilities and technologies, as opportunities arise, required to deliver high-quality BRT service. This BRT service will be a pre-curser to the RT service should the City receive funding for this major improvement from the Province.

Core Service Area – Within the urbanized area defined generally as west of Centennial Parkway, north of Lincoln Alexander Parkway, and east of the Chedoke Expressway, the transit system will consist of a high-frequency grid of north-south and east-west routes overlaying the one-kilometer grid of arterial and primary collector streets that predominate in much of metropolitan Hamilton. Service frequency on most weekday routes will be improved to every 10 minutes during peak times.

Outlying Service Areas – Existing service in Ancaster, Dundas, South Hamilton, Stoney Creek and Waterdown will be refocused to provide short-distance neighborhood and feeder trips to the nearest transit hub. Service frequency on weekday routes at peak times will be improved to every 15 minutes in most areas.

While all these improvements are important, from a ridership growth perspective, the core strategy must include a focus on rapid transit and a high-frequency feeder network.

Route Proposals

Individual route modifications are displayed in Exhibit 4-2 and Exhibit 4-3, and are described in detail for each route on the following pages. (For full details of current service patterns, see Appendix A). These proposals are intended to be high-level guidelines, and should be subject to review and refinement by HSR staff prior to implementation.

Exhibit 4-2: Route structure adjustments

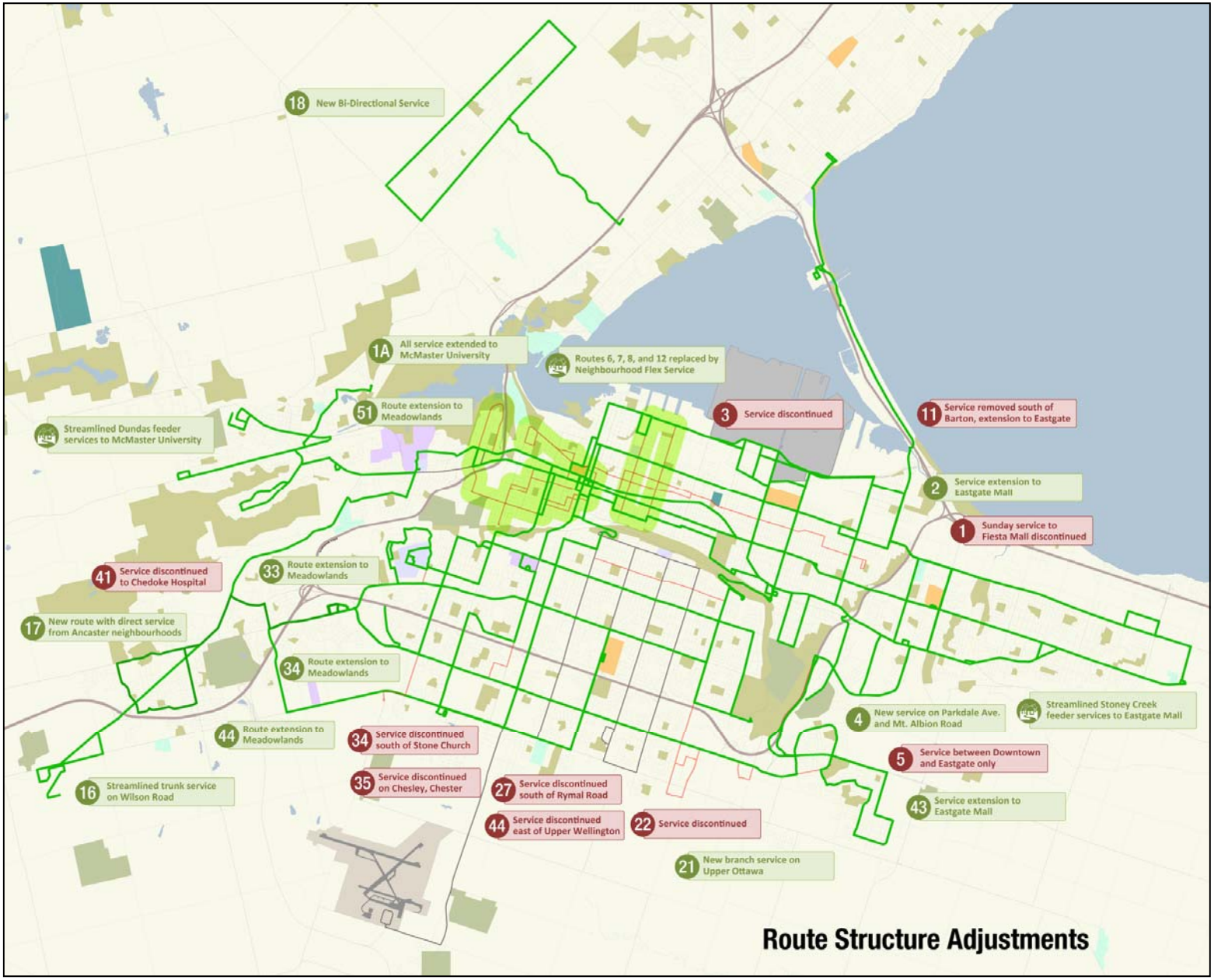
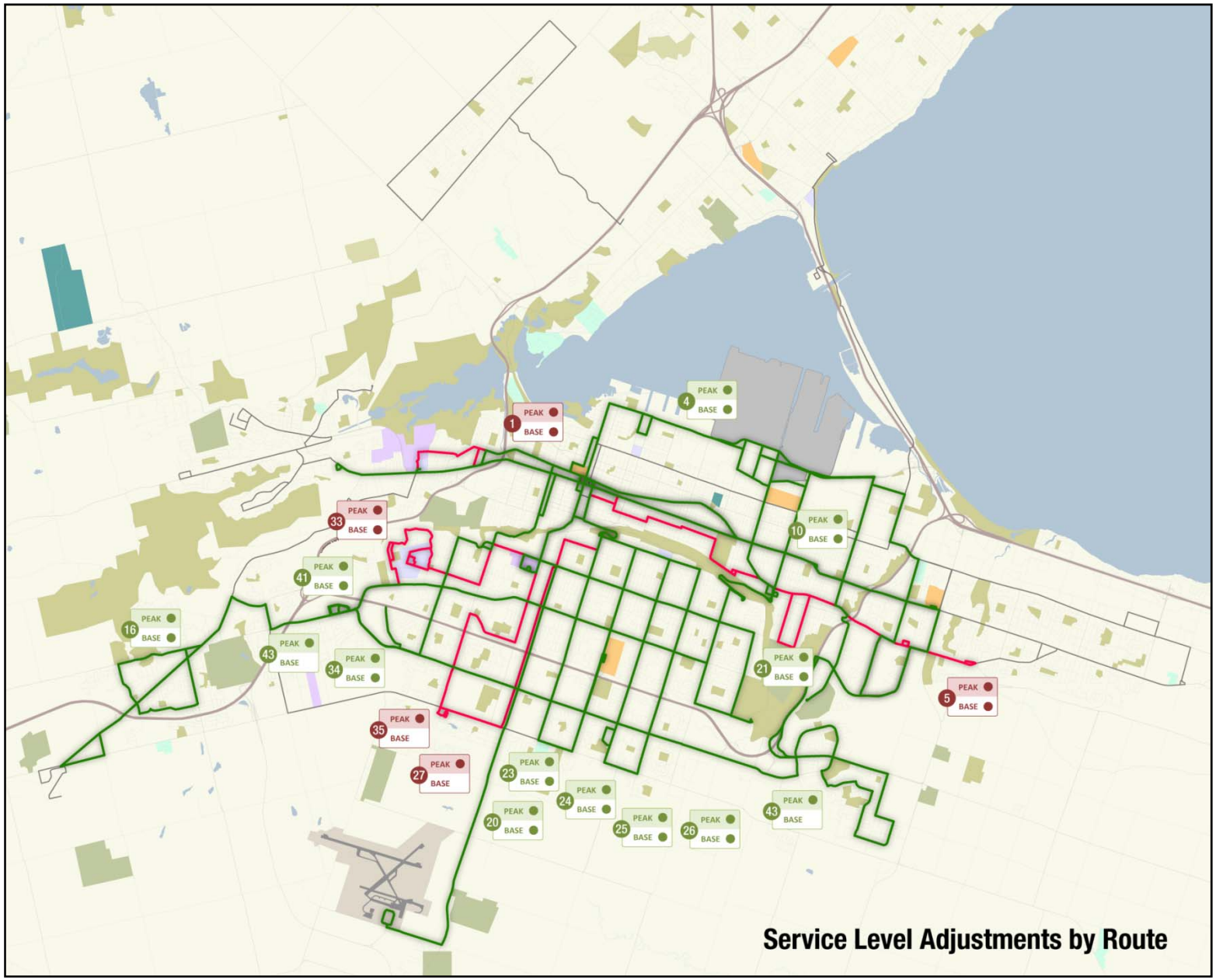


Exhibit 4-3: 2015 level adjustments



Mainline routes

Routes 1 (King) and 10 (B Line Express)

Consistent with a long-range vision for enhanced east-west transit travel on King Street/Main Street and Queenston Road, it is recommended that existing Route 1, 5 and 51 services in the corridor be restructured along with the current Route 10 B Line service to form a more prominent Bus Rapid Transit (BRT) route underlain by simplified local service running between the Eastgate Square and McMaster University transit hubs via Downtown Hamilton.

Route Structure	1. Operate all Route 1 westbound trips on the "1A" pattern to proposed McMaster Transit Center 2. Discontinue Route 1 Sunday-only service east of Eastgate Square to Fiesta Mall. 3. Truncate Route 5 west of Downtown Hamilton 4. Eliminate interline between Routes 10, 55 and 58 through Eastgate Square. 5. Truncate Route 10 westbound trips at proposed McMaster Transit Center
Service Span and Frequency	1. Improve Route 10 peak headway from 10 minutes to 8 minutes 2. Improve Route 10 base headway from 15 minutes to 8 minutes 3. Reduce Route 1 peak and base headways from 7/8 minutes to 10 minutes, subject to evaluation of probable loadings.
Schedule Cycle	Route 1 operates within a 120-minute cycle with up to 103 minutes of scheduled round trip running time and a minimum of 17 minutes of recovery time per cycle. Route 10 operates with an 80-minute cycle initially with up to 72 minutes of scheduled round trip running time and a minimum of eight minutes of recovery time per cycle. Incremental running time savings may be generated as BRT operating and traffic flow treatments are undertaken.
Benefits	1. Simplifies route structure in this corridor 2. Allows service level changes west and east of downtown to be adjusted independently 3. Eliminates short turns and difficult turning movements in downtown.
Obstacles	1. Forces more transfers in Stoney Creek

Route 5 (Delaware)

This carries the most passengers of any HSR route, although service productivity is slightly below average among HSR mainline and radial routes. The route has an extensive coverage area between Stoney Creek, Ancaster and Dundas through the lower city and Downtown Hamilton. Both alignment and schedule are overly complex with a total of seven branches from the trunk line on Main and King Streets through the heart of the city, including four branches west of downtown to Ancaster and Dundas, and three branches east to Stoney Creek. Simplification is recommended through restructuring Route 5 as a singular alignment traversing the lower city between Eastgate Square and

Downtown Hamilton. Alternative coverage on discontinued segments will be provided via other routes.

