



**CITY OF HAMILTON**

**PUBLIC WORKS DEPARTMENT  
Transportation Division**

<b>TO:</b> Mayor and Members General Issues Committee	<b>WARD(S) AFFECTED:</b> CITY WIDE
<b>COMMITTEE DATE:</b> February 25, 2013	
<b>SUBJECT/REPORT NO:</b> Public Bike Share Transit System Implementation Plan (PW13015) - (City Wide)	
<b>SUBMITTED BY:</b> Gerry Davis, CMA General Manager Public Works Department	<b>PREPARED BY:</b> Peter Topalovic Project Manager, Transportation Demand Management (905)546-2424, Extension 5129
<b>SIGNATURE:</b>	

**RECOMMENDATION**

- (a) That the implementation of a public bike share transit system be approved, as outlined in Appendix "A" to Report PW13015, subject to finalization of an agreement to secure a system supplier and operator through a Request for Proposals (RFP) process;
- (b) That staff report back to Council with the results of the RFP process;
- (c) That the General Manager of Public Works be given delegated authority to negotiate with potential system sponsors and enter into agreements for the purpose of fully offsetting the operating costs of the system for a minimum period of three years;
- (d) That the capital and start-up costs of the Public Bike Transit System, as outlined in Appendix "A" to Report PW13015, be funded from the Rapid Transit Capital Reserve (108047) to an upset limit of \$1,600,000, subject to available funding and approval from Metrolinx.

**EXECUTIVE SUMMARY**

This report recommends that the City of Hamilton implement a Public Bike Share Transit System, as outlined in the Public Bike Share Transit Business Case (attached

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as Appendix "A"). It also recommends that the capital and start-up funding for the system be funded through Rapid Transit Capital Reserve (108047) for \$1.6 million. It is intended that the system be operationally self-sustaining over a ten (10) year period, guaranteed through a service level agreement with a third party operator.

A Public Bike Transit System is a public service in which bicycles are made available for shared use to members of the public who do not own the bikes, but pay a small fee to use them on a daily, monthly or yearly basis. Numerous public bike share systems have been developed in the United States, Canada and Europe in large and medium sized cities including Paris, France, London, England, New York, Minneapolis, Minnesota, Montreal, Toronto and more recently Chattanooga, Tennessee, a city of five hundred thousand (500,000) people.

The intent of developing a Public Bike Transit System in Hamilton is to:

- (a) Improve access to the A-Line and B-Line transit corridor by offering residents within two (2) to five (5) kilometres of the corridors a quick and efficient way to get to the bus service and make a connecting trip
- (b) Provide bicycles to households which do not currently own bicycles or to those households that wish to have access to commuter bicycles that do not have to be stored, locked up or are subject to the threat of theft
- (c) Develop a public bicycle network that is located near existing cycling networks, transit corridors, transit stops, transit stations and key areas of interest
- (d) Establish a true multi-modal transportation network in the City by offering a bike transit network that complements the existing bus transit network in a way that builds on existing ridership patterns and encourages use of both bicycles and busses as connecting trips

The Public Bike Share Transit System combines pedestrian, cycling and transit facilities in an integrated fashion and is based on a successful North American model which views public transit from a new perspective that includes all modes and recognizes that a commute trip can be fast and more convenient when it combines multiple modes in one (1) trip. The innovative nature of the project helps fill a niche that traditional transit cannot provide. This is an 'on demand' transit service that facilitates connectivity to the A and B express bus lines in the most convenient way possible for the transit rider.

Since 2009, a bike share feasibility study and market research project, in partnership with McMaster University researchers was conducted, including two (2) stakeholder workshops and a physical demonstration of bike sharing systems in front of City Hall. The results of these studies have been incorporated into the Bike Share Transit Business Plan, attached as Appendix "A".

**Alternatives for Consideration - See Page 8**

**FINANCIAL / STAFFING