Route Structure	1. Truncate existing service west of Downtown. 2. Terminate all eastbound trips at Eastgate Square.
Service Span and Frequency	1. Reduce peak headway from alternating 7/8 minutes to 10 minutes. 2. Reduce base and evening headways from 10 to 15 minutes.
Schedule Cycle	Operates within a 90-minute cycle with up to 80 minutes of scheduled round trip running time and a minimum 10 minutes of recovery time per cycle.
Benefits	Simplifies route structure in this corridor
Obstacles	Impacted by RT decision and McMaster terminal. May require an additional terminal.

Routes 20 (Upper James BRT) and 27 (Upper James local)

Consistent with a long-range vision for enhanced north-south transit travel on Upper James Street between Downtown Hamilton and Hamilton International Airport, it is recommended that existing Route 20 and 27 services in the corridor be restructured as Bus Rapid Transit (BRT) underlain by simplified local service running between Downtown Hamilton and Rymal via Mohawk College.

Route Structure	1. Truncate Route 27 south of Rymal Road. 2. Interline with Route 35 via Rymal Road.
Service Span and Frequency	1. Improve Route 20 peak period headway from 30 minutes to 10 minutes. 2. Initiate Route 20 base period service with 10-minute headway. 3. Reduce Route 27 peak headway from 15 to 20 minutes. 4. Maintain Route 27 base period headway at 20 minutes.
Schedule Cycle	1. Route 20 operates within an 80-minute cycle with up to 72 minutes of scheduled round trip running time and a minimum 8 minutes of recovery time per cycle. 2. Routes 27 and 35 are interlined and operate within a 140-minute cycle with up to 124 minutes of scheduled round trip running time and a minimum 16 minutes of recovery time per cycle.
Benefits	Enhances status as key route, supporting development of rapid transit corridor.
Obstacles	N/A

Route 100 Crosstown Flyer (new)

This is a newly proposed high-speed express service designed to connect four outer transit hubs (Eastgate Square, Lime Ridge Mall; Meadowlands Centre and McMaster University) via area expressways on weekdays and Saturdays.

Route Structure	1. Eastgate Square to Lime Ridge Mall via Queenston Road, Red Hill Valley Parkway and Lincoln Alexander Parkway and Upper Wentworth Street. 2. Lime Ridge to Meadowlands via Upper Wentworth Street, Lincoln Alexander Parkway and Golf Links Road. 3. Meadowlands to McMaster via Golf Links Road, LINC, Chedoke Expressway, Longwood Road and Main Street. Possible stop at West Hamilton Innovation Park.
Service Span and Frequency	1. Operate 15 minute peak headways 2. Operate 30 minute base, evening and weeknight headways.
Schedule Cycle	Route 100 operates within a 120-minute cycle with up to 104 minutes of scheduled round trip running time and a minimum 16 minutes of recovery time per cycle.
Benefits	1. Decrease in cross-city journey times 2. Express status and high speed will attract new riders to transit.
Obstacles	Requires terminal space at Lime Ridge Mall and proper transfer point at Lincoln/Upper James

Radial

Route 4 (Bayfront)

This combines east-west radial service on Burlington Street and north-south crosstown service on Woodward Avenue, Nash and Quigley Roads. Service productivity has declined significantly due to decreased factory employment and economic activity along the lakefront. Partial consolidation with current Route 11 Parkdale is recommended such that Route 4 operates two branches covering Nash Road and Parkdale Avenue.

Route Structure	1. Operate branch service on Parkdale Avenue and Mt. Albion Road between Glow Avenue and Greenhill Avenue. 2. Operate branch service on Nash Road and Quigley Road between Glow Avenue and Greenhill Avenue (existing route). 3. Interline branches via Greenhill Avenue between Mt. Albion Road and Quigley Road. 4. Discontinue existing service on Mt. Albion Road south of Greenhill Avenue, subject to ensuring neighborhoods aren't left with no stops within easy walking distance.
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes. 2. Provide 20-minute peak headways on each branch. 3. Improve base headway from 20 to 15 minutes.

	4. Provide 30-minute base headways on each branch.
Schedule Cycle	Operates within a 120-minute cycle with up to 109 minutes of scheduled round trip running time and a minimum 11 minutes of recovery time per cycle.
Benefits	Allows for transfer of former branches of Route 5 (Delaware), thus simplifying route structure.
Obstacles	Has impacts on multiple routes

Route 6 (Aberdeen), Route 7 (Locke) and Route 8 (York)

These three routes provide neighbourhood service on the near-west side of Downtown Hamilton to Princess Point in Westdale North. The alignments are indirect and partially overlap, creating unnecessary complexity for HSR customers. Discontinuation of fixed route service and replacement with a neighbourhood flexible service design is proposed. Alternatively, a much simpler single route with a loop alignment could be adopted to serve those areas that would otherwise be too far from a bus stop. There is also the possibility of Burlington's Transit's route 1 serving under some cross-boundary fare agreement, but this would increase inter-municipal travel times.

Route 21 (Upper Kenilworth)

This plays an important role in the upper city transit grid combining east-west crosstown service on Fennell Avenue to Mohawk College and north-south radial service continuing to Downtown Hamilton. Consolidation of Routes 21 and 22 is recommended such that Route 21 assumes coverage on Upper Ottawa Street between Fennell Avenue and Limeridge Road with branch operations on Upper Kenilworth and Upper Ottawa.

Route Structure	1. Operate alternating trips via Upper Kenilworth and Upper Ottawa branches between Lime Ridge Road and Fennell Avenue 2. Interline branches through Mountain Brow Loop
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes 2. Improve base period headway from 30 minutes to 10 minutes 3. Operate 20-minute headways on Kenilworth and Ottawa branches
Schedule Cycle	Route 21 operates within an 80-minute cycle with up to 68 minutes of scheduled round trip running time and a minimum 12 minutes of recovery time per cycle.
Benefits	General improvement to service in mountain region.
Obstacles	Reduces coverage south of Limeridge Road

Route 22 (Upper Ottawa)

Operates between Mountain Business Park and Downtown Hamilton via Upper Otttawa Street and Queensdale Avenue. Service productivity is substantially below average among HSR radial routes due to proximity of the Queensdale segment to stronger Routes 21 and 23. Consolidation of existing service on Upper Ottawa Street into Route 21 Upper Kenilworth and discontinuation of service on Queensdale Avenue is recommended.

Route 23 (Upper Gage)

This is an important component of the upper city transit grid and performs well in terms of ridership and productivity. Peak period headway improvement to 10 minutes is recommended.

Route Structure	No change.
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes. 2. Maintain base headway at 20 minutes.
Schedule Cycle	Routes 23 and 24 are interlined and operate within a 120-minute cycle with up to 109 minutes of scheduled round trip running time and a minimum 11 minutes of recovery time per cycle.
Benefits	General improvement to service in mountain region.
Obstacles	

Route 24 (Upper Sherman)

This is an important component of the upper city transit grid and performs well in terms of ridership and productivity. Peak period headway improvement to 10 minutes is recommended.

Route Structure	No change
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes. 2. Maintain base headway at 20 minutes.
Schedule Cycle	Routes 24 and 23 are interlined and operate within a 120-minute cycle with up to 109 minutes of scheduled round trip running time and a minimum 11 minutes of recovery time per cycle.
Benefits	General improvement to service in mountain region.
Obstacles	

Route 25 (Upper Wentworth)

This is an important component of the upper city transit grid and among HSR's most productive radial routes. Peak period headway improvement to 10 minutes is recommended.

Route Structure	No change.
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes. 2. Maintain base headway at 20 minutes.
Schedule Cycle	Routes 25 and 26 are interlined and operate within a 120-minute cycle with up to 100 minutes of scheduled round trip running time and a minimum 20 minutes of recovery time per cycle.

Benefits	General improvement to service in mountain region.
Obstacles	

Route 26 (Upper Wellington)

This is an important component of the upper city transit grid and among HSR's most productive radial routes. Peak period headway improvement to 10 minutes is recommended.

Route Structure	No change.
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes. 2. Maintain base headway at 20 minutes.
Schedule Cycle	Routes 26 and 25 are interlined and operate within a 120-minute cycle with up to 100 minutes of scheduled round trip running time and a minimum 20 minutes of recovery time per cycle.
Benefits	General improvement to service in mountain region.
Obstacles	

Route 33 (Sanatorium)

This operates between Scenic Drive in the Mountview neighbourhood and downtown Hamilton. The route is below average in ridership and productivity among HSR radial routes. Adjustments to the current alignment and level of service are recommended to improve reverse direction ridership potential, simplify routing in the Chedoke Hospital area and to better balance service supply and demand.

Route Structure	1. Extend outbound route from Scenic Loop to Meadowlands Centre transit hub. 2. Consolidate alignment variations in the Chedoke Hospital area into a single routing consisting of Rice Avenue, Sanatorium Road, Goulding Avenue and San Remo Drive.
Service Span and Frequency	1. Change peak headway from 15 to 20 minutes 2. Change base headway from 30 to 40 minutes
Schedule Cycle	Route 33 operates within an 80-minute cycle with up to 72 minutes of scheduled round trip running time and a minimum eight minutes of recovery time per cycle.
Benefits	Simplified routing
Obstacles	

Route 34 (Upper Paradise)

This is an important component of the upper city transit grid and performs near average in terms of ridership and productivity. Consolidation of outer branches

and extension to the Meadowlands Centre transit hub to improve potential for reverse direction ridership is recommended.

Route Structure	1. Truncate regular route service south of Stone Church Road; discontinue existing segment serving Glancaster Loop via Upper Paradise Road, Rymal Road and Glancaster Road. 2. Deviate selected trips via St. Thomas More School at school bell times. 3. Reroute existing route from Upper Paradise Road and Stone Church Road to Meadowlands Centre via Stone Church and Golf Links Road. 4. Operate alternating trips via Upper Horning Loop.
Service Span and Frequency	1. Improve peak headway from 15 to 10 minutes 2. Improve base headway from 30 to 20 minutes 3. Reduce evening headway from 30 to 40 minutes
Schedule Cycle	1. Route 34 operates within an 80-minute cycle with up to 65 minutes of scheduled round trip running time and a minimum 15 minutes of recovery time per cycle.
Benefits	1. Better service to significant trip generator (St. Thomas More school) 2. More efficient routing
Obstacles	

Route 35 (College)

This is a significant component of the upper city transit grid with above average service productivity among radial routes. However, Ridership potential is constrained due to the proximity of West 5th Street to Upper James, a designated Bus Rapid Transit (BRT) corridor. Consolidation of branch operations, extension of outbound trips from St. Elizabeth's Village to Upper James Street via Rymal Road to facilitate interlining with Route 27, and level of service adjustments are recommended.

Route Structure	1. Discontinue branch service on West 5th, Chesley and Chester between Limeridge Road and Stone Church Road. 2. Interline with Route 27 via Rymal Road to connect to the A Line.
Service Span and Frequency	1. Change peak and base headways from 15 to 20 minutes 2. Change weeknight headways from 30 to 40 minutes
Schedule Cycle	Routes 35 and 27 are interlined and operate within a 140-minute cycle with up to 124 minutes of scheduled round trip running time and a minimum 16 minutes of recovery time per cycle.
Benefits	1. Simplified routing 2. Interlining improves connectivity
Obstacles	

Route 51 (University)

This operates weekday and Saturday service during the school year between the West Hamilton Loop and downtown Hamilton. No service is operated during the summer months or during Christmas and Spring break periods. Currently the route is dedicated to the McMaster University market and is the most productive route in the HSR system. Integration into the regular route network is recommended to improve network access to the proposed McMaster University transit hub and shift heavy passenger loads to the "B" Line.

Route Structure	1. Truncate existing service between McMaster University and Downtown Hamilton. 2. Operate all trips between McMaster and Meadowlands via Emerson Street, Whitney Avenue, Main Street, Wilson Street, Rousseaux / Mohawk Road, McNiven Road and Golf Links Road.
Service Span and Frequency	1. Change peak headway from 30 to 15 minutes. 2. Maintain base headway at 30 minutes.
Schedule Cycle	Route 51 operates within a 60-minute cycle with up to 48 minutes of scheduled round trip running time and a minimum 12 minutes of recovery time per cycle.
Benefits	1. Improves network access to McMaster University and future hub 2. Promotes use of B-line.
Obstacles	Need McMaster transit terminal

Crosstown

Route 2 (Barton)

This is among the most successful local routes in the system. Limited modification of the existing alignment is proposed to improve reverse direction ridership with a stronger eastern terminal point at Eastgate Square.

Route Structure	1. Reroute eastbound trips to Eastgate Square via Centennial Parkway. 2. Replace existing segment on Barton Street between Centennial Parkway and Barton Loop with proposed 55A - Stoney Creek North.
Service Span and Frequency	1. Standardize peak/base headways at 8 minutes. 2. Maintain current headways at other times.
Schedule Cycle	Peak/base service operates within a 104-minute (peak/base) cycle with up to 89 minutes of scheduled round trip running time and a minimum of 15 minutes of recovery time per cycle. Evening and night service operates within a 100-minute (peak/base) cycle with up to 85 minutes of scheduled round trip running time and a minimum of 15 minutes of recovery time per cycle.

Benefits	1. Supports node/corridor concept 2. Reinforces strong route
Obstacles	Capacity of Eastgate terminal

Route 3 (Cannon)

This is a lower performing crosstown route running parallel to and in between the two highest frequency routes in the system on Barton Street and Main/King. Further, walking distances are generally below the minimum standard. Discontinuation is recommended, with redeployment of resources to support service enhancements in the Main/King corridor. However, this area will be affected by any decisions about rapid transit on the B-line corridor.

Route 11 (Parkdale)

This provides north-south crosstown service between Burlington and Heritage Green in southeast Hamilton via Lakeshore Road, Beach Boulevard and Parkdale Avenue. Ridership volumes along Lakeshore and Beach are significantly lower than along Parkdale, and passenger data indicates significant on-street transfer activity at Queenston, Main and Barton.

Restructuring and partial consolidation with Route 4 such that Route 4 would assume coverage of Parkdale and Route 11 would be rerouted between Burlington and Eastgate Square. A name change to Route 11 Beach Boulevard should be considered.

Route Structure	Truncate service south of Barton Street and reroute to Eastgate Square from Woodward Avenue via Barton Street and Centennial Parkway.
Service Span and Frequency	1. Maintain peak, base and evening headways at 30 minutes 2. Improve weeknight headways from 60 to 45 minutes
Schedule Cycle	Operates within a 90-minute cycle with up to 80 minutes of scheduled round trip running time and a minimum 10 minutes of recovery time per cycle.
Benefits	1. Supports node/corridor network structure 2. Reduces length of route (increasing reliability) 3. Supports changes to route 4 (Bayfront)
Obstacles	1. Must be done as part of a multiple route re-structuring 2. Parkdale and Bayfront routes have been restructured “numerous times”.

Route 41 (Mohawk)

This operates an "L"-shaped alignment between Meadowlands Centre and the Bayfront industrial area in Hamilton, and provides an important linkage between the lower and upper city via Kenilworth Access. The route is the strongest crosstown route in terms of ridership and productivity. Consolidation of branch service and extension of all westbound trips to the Meadowlands Centre transit hub are recommended.

Route Structure	1. Remove 41A branch service and meet needs of Chedoke Hospital through other routes 2. Operate all trips on 41 alignment to Meadowlands Centre. 3. Maintain existing branch operations on Kenilworth Street and Ottawa Street through the Lower City.
Service Span and Frequency	Remove 41A branch service and meet needs of Chedoke Hospital through other routes
Schedule Cycle	Route 41 operates within a 150-minute cycle with up to 128 minutes of scheduled round trip running time and a minimum 22 minutes of recovery time per cycle.
Benefits	1. Provides transferable service hours 2. Walking distances meet minimum service standard.
Obstacles	

Route 43 (Stone Church)

This provides upper city cross-town service between Meadowlands Centre and Heritage Green via Lime Ridge Mall. It is a near-average performer in terms of ridership and productivity. However, restructuring is recommended to improve two-way ridership flow on the route by streamlining the alignment within Heritage Green and extending eastbound trips to the Eastgate Square transit hub.

Route Structure	1. Simplify existing routing through Heritage Green via Highland Road, First Road and Mud Street. 2. Extend all eastbound trips to Eastgate Square via Red Hill Valley Parkway, Greenhill Avenue, King Street and Centennial Parkway. 3. Operate selected trips via Mountain Business Park.
Service Span and Frequency	1. Improve peak headway from 30 to 15 minutes. 2. Maintain base headway at 30 minutes.
Schedule Cycle	Route 43 operates within a 180-minute cycle with up to 155 minutes of scheduled round trip running time and a minimum 25 minutes of recovery time per cycle.
Benefits	Simplified route structure
Obstacles	

Route 44 (Rymal)

This operates upper city crosstown service between Ancaster Business Park and Eastgate Square during peak periods only. Prior to September 2009, the route operated between the Glancaster Loop and Mountain Business Park only, and was among the lowest of all HSR routes in terms of ridership and productivity. Substantial restructuring and level of service adjustments are recommended to redefine the position of Route 44 in the upper city transit grid.

Route Structure	1. Truncate existing service east of Upper Wentworth Street. 2. Reroute eastbound trips to Lime Ridge Mall via Upper Wentworth Street. 3. Reroute westbound trips to Meadowlands Centre from Garner Road via Southcote Road and Golf Links Road.
Service Span and Frequency	1. Improve peak headways from 30 to 15 minutes 2. Initiate base and evening service with 30 minute headways
Schedule Cycle	Route 44 operates within a 90-minute cycle with up to 80 minutes of scheduled round trip running time and a minimum 10 minutes of recovery time per cycle.
Benefits	1. Simplified route structure 2. Better match to upper city grid
Obstacles	

Feeder

Route 12 (Wentworth)

This provides operates peak-only neighbourhood service east of Downtown Hamilton on a one-way loop via Victoria Avenue, Burlington Street, Wentworth Street and Stinson Street. The route carries the fewest passengers of any HSR route and is among the lowest in service productivity. Discontinuation of fixed route service and replacement with Transcab, a community bus or a similarly flexible service design is proposed.

Route 16 (Ancaster)

This provides on a circuitous one-way loop that covers a large area in Ancaster but requires excessive travel time to Meadowlands Centre for many passengers. This area should be served by two routes targeting commuters and local markets separately. It is recommended that Route 16 operate on Wilson Street in both directions between the Meadowlands transit hub and Ancaster Business Park.

Route Structure	1. Operate bi-directional service on Wilson Street between Rousseaux Road and Garner Road.
Service Span and Frequency	1. Maintain peak headways at 30 minutes. 2. Improve base period headways from 60 to 30 minutes. 3. Operate new weeknight service on 60-minute headways.
Schedule	Operates within a 60-minute cycle with up to 52

Cycle	minutes of scheduled round trip running time and a minimum eight minutes of recovery time per cycle.
Benefits	1. More direct routing 2. Removal of circuitous one-way loop
Obstacles	

Route 17 (Ancaster Circulator) (new)

This is a proposed neighborhood circulator route connecting residential subdivisions with Ancaster Town Plaza and Meadowlands Centre.

Route Structure	Operate bi-directional service west of Ancaster Town Plaza on a loop consisting of Jerseyville Road, Meadowbrook Drive, Amberly Drive, and Fiddlers Green Road.
Service Span and Frequency	1. Operate 30-minute peak and base period headways. 2. Operate new weeknight service on 60-minute headways.
Schedule Cycle	Operates within a 60-minute cycle with up to 52 minutes of scheduled round trip running time and a minimum eight minutes of recovery time per cycle.
Benefits	1. Shorter walking distances 2. Bidirectional loop means consistent journey times each way
Obstacles	

Route 18 (Waterdown, becomes Waterdown East)

This operates a peak-only feeder service between Waterdown and the Aldershot Rail Station. The current alignment is a large one-way loop covering most of Waterdown, but requires out-of-direction travel and excessive onboard travel time to and from the GO station and local stores near Dundas Street and Hamilton Street. Waterdown should be served by two routes that are more direct and reduce travel times between residential subdivisions, Main Street and the Aldershot GO station. It is recommended that Route 18 cover the area east of Hamilton Street.

Route Structure	Operates from the Aldershot GO station via Waterdown Road to Mill Street, Dundas Street, Hamilton Street, Parkside Drive, Boulding Avenue, Niska Drive, First Street, Dundas Street, Mill Street and Waterdown Road to the Aldershot GO station.
Service Span and Frequency	1. Operate 60-minute peak and base period headways. 2. Coordinate with Route 19 and GO trains.
Schedule Cycle	Route 18 operates within a 30-minute cycle with up to 25 minutes of scheduled round trip running time and a minimum five minutes of recovery time per cycle.

Benefits	1. Reduced walking distances 2. Consistent journey times each way 3. Reduced journey times between residential subdivisions, Main Street and the Aldershot GO station.
Obstacles	1. Relatively high average speed required 2. 60 minute headways limit ridership growth potential

Route 19 (Waterdown West) (new)

This new service would provide a complement to the changes to route 18 (Waterdown East). Waterdown should be served by two routes that are more direct and reduce travel times between residential subdivisions, Main Street and the Aldershot GO station It is recommended that Route 19 cover the area west of Hamilton Street, and should include access to the 'big box' commercial areas.

Route Structure	Operates via from the Aldershot GO station via Waterdown Road to Mill Street, Dundas Street, Hollybush Drive, Parkside Drive, Hamilton Street, Dundas Street, Mill Street and Waterdown Road to the Aldershot GO station. Selected trips serve the Waterdown Business Park area.
Service Span and Frequency	1. Operate 60-minute peak and base period headways. 2. Coordinate with Route 18 and GO trains.
Schedule Cycle	Route 19 operates within a 30-minute cycle with up to 25 minutes of scheduled round trip running time and a minimum five minutes of recovery time per cycle.
Benefits	1. Reduced walking distances 2. Consistent journey times each way 3. Reduced journey times between residential subdivisions, Main Street and the Aldershot GO station.
Obstacles	1. Relatively high average speed required 2. 60 minute headways limit ridership growth potential

Route 52 (Dundas Local)

This presently operates peak period route deviation service in Dundas and Pleasant Valley. The route functions as a feeder to Route 5-Delaware with schedules coordinated with eastbound Delaware service in the morning and westbound service in the afternoon. Consolidation of existing services in Dundas is recommended such that Route 52 becomes the primary full-service route replacing Route 5. All eastbound trips will serve the McMaster University transit hub.

Route Structure	1. Operate trunk service between McMaster and downtown Dundas via Osler Drive, South Street and Oglivie Street, and two branches: a. via King Street to Head Street; b. via Governor's Road to Pirie Drive. 2. Operate selected Head Street branch trips via York Road (currently 52A). 3. Operate selected Pirie Drive branch trips via Old Ancaster Road and Pleasant Avenue (currently 52A).
Service Span and Frequency	1. Operate 15-minute peak headway on the trunk and 30-minute peak headway on the branches. 2. Operate 30-minute base headway on the trunk and 60-minute base headway on the branches, with long-term aim of 15-minute headway on the trunk and 30-minute headway on the branches. 3. Operate hourly weeknight headway on the trunk and limited service on the branches.
Schedule Cycle	Route 52 operates within a 60-minute cycle with up to 50 minutes of scheduled round trip running time and a minimum 10 minutes of recovery time per cycle.
Benefits	1. Better service for Dundas. 2. Simpler route structure than old route 5 (Delaware) branches.
Obstacles	

Routes 55/55A (Stoney Creek Central) and 58 (Stoney Creek Local)

This collectively operate feeder service between the Barton, Queenston and King Street corridors in Stoney Creek and Eastgate Square. Integration of the three routes into a common timetable and level of service improvements are recommended.

Route Structure	1. Operate as three feeder routes to Eastgate Square a. 55 - Jones Loop via Queenston Road b. 55A - Levi Loop via Barton Street and Centennial Parkway c. 58 - Green Road via King Street and Centennial Parkway 2. Interline Levi Loop and Jones Loop routes via Barton Street and Jones Road
Service Span and Frequency	1. Improve peak headways to 15 minutes. 2. Maintain base and evening headways at 30 minutes. 3. Improve service hours to run from 6am to midnight for 55 and 55A.
Schedule Cycle	Routes 55 and 55A are interlined and operate within a 90-minute cycle with up 80 minutes of scheduled round trip running time and a minimum 10 minutes of recovery time per cycle. Route 58 operates within a 30-minute cycle with up to 26 minutes of scheduled round trip running time and a minimum four minutes of recovery time per cycle.
Benefits	Better integration between services serving Stoney Creek area.
Obstacles	

4.3 Transit Priority Measures Plan

To improve the attractiveness of public transit and achieve the future level of transit use targeted within this 5-Year Transit Plan, a greater emphasis will need to be placed on priority for HSR vehicles in a number of key locations throughout the city. This section identifies and discusses a number of these operational strategies.

In an effort to improve the level of service to transit, several cities have implemented Transit Priority Measures (TPM) to reduce transit vehicle travel time, improve schedule adherence, and service reliability. Two common TPMs are active Transit Signal Priority (TSP) and passive transit priority techniques.

Active Transit Signal Priority

Active transit priority causes regular operation of traffic signals to be altered temporarily in response to the presence of a transit vehicle. The objective is to advance the transit vehicle through the signalized intersection using a wide range of transit priority techniques, the most common of which are the green extension and red truncation. A transit vehicle detection system is used to identify the transit vehicle in general traffic. There are two types of active TSPs, namely: conditional and unconditional.

- **Conditional** – provides priority to a bus only when predetermined conditions are met, which is typically schedule adherence. When the bus is behind schedule by a threshold amount, then priority is requested. Passenger loading is occasionally used as a condition for priority.

- **Unconditional** – provides priority to each bus as the bus approaches the signalized intersection.

Passive Transit Priority

Passive priority is a transit priority solution that generally involves geometric treatments to favour transit operations. Geometric treatments such as bus stop relocation, taper length modifications, parking/stoppage restrictions, queue jump lanes/queue by-pass lanes, etc can provide “passive” priority to buses.

New Transit Signal Priority Locations

This section provides details of the three locations where TPM should be prioritised, plus a summary table of other areas that would benefit from TPM.

King / Main James / John Streets Area

This area covers the King/Main corridor between Queen St and Catharine St South, and the James St/John St corridor between King St and the Mountain Access. Exhibit 4-4 shows a photo of part of the affected area.

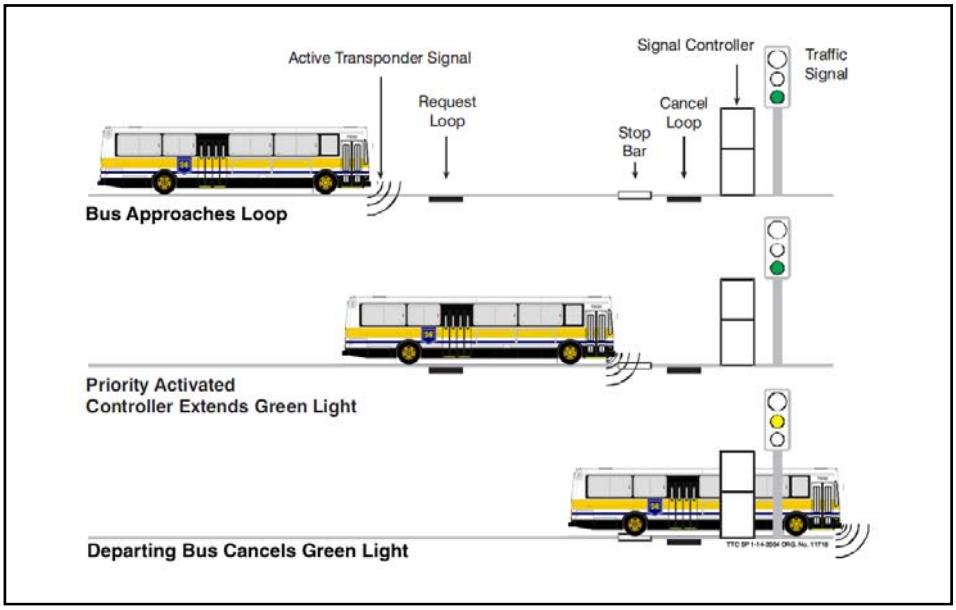
This section of downtown Hamilton presents the greatest delay for transit vehicles due to general congestion of all vehicular traffic. In addition, it is in this area where passenger loads are highest, compounding delays through heavy boarding and alighting activity at closely spaced stops. Due to these conditions, the downtown corridors of King Street, Main Street, James Street, and John Street are prime candidates for the application of various transit priority measures.

The most effective measure that can be implemented along these corridors would be to provide bus-only lanes, particularly during peak periods. This would allow buses to bypass heavy traffic conditions and improve operating conditions and reliability. Many cities employ rush-hour only bus lanes by converting curb parking lanes.

Exhibit 4-4: Bus in traffic on King Street at MacNab

Installation of active signal priority will require that buses be equipped with CAD/AVL and transponder systems in order to activate signal priority only when running behind schedule. An illustration of an active transit signal priority system can be found in Exhibit 4-5. This type of system allows buses to extend the length of a green light, or shorten the length of a red light, in order to reduce delay at heavy intersections. It is best coupled with the use of far side bus stops to minimize “wasted” extended signals when serving near side bus stops.

Exhibit 4-5: Active Signal Priority



Lime Ridge Mall

Lime Ridge Mall is the main transit hub for routes on Hamilton Mountain, served by four major routes at an off-street terminal facility. The entrance and exit to this terminal is shared with general traffic, leading to excessive delays. This is illustrated in Exhibit 4-6, which shows a bus being delayed by other vehicles leaving the mall.

Exhibit 4-6: Bus Stuck behind Cars Exiting Lime Ridge Mall

Considering the major role that the terminal is to play in the future with increases in service on the Mountain, it is imperative that the movement of transit vehicles be improved and prioritized at this location through a combination of active signal priority and physical priority measures.

ENTRANCE TO TERMINAL

Currently, there is a dedicated left turn lane from southbound Upper Wentworth into the terminal, shared with general traffic into the mall. Constraints in right-of-way limit the ability for physical transit priority measures. Instead, active signal priority can be a solution here by allowing entering buses in queue to extend the advance green until they have cleared the intersection, therefore reducing the delay.

Other entrance movements into the terminal involve right hand turns from the curb lane, which do not require any priority measures.

EXIT FROM TERMINAL

Buses departing the terminal share the same access points as the entrance, therefore, they are also delayed by general traffic leaving Lime Ridge Mall. The south exit, as seen in Exhibit 4-6, presents additional challenges, as buses make both left and right turns onto Wentworth. The ideal solution would be to construct a third, bus-only lane on the curb (Exhibit 4-7), therefore allowing buses priority at the signal, limiting delays caused by congestion at the exit.

Exhibit 4-7: Proposed Bus-only Lane, South Exit at Lime Ridge Mall

UPPER JAMES STREET AND MOHAWK ROAD

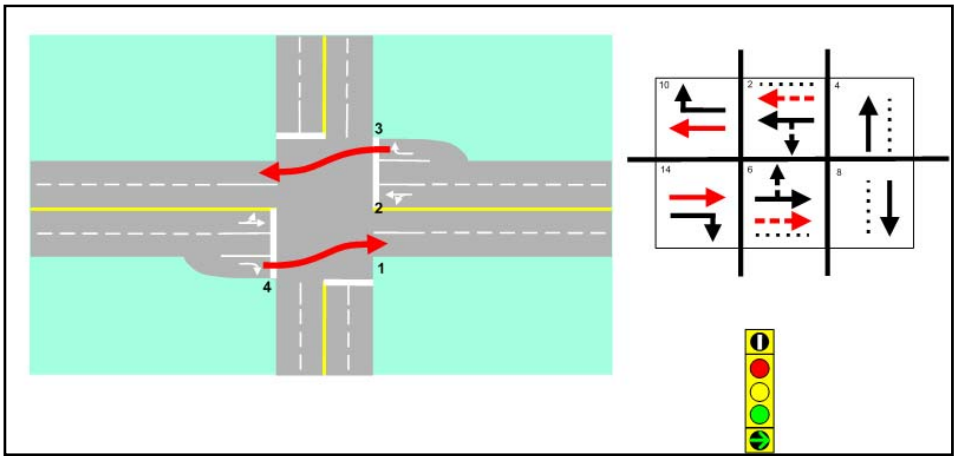
The intersection of these two main arterials (Exhibit 4-8) on Hamilton Mountain creates significant delays at peak periods for both general traffic and buses. With the introduction of A-Line bus rapid transit on the Upper James corridor, the intersection of Upper James and Mohawk is a prime candidate to introduce transit priority measures to improve operation and to facilitate easy bus-to-bus transfers.

Exhibit 4-8: View of Mohawk Road and Upper James Street Intersection

The use of queue jump lanes on Upper James for northbound and southbound buses is recommended to allow buses to bypass congestion at this location. Bus stops should be located to the far side to facilitate efficient transfers with the nearside eastbound and westbound Mohawk Road bus stops. Exhibit 4-9 demonstrates one way of implementing queue jump lanes through a lane shift scheme. Under this scheme, transit vehicles use the right turn lane as a queue jump lane, and the signal phasing (shown on the right of the Exhibit) allows

buses to jump ahead of queues in the regular straight-ahead lanes. Such a scheme requires modification to the signal heads to display a transit aspect (shown at the bottom right of the Exhibit).

Exhibit 4-9: Lane Shift for Transit Vehicles



Other locations

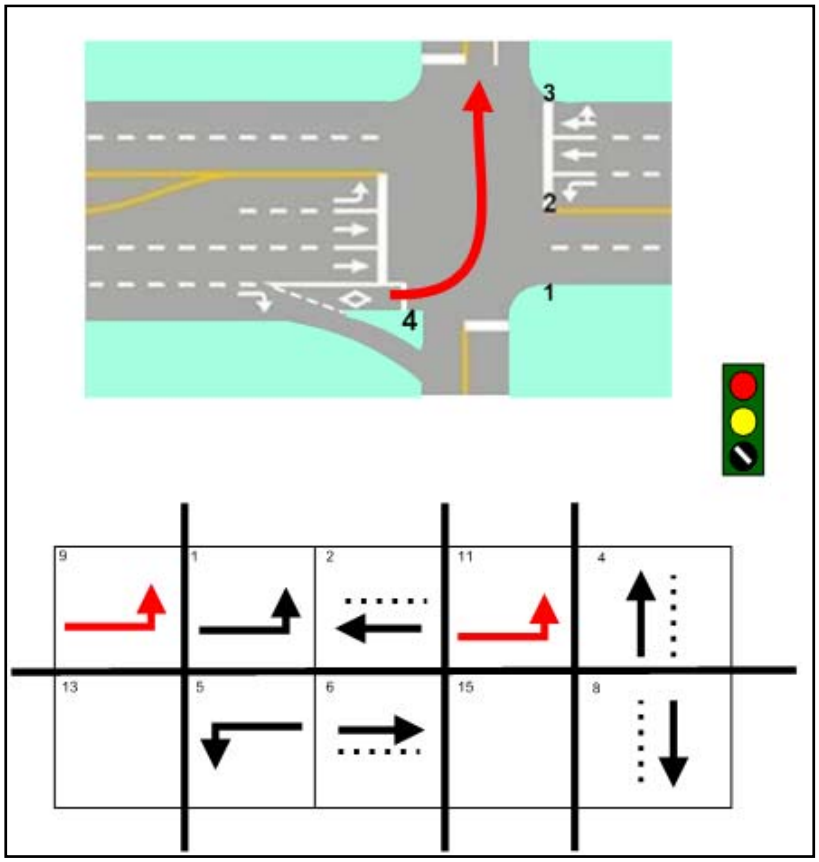
Exhibit 4-10 shows four other locations where HSR's operations would benefit from TPM. One measure suggested is a transit-only curb-side lane, which then has a dedicated movement. This is illustrated is in Exhibit 4-11.

Exhibit 4-10: Other TPM locations

Route	Location *	Likely cause	Solution
1	875 Main St West	School/Congestion	Active TSP at Main/Longwood to extend green aspect
2	1767-1787 Barton St E	Congestion / Hamilton Doublerink Arena	Add dedicated left-turn phase for NB Parkdale to WB Barton movement
4	101-209 Nash Rd N	Junction of Barton and Nash	Transit-only curb lane with left turn signal (See Exhibit 4-11)
5	1-27 Jones St, Stoney Creek	General commercial	Add advance left phase for King to NB Mountain (if not present and still required after route changes)

* Street numbers are for indicative purposes only.

Exhibit 4-11: Dedicated Left Turn Phase for Transit Vehicles



Capital Cost – Transit Priority Measures

Implementation of transit priority measures will require a separate study to confirm the measures to be introduced and to prepare cost estimates and an implementation plan. On a preliminary basis, a capital cost estimate for traffic control, signage and road improvements of $5.0 million is suggested.

4.4 Infrastructure Plan

This section summarizes the required future investment in the City's transit infrastructure, consisting of vehicle purchases for replacement as well as for service expansion as required for the 5-Year service plan, expansion of the transit centre, new or re-constructed terminals, bus stop designs and signage and additional shelters. The required program of investment is based on the prior analysis discussed in section 3.8.

Transit Vehicles

The base fleet replacement program (Section 3.8) identifies a requirement for 18 vehicles to be acquired annually based on the target 12-year replacement cycle recently adopted by the City. This represents an annual investment of approximately $8.1 million annually or $40.5 million over 5 years for clean diesel vehicles at an average unit cost of $450,000.

The 5-Year service plan calls for an additional 31 vehicles for service expansion including spares. Eleven of these vehicles would be required in years 2010-11 with the remaining 20 vehicles in years 2012 and 2013. This presents an expenditure of $13.95 million over the five years.

All vehicles would be 12.2m clean diesel and low-floor in accordance with the City's current specifications and provincial requirement for accessible vehicles.

Transit Centre/Garage

With the addition of 31 vehicles to the fleet by 2011, the practical capacity of the Mountain facility will be exceeded as the vehicle fleet will total 248 vehicles or over 260 units when the 25 articulated bus fleet (1 articulated bus = 1.5 units) is factored in.

Further expansion of the transit fleet may be anticipated beyond 2014 (the end of this 5-year plan) independent of the introduction of RT service to Hamilton sometime after 2014. Typically, a move to higher capacity transit also requires a parallel expansion of feeder services to support the high capacity service although this issue is expected to be addressed as part of the RT planning.

Nevertheless, with the Mountain facility reaching capacity during the term of this service plan, the City should undertake a longer review of its transit facility needs. Such study would identify in specific detail the City future transit fleet needs for a minimum horizon timeline of 25 years and consider the impact of introducing RT service and its corresponding operations and maintenance facility needs. The study should also consider whether the Mountain facility should, or can, be expanded to meet future needs or whether a second facility should be established. This study should be undertaken within the next two years.

Terminals

Four of the City's five primary transit terminals are in generally good condition and have suitable capacity to meet future operational needs within this 5-Year plan. The fifth terminal, MacNab Street, is undergoing reconstruction and will then also be operationally suitable.

Additional terminals are needed at McMaster University as well as in the vicinity of Mohawk and West 5th Street, the latter linked to the new BRT line. In view of the transit services at McMaster, a transit terminal may need to accommodate up to 8 buses and routes and should therefore have approximately 8 loading bays and related passenger and operational amenities. A Mohawk-5th Street terminal may require up to 6 loading bays with related operational and passenger amenities.

A preliminary capital budget estimate for these terminals would be $2 million to $3 million, subject to final design and availability of land.

Bus Stops and Shelters

As discussed in section 3.8, bus stop signage has become varied in its design and installation. Greater care and uniformity should be given to this important aspect of transit infrastructure. The original cylindrical design supplemented by flat panels on hydro poles at specific locations and adopted some years ago,

represents an excellent approach to creating a bus stop design that is distinctive and therefore easily recognizable. It is understand that the City moved away from this original design in recent years as a cost-cutting measure with predictable results. It is recommended that the City revert back to its original bus stop design and move aggressively to renew and up-date its bus stop signage to enhance the image of its transit service, and ensure signage is kept lean and free of graffiti. The estimated cost to renew the bus stop inventory in the short term is $300,000, on the basis of a cost of $300 per bus stop for one-half of the bus stop inventory.

A total of 147 shelters are proposed to be acquired and installed over the next five years to supplement the base shelter advertising agreement with CBS Outdoor and raise the bus stop/shelter coverage rate to 40%. The estimated cost for this program is $1.47 million.

4.5 Organization and Staffing Plan

Section 3.5 reviewed the HSR organization, staffing levels and functional relationship within the Public Works Department. The organization structure within the division is appropriate although greater emphasis should be given to project management through the designation of specific project managers as well as additional resources in marketing and outreach and operations road supervision. The key conclusions from this review were that:

- The maintenance department staffing for vehicle maintenance is higher than industry guidelines although the staff handle more maintenance work in-house and service a large CNG fleet. However, with 31 vehicles to be added to the fleet for service expansion, representing a need for 4 additional mechanics and 4 cleaning staff, and with pending retirement of the CNG fleet, a reduction in maintenance staff complement will not be required.
- Additional staff resources are required to better meet the transit system's marketing and outreach needs. A total of two staff are proposed for this functional area to analyze customer feedback and to develop and implement a more focused marketing plan. The budget impact would be $100,000 including benefits.
- Additional road supervision resources are required to better meet the needs of transit operations particularly during the evening and weekend time periods based on the review of existing conditions and an analysis of the current Rev-Hr per Supervisor ratio. Two additional staff members are proposed for this area at an annual cost of $150,000 including benefits. This would permit additional supervisory resources as needed.
- Establish a specific project manager position to handle specific operating and capital projects related to short-term transit projects. The estimated budget for this position would be $75,000 including benefits.

Notwithstanding the foregoing needs of the HRS/transit division per se, the recent organizational change within the Public Works department raises issues with regard the importance and role of transit within the community and priority being given to it by the City administration. The recent change places the person responsible for transit one step further away from the policy board (City Council)

and other key decision-makers within the City all of which is inconsistent with both the City's vision and objectives and stakeholder views of transit. It is recommended that not only the recent change be revisited but that consideration be given to establishing transit as a stand-alone department reporting to the City Manager.

4.6 Marketing/Corporate Communications Plan

Section 3.6 reviewed the HSR's marketing, outreach and communications activities and noted that the program lacks a focussed approach with a large number of activities being undertaken. Although the range of activities is commendable, the quantity dilutes the effectiveness of the overall program. To be more effective, the marketing activities should be simplified to a limited number of key strategies. Further, the review concluded that the HSR lacks the resources and budget to implement an effective plan. The marketing plan should also include measurable results. A strong, visible and pro-active marketing plan is essential to the success of the 5-Year Transit Plan and to achieving ridership growth.

The following section outlines a recommended Marketing Plan outline which focuses on five essential strategies. They are:

- Corporate renewal
- Current Customers
- Prospective Customers
- Public Relations including business and political leaders
- Internal communications

The "action" sections described below under each "Strategy" outline the activities for each strategy. The specific details of each strategy will be up to staff to fine tune, since politics, legislation, media and other issues of the time may affect the overall look and outcome of each individual program. The Strategies are listed in order of priority. If budget does not allow for all of the Strategies to be implemented, for example in the first year, then transit staff would choose to implement the first few Strategies and would budget for the others in subsequent years.

The Strategies include more than just the current customer, although all are important and are interdependent. As an example, it is highly unlikely that good customer service can be met for either Current or Prospective Customers if Internal needs (staff) are not also looked after.

It should be noted that the following is an outline for a five year Marketing and Outreach Plan which provides strategic directions for the annual work plan and should therefore be up-dated every year. Once a budget and resources are approved, the proposed marketing manager would create a detailed work plan based upon the Strategies in the Plan. The work plan would include the specific activities and target results agreed upon for that particular year, the dates for implementation of each activity, and the exact costs and resources required implement the strategy for that year.

The activities within the Corporate Renewal strategy include:

- Developing a new corporate image and identity (and possibly name) for the HSR. The image would include new logo, paint scheme and name

- Applying the new identity to all corporate materials and infrastructure (buses, stops, printed materials)

The activities within the Current Customer Target, in order of priority are:

- Map/Schedule Design, Printing and Distribution

- Schedule Update Printing/Distribution

- Web Site design and content

- Shelter Display Materials including maps and other customer information and promotional ads

- Customer Contact Program

- Customer Surveys

- Transit Theme Days

The activities within the Prospective Customer Target, in order of priority are:

- Route Branding – taking a specific route and developing an image or name – such as for the BRT services

- Student Transit Ambassador Program

- College Program

- Exterior and Interior Transit Specific Bus Cards

- Transit Specific Shelter Ads

- Mass Media Ad Campaign

- Niche Ridership Training Program

The activities within the Public Relations Target, in order of priority are:

- Contact list and program for regular contact with the media verbally or electronically

- Media Relations Kits

- Public Information Kits

The activities within the Business and Political Target, in order of priority are:

- Regular consultation with key opinion leaders including attendance at business meetings

- One-on-one meetings with employers
- Meetings with medical and educational institutions

The activities within the Internal Strategy are:

- Staff Training
- Networking
- Communications, verbally, electronically and in posted bulletins

Together these activities demonstrate how comprehensive an effective marketing plan needs to be.

Resource Requirements

The marketing and outreach audit indicated that the current marketing budget for HSR is within industry guidelines of 3% of total operating expenses. However, given the wide range of activities being undertaken, this budget is insufficient to be effective. The range of activities should be reduced. At the same time, the personnel resource is limited and should be expanded to permit more effective program delivery and results.

A total budget of $180,000 to $200,000 annually should be maintained with a major portion of the budget going to communications and customer relations.

As noted in the marketing plan, a key priority is the re-branding of the HSR including the possibility of a new identity (name) and logo and colour scheme. This strategy is a significant activity in itself and will need to be funded separately from the regular marketing budget. The cost could be in the range of $1.0 million to develop a new corporate identity with logo and colour scheme, as well as a further $10.0 to $12.0 million to apply the new identity to all physical assets (buses, stops, shelters, terminals, buildings, printed materials).

The budget outlined above is for external costs. It does not include transit staff and volunteer time. The staff time required to implement and continue the plan will exceed the available resources when the other daily duties of the current marketing staff people are taken into account (planning, scheduling). Thus, additional resources would be required to accomplish all of the proposed tasks. These could be contracted out.

A strong marketing and outreach plan which effectively promotes the value and role of public transit in Hamilton is essential to the success of the 5-Year Transit Plan and to increasing transit use and achieving meaningful GHG reductions. However, no matter how good a service the HSR provides, it must be supported by an effective marketing and communications program.

4.7 Financial Plan

This chapter summarizes the financial resources required to implement the Five-Year Transit Plan and includes estimates for operating and capital expenditures.

Funding/Budgeting Approach

A key finding in the analysis of HSR performance outlined in Section 3.2, is the low average fare in comparison with Hamilton's peer group. The average fare is the product of total fare revenues divided by the number of annual revenue passengers. HSR's average fare is approximately $1.37, around 25% lower than the peer group average of $1.75,

A low average fare indicates that, compared to Hamilton's peer transit systems, the transit system is bringing in a lower level of revenue per passenger. The average fare also reflects the blend of fare rates and proportion of users paying by each fare category. A low average fare suggests that the fare structure (the matrix of fare rates for the various categories of transit users) is low overall and should be adjusted upwards to increase revenues. A review of the fare structure and profile of users indicates that the adult rate of $2.40, which is the benchmark for pricing, is lower than Hamilton's peer group, which averages $2.75. However, further analysis of ridership and fare levels indicates that the low adult rate does not alone account for the low average fare. Instead, Hamilton has a wide range of discount fares which are used by a high percentage of transit users. The discount fares include discounted ticket prices (23% reduction from adult cash rates), monthly pass, day pass, university/college pass including a new summer semester pass, seniors and golden age passes, and discounts for persons living on low income (Affordable Transit Pass program).

While passes, such as the monthly and day passes are designed to encourage ridership and loyalty to transit with definitive benefits to the transit system, many of the fare discounts respond to economic or social needs of the community. In this regard, therefore, reductions from the base transit fare structure represented by the Adult, Student, child and Senior cash and ticket rates reduce the revenue intake for the transit system. In turn, lower fare revenue increases the net cost to the municipality to provide public transit whereas, in fact, the reduction in revenue is not the fault of the transit system. Since the revenue-cost ratio or net cost to operate the transit service is a major budget factor in determining the financial (and other) resources provided to the transit system, a low average fare directly and negatively impacts the level of funding available to operate transit.

Increasing the average fare would therefore increase the available funding to improve and expand transit service across Hamilton. Increasing the average fare to that of Hamilton's peer group could yield an additional $7 million per year, allowing service enhancements while maintain financial performance.

The average fare and funding for transit can be increased in each of three ways:

- By adjusting the fare structure upwards;
- Reducing the number and level of discounted fares; and,
- Charging the discounted fare differential for socially-based fare discounts to a general municipal "social assistance" budget and crediting, in turn, the transit budget with the regular fare. Funds within the municipal budget would thereby be reallocated to better meet the budget needs of transit.

Each of these strategies would serve to increase the average fare and generate "new" revenue to fund transit service improvements. Reducing the number of and level of discounted fares and, in particular, allocating socially-based fare discounts to a general municipal "social assistance" budget would emphasize the fact that the HSR/Transit dependent is in the business of providing a public transit service not a social service. Stakeholder consultations clearly indicated that HSR is viewed as a social service serving people on low income rather than performing as a transit service meeting the needs of the whole community.

From a budgeting standpoint, decisions regarding transit service levels and associated costs would not be adversely influenced by decisions based on "social, economic" needs but rather, transportation and public transit needs.

Current Fare Strategy

An important component of the Five-Year Transit Plan is the establishment of objectives, strategies and policies in regard to the fares and financing of the various transit services offered by the HSR. A fare structure should contribute to transit's financial stability, the ease and convenience of transit's customers, and to the continuing increase in ridership and movement to the next higher order in terms of successful transit systems.

Fare Structure Review

The existing fare structure as of January 1, 2008 is summarized in Exhibit 4-12.

Exhibit 4-12: HSR Fare Structure – January 1, 2008

Fare Category	Cash	Tickets	Monthly Pass
Adult	$2.40	$1.85	$79.00
Elementary/Secondary Student	$2.40	$1.50	$63.00
Senior	Adult Fare or **Annual Pass** - $205.00		
Child (Under 5)	Free		
Day Pass	$8.00 (good for two adults and up to four youth/children)		
GO Integration Pass	$15.00 (per month w/ GO Monthly Pass, good for all HSR routes)		
Summer Youth Pass	$63.00 (July and August)		
McMaster UPass	Included in student fees		
McMaster Summer Semester Pass	$252.00 (May to August)		
Affordable Transit Pass Program	50% off monthly pass for individuals under ODSP or Ontario Works or qualified as low income		
Golden Age Transit Pass	Free transit pass for residents over 80 years of age		
Passengers with Mobility Aids	Free boarding with use of mobility device (four legged cane, walker, wheelchair, scooter)		

Hamilton Street Railway's conventional fare structure follows the traditional adult, student, child, and senior rate categories and is fairly easy to understand. However, an increasing number of affordable fare policies have been put into place over the past several years that are creating a strain on operating revenues and reducing the system's overall average fare. Many of these policies are outside HSR's principal role of providing public transit and should be evaluated whether they should be subsidized by transit riders.

SINGLE-RIDE CASH FARES

	Hamilton	Waterloo	London	York	Mississauga	Brampton	Durham	Average
Cash Fare	$ 2.40	$ 2.50	$ 2.75	$ 3.25	$ 3.00	$ 3.00	$ 2.90	$ 2.83
Seniors	$ 2.40	$ 2.50	$ 2.75	$ 3.20	$ 3.00	$ 3.00	$ 1.90	$ 2.68
Student	$ 2.40	$ 2.50	$ 2.75	$ 3.25	$ 3.00	$ 3.00	$ 2.70	$ 2.80

The current single-ride cash fare of $2.40 is the lowest amongst peer systems in Ontario. Similar to most systems, a single cash fare has been adopted in Hamilton, regardless of fare category.

TICKETS

	Hamilton	Waterloo	London	York	Mississauga	Brampton	Durham	Average
Ticket	$ 1.85	$ 1.80	$ 1.90	$ 2.60	$ 2.40	$ 2.50	$ 2.63	$ 2.24
Discount	**23%**	**28%**	**31%**	**20%**	**20%**	**17%**	**9%**	21%
Senior Ticket		$ 1.55	$ 1.43	$ 1.50	$ 1.65	$ 1.50	$ 1.79	$ 1.57
Discount		**38%**	**48%**	**53%**	**45%**	**50%**	**6%**	40%
Student Ticket	$ 1.50	$ 1.55	$ 1.54	$ 1.90	$ 2.25	$ 2.35	$ 2.42	$ 1.93
Discount	**38%**	**38%**	**44%**	**42%**	**25%**	**22%**	**10%**	31%

Tickets provide a discount on the cash fare and are purchased in packs of five. The discount provided by HSR on their tickets is similar to its peers, with the discounted adult ticket price of $1.85. Only Waterloo Region has a lower ticket price in this comparison group. Unlike other jurisdictions, HSR does not provide discounted senior tickets, but instead a discounted annual pass. The student ticket rate is the lowest in the comparison group, with a higher-than-average discount over the cash fare.

MONTHLY PASSES

	Hamilton	Waterloo	London	York	Mississauga	Brampton	Durham	Average
Pass	$ 79.00	$ 60.00	$ 81.00	$ 105.00	$ 107.00	$ 102.00	$ 97.00	$ 90.14
Pass Rate	**42.7**	**33.3**	**42.6**	**40.4**	**44.6**	**40.8**	**36.9**	40.2
Senior Pass	$ 17.08	$ 50.00	$ 57.50	$ 46.00	$ 41.00	$ 47.00	$ 39.00	$ 42.51
Pass Rate	**7.1**	**32.3**	**40.2**	**30.7**	**24.8**	**31.3**	**21.8**	26.9
Student Pass	$ 63.00	$ 50.00	$ 81.00	$ 75.00	$ 101.00	$ 96.00	$ 81.50	$ 78.21
Pass Rate	**42.0**	**32.3**	**52.6**	**39.5**	**44.9**	**40.9**	**33.7**	40.8

*HSR senior pass price is the cost of the annual transit pass, divided by twelve months

HSR also offers monthly passes to provide even greater value for customers who ride frequently. The value of this pass can be calculated through the pass rate, which represents the number of rides a customer must make before additional rides are essentially “free”. Despite having one of the lowest pass prices, Hamilton’s pass rate is slightly higher than average in the comparison group for both regular and student groups, at approximately 42 rides per month (average=40).

In lieu of a seniors’ monthly pass, HSR offers an annual seniors pass for $205.00, which translates to just over $17 per month, or a pass rate of just 7.1 rides per month. This is a significant discount over the cash fare, and significantly higher than the comparison group, which averages a trip rate of approximately 26.9. Peterborough is the only other municipality in Ontario, with only seven nationally, that offers an annual pass for seniors.

In addition to a regular monthly pass, HSR also offers a GO Transit Integration Pass, which for $15 in addition to a GO Transit Monthly Pass, can be used for unlimited travel on HSR routes.

OTHER FARE INITIATIVES

A day/group pass is offered on HSR for $8.00, which is valid for up to two adults and four children/students, seven days a week. This pass is currently being marketed with Environment Hamilton as a "Passport to Hamilton" to encourage its use. Many transit operators offer day passes; however, few of these operators offer the group pass incentive, and those that do, such as the Toronto Transit Commission, only do so for weekends and statutory holidays.

A Universal Bus Pass (UPass) is currently offered for undergraduate students at McMaster University, with the fee included in tuition costs. Currently, the UPass does not extend to students in Hamilton's other major post-secondary institution, Mohawk College.

In addition, several fare initiatives have been implemented as a result of City Council direction. This includes free transit for any customers using a mobility aid, including wheelchairs, scooters, four-legged canes, and walkers. The Golden Age Transit Pass was introduced in 2009 to provide free transit for all residents of Hamilton over 80 years of age.

Analysis

Prior to the recently approved fare increase, it had been almost two years since the last fare increase. Although it has been difficult to increase fares due to the economic situation, costs to provide transit as a result of wage increase, fuel and other commodity prices have continued to increase. Delaying an upward adjustment in fares does widen the gap between the cost of providing the service and the portion that users pay. It also increases the amount of funding required from the municipality to maintain the existing services. The HSR's revenue-cost ratio has, as a result, declined over the past few years and is now approximately 52% compared to 54% just a few years ago.

As the time between fare adjustments lengthens, it becomes more difficult to adjust the fares to maintain a suitable balance between community investment and the cost to the user because the degree of adjustment increases to the point that a high percentage increase is required to "re-adjust" the balance. This inevitably results in both a negative reaction from the public and transit users but also results in a decline in transit use as people search for other ways to make up the difference in cost. For these reasons, transit systems generally follow a practice of "small annual fare adjustments" linked to the budget process in order to keep fare changes to a minimum, preserve ridership levels and maintain a positive attitude towards the transit system.

In general, the fare structure for the typical customer offered by Hamilton Street Railway is not simple. The cash, ticket, and monthly pass options provide users with the opportunity for cost savings based on more frequent uses of the system while still providing value to single-ride customers. Compared to its peers, HSR's cash and ticket rates are below average, while its pass price is within the range for its closest peers. In the context of rising operating costs and budgetary shortfalls, a cash and ticket fare increase should be considered to provide additional revenue and to bring HSR closer to the cash fare average of

its provincial peers. Increasing the cash and ticket fare prices without a subsequent increase in pass prices would decrease the price rate. However, it may be beneficial to limit an increase in the monthly pass price to cushion the effect of a cash/ticket price increase and also to increase the value and attractiveness of the monthly pass.

The trip rate for HSR's monthly adult and student passes is currently around the average for peer systems in Ontario. This rate should be maintained as it provides a balance between providing value for the average rider and financial impact on the system. The GO Fare Integration Pass should be reviewed, as the current cost ($15) does not reflect the true value of the pass, as it is essentially the equivalent to an adult pass that costs five times more. Most systems offer a co-fare arrangement, where passengers pay around 50-75 cents to board a local bus to a GO station when presenting a valid GO ticket or pass. Such an approach should be investigated for use on HSR.

In addition to below average cash and ticket rates, HSR has the burden of an increasing number of fare programs that are contributing to low overall average fare. Many of these programs are forcing HSR to subsidize eligible customers by reducing revenue for issues of social assistance. For example, Hamilton City Council recently approved the provision of a "Golden Age Transit Pass" for senior citizens aged over 80, when HSR already provides a deeply discounted senior's annual pass. The financial impact of the Golden Age Transit Pass amounts to approximately $184,000 in 2009, a significant amount when funding for service is constrained.

In addition, the free fare program for passengers with mobility aids, such as wheelchairs, scooters, canes, and walkers, also has a significant impact on fare revenue, with over 1,400 boardings observed during the ridership survey day. This program could be easily abused, as any customer can purchase one of these mobility aids and have free access to the system. It should be noted that many transit systems do allow free use of the conventional bus system for approved specialized transit registrants. The purpose of these free fares is to encourage use of the conventional system and therefore reduce the strain on the limited capacity of the specialized system. The current approach by HSR, though similar, does not have the control and oversight of requiring registration. Should this program be continued, it would be in the best interest of the system to require an application, similar to DARTS, but with less restrictive requirements.

Proposed Fare Strategy

The proposed fare strategy for Hamilton is as follows:

- Immediately increase fares by 5% across-the-board together with upward adjustments to fare discounts effective January 1, 2010 as outlined above;

- Small Annual Adjustment - follow the principle of "small annual fare adjustments" and avoid lengthy periods between fare changes. A short term (two year) goal would be to increase the adult cash fare to $2.75 and other fare rates correspondingly followed thereafter by small annual adjustments;

- Reduce the discount for tickets and passes compared to cash. The discount for tickets should be reduced to 15%. The pass pricing should

reflect a higher rate of two trips per weekday (22 days/44 trips) multiplied by the revised discounted pass price;

- Increase the university/college pass to better reflect usage and cost of transit use;

- Shift the cost of social, economic fare discounts from the transit budget to a municipal "social assistance" budget and give credit to transit for the full value of the fare discount.

5-Year Operating and Capital Budget

Exhibit 4-13 presents the five year operating and capital budget for the transit service plan for the conventional service. All operating costs are in constant dollars.

The recommended service changes are programmed to occur over the 5 year term of the Plan at a projected annual increase of 5% with annual revenue-hours of service growing to 806,910 from a base of 655,086 in 2008. Ridership is projected to increase from 21 million in 2008 to approximately 27 million by 2014 based on the proposed route changes and service improvements. A detailed summary and costing of the recommended Service Plan is provided in Appendix C.

Fare revenues will increase consistent with the proposed fare strategy and annual small increases in fare rates from $32.6 million to $48.6 million by 2014. Direct operating costs will be $93,758,000 in 2014 compared to $63,801,000 in 2008 and include approximately 94 additional bus operator FTEs and four staff FTEs. The net operating cost, or municipal investment, therefore will be $45,212,000 by 2014, an increase of $14,322,000 over 2008 levels.

The 5-year capital budget will total approximately $65.3 million comprised of $54.5 million for 121 new buses (90 for replacement and 31 for service expansion), $3.0 million for construction of two new terminals, $1.47 million for 147 additional shelters, $300,000 for bus stop improvements, $1.0 million for re-branding of HSR, $5.0 million for transit priority measures and $100,000 for a Transit Priority Strategy study and Facility Needs Strategy study.

Exhibit 4-13: 2010-2014 HSR Operating and Capital Budget

		2008 Actual	2010		2011		2012		2013		2014		Change 2008-14
Service Area Pop.		465,000	469,650		471,998		474,358		476,730		479,114		14,114
Vehicle Fleet	+ Buses (Replacement)	18	18		18		18		18		18		+90
	+ Buses (Expansion)	6	5		6		10		10				+31
	- Buses (Retirements)	18	18		18		18		18		18		90
	Total Buses	24	23		24		28		28		18		121
	Total Fleet	217	222	+5	228	+6	238	+10	248	+10	248	+0	+31
Staff	Operations	28.3	30.3	+2	30.3	+0	30.3	+0	30.3	+0	30.3	+0	+2
	Bus Operators	402	415	+13	436	+21	458	+22	481	+23	496	+15	+94
	Maintenance	112	112	+0	112	+0	112	+0	112	+0	112	+0	+0
	Administration	42.5	44.5	+2	44.5	+0	44.5	+0	44.5	+0	44.5	+0	+2
	Total Staff	584.8	601.8	+17	622.8	+21	644.8	+22	667.8	+23	682.8	+15	+98
Revenue Hours	Bus	655,086	676,338		710,155		745,663		782,946		806,910		151,824
Revenue Hours per Capita		**1.41**	**1.44**		**1.50**		**1.57**		**1.64**		**1.68**		***0.28***
Rev. Passengers	Bus	20,952,826	21,000,000		22,050,000		23,384,025		24,798,759		26,068,949		5,116,123
Rev. Passengers per Rev.	Bus	32.0	31.0		31.0		31.4		31.7		32.3		0.3
Revenue Passengers per Capita		**45.1**	**44.7**		**46.7**		**49.3**		**52.0**		**54.4**		***9.4***
Direct Operating Expenses	Bus	$ 63,800,752	$ 67,628,799		$ 73,140,546		$ 79,101,501		$ 85,548,273		$ 93,757,788		$ 29,957,036
Additional Staff	Operations	$ -	$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 200,000
	Administration	$ -	$ 125,000		$ 125,000		$ 125,000		$ 125,000		$ 125,000		$ 125,000
Total Direct Operating Cost		$ 63,800,752	$ 67,953,799		$ 73,465,546		$ 79,426,501		$ 85,873,273		$ 94,082,788		$ 30,282,036
Operating Cost per Rev. Hour		**$ 97.39**	**$ 100.47**		**$ 103.45**		**$ 106.52**		**$ 109.68**		**$ 116.60**		***$ 19.20***
Passenger Revenue	Bus	$ 31,692,311	$ 33,034,211		$ 35,726,499		$ 39,024,591		$ 42,627,146		$ 46,154,820		$ 14,462,509
Average Fare		**$1.51**	**$1.57**		**$1.62**		**$1.67**		**$1.72**		**$1.77**		***$0.26***
Other Revenue	Bus	$ 893,822	$ 893,822		$ 893,822		$ 893,822		$ 893,822		$ 893,822		$ -
Operating Revenue	Bus	$ 32,586,133	$ 33,928,033		$ 36,620,321		$ 39,918,413		$ 43,520,968		$ 47,048,642		$ 14,462,509
Net Operating Cost	Bus excluding Debt	$ 31,214,619	$ 34,025,766		$ 36,845,225		$ 39,508,088		$ 42,352,305		$ 47,034,146		$ 15,819,527
	Increase vs. 2008		+9%		+18%		+27%		+36%		+51%		
Net Cost per Capita		**$ 67.13**	**$ 72.45**		**$ 78.06**		**$ 83.29**		**$ 88.84**		**$ 98.17**		
Revenue/Cost Ratio		**51.07%**	**50.17%**		**50.07%**		**50.46%**		**50.87%**		**50.18%**		
Capital Expenses	Buses (Replacement)		$ 8,100,000		$ 8,100,000		$ 8,100,000		$ 8,100,000		$ 8,100,000		$ 40,500,000
	Buses (Expansion)		$ 2,250,000		$ 2,700,000		$ 4,500,000		$ 4,500,000				$ 13,950,000
	Total - Buses (121)		$ 10,350,000		$ 10,800,000		$ 12,600,000		$ 12,600,000		$ 8,100,000		$ 54,450,000
	Terminals (construct two)		1,500,000		1,500,000								$ 3,000,000
	Bus Stops (renew 1,000 stops)		150,000		150,000								$ 300,000
	Shelters (147 shelters)		294,000		294,000		294,000		294,000		294,000		$ 1,470,000
	Re-branding of HSR, design fee		1,000,000										$ 1,000,000
	Transit Priority Measures study		50,000										$ 50,000
	TPM improvements - construct						2,500,000		2,500,000				$ 5,000,000
	Facilities Needs study				$ 50,000								$ 50,000
	Total	$ -	$ 13,344,000		$ 12,744,000		$ 15,394,000		$ 15,394,000		$ 8,394,000		$ 65,270,000

5. Conclusions, Recommendations and Implementation Plan

5.1 General Conclusions

The foregoing report presents the result of an extensive review and analysis of HSR's operations and its human and financial resources which included stakeholder consultation, detailed counts and surveys of users, and a critical analysis of HSR's network of routes and services. Based on the information gathered and analyzed, a proposed future direction for re-investing in the City's public transit service to re-structure and expand the service is proposed in the form of a strategic operations plan with sub-plans for service, infrastructure, organization and staffing, and finance.

The primary conclusion drawn from the Market Assessment and the analysis of HSR's service is that, overall, HSR provides cost-efficient fixed route transit services which are well-regarded by transit users. However, revenue and ridership levels are lower than would be expected of a system serving a city the size and density of Hamilton. Further, there are areas where services are over-loaded or where on-time performance is difficult to achieve. Solutions to this including revisions to routes and service levels, as well as implementing transit priority measures in key areas. Although some opportunities exist to re-align service levels to match ridership, the net cost savings are not large. Changes should be to the fare strategy, including increasing fares annually (by small amounts), increasing student pass usage, and decreasing the discount for paper tickets and passes compared to cash.

HSR cannot act alone. All departments of the City of Hamilton must look for opportunities to enhance transit use and effectiveness, particularly through land use planning. As part of this, there is a need to change the image of public transit from that of "social service" to that of "transportation service". As part of this, the cost of providing reduced fares to passengers groups with high social needs should be shifted to the "social services department". Further, HSR has to ensure it services are properly marketed to the public.

HSR has been given a long-term mission of more than doubling transit ridership to between 80 and 100 rides per capita. Direction is required from the City Council to decide how much should be invested in transit over next five years to achieve strategic objectives, both in terms of capital expenditure and operational support.

5.2 Recommended Actions

Based on the findings and conclusions of this study and in order to achieve the objectives of improving the City's conventional public transit services (HSR) and to move towards achieving the long term transit modal split target in the City's Transportation Master Plan, the following are the recommended actions and their benefits to HSR customers, employees and the general public.

Exhibit 5-1: List of Recommended Actions

Recommended Actions	Customers	Employees	General Public
1. Adopt this report in principle as the basis for planning, managing and financing HSR services over the next five year period, 2010 to 2014.	✓	✓	✓
2. Pursue new transit markets through the implementation of the following key activities: a. Expand U-Pass program and opportunities for private sponsorship b. Market transit services in conjunction with transit service improvements c. Expand employee pass program and related travel demand management initiatives d. Establish and implement a park and ride program e. Enhance fare products to complement market strategy (eg. Bus buddy pass, annual pass)	✓		✓
3. Develop and implement a comprehensive marketing and corporation communications plan with appropriate budget and staff resources as outlined in sections 3.6.	✓	✓	✓
4. Update the image of the HSR by re-branding with a new identity (name), logo and colour scheme.	✓	✓	✓
5. Adopt the revised transit Mission Statement, Goals and Objectives and Service Standards as outlined in Section 4.1.	✓	✓	✓
6. Implement the 5-year transit service plan as outlined in section 3.2 with the objective of increasing ridership by 28.6% over the 5-year term of the plan through increased service penetration and service levels as set out in section 3.1. The key elements of the service plan are: a. Re-structure the transit route network and service levels to both simplify route structure as well as to improve efficiency and effectiveness, address capacity issues and provide more attractive service for transit users; b. Adjust route running and layover times to better reflect actual operating conditions; c. Provide improved cross-town services between key nodes and to the key travel origins and destinations; d. Prepare for introduction of proposed rapid transit services by increasing service levels in the A line and B line corridors.	✓	✓	✓
7. Undertake a transit priority measures study to prepare a suitable strategy for giving transit vehicles priority at traffic congestion points throughout the City.	✓	✓	
8. Adopt the infrastructure plan including the purchase of 31 buses for service expansion and 90 replacement buses over the 5 year term of the service plan.	✓		✓
9. Enhance and expand the role of transit terminals across the city as transportation hubs. Construct transit terminals at McMaster University and in the vicinity of Mohawk College.	✓		✓
10. Upgrade bus stop signage and accessibility features of bus stops including the addition of 147 shelters.	✓		✓
11. Undertake a transit facility needs study to define future needs and facility location strategy.		✓	✓

Recommended Actions	Customers	Employees	General Public
12. Implement internal organization changes as outlined in section 3.5 including four additional staff FTEs in operations, administration and marketing areas.	✓	✓	
13. Adopt the 5-Year operating and capital plan as summarized in section 4.7 and Exhibit 4.13 including approximately 94 bus operator FTEs for the service expansion. The cost of social/ economic fare discounts should be shifted from the transit budget to a municipal "social assistance" budget.	✓	✓	✓
14. Adopt the fare strategy outlined in section 4.7 with the objective of increasing the average fare. This includes small annual fare increases and a reduction in discount offered for tickets/passes.	✓		✓

5.3 Implementation Plan

The following Action Steps and Timeline are proposed as a guide to City Council and staff for implementing the Hamilton Street Railway Operational Review conclusions and recommendations.

Exhibit 5-2: Implementation Timeline

	Action and Steps	Timeline
1	City Council receives the Hamilton Street Railway Operational Review Results Presentation and recommendations and refers to staff for review and a recommended action plan for implementation	February 2009 (Complete)
2	City Council receives the Hamilton Street Railway Operational Review Report and requested to approve Vision, goals, Objectives, revised service standards and overall recommendations	March 2010
3	Include report recommendations and budget in 2010 operating and capital budget process and in 5 year capital budget	Fall/Winter 2009-10
4	Proceed to progressively implement the recommended route and services changes over the 5-year period, 2010 – 2014	Spring 2010
5	Proceed to implement internal organizational and staffing recommendations	Spring 2010
6	Undertake a transit facility needs study to define the long term needs of the City	Spring 2010
7	Undertake a Transit Priority Measures needs strategy study	Summer 2010
8	Issue RFP for multi-year acquisition of buses required for service expansion and award contract	Fall 2010

	Action and Steps	Timeline
9	Implement first stage of recommended route and service improvements	Fall 2010
10	Implement 2nd, 3rd and 4th year service plan route and service improvements	2011 to 2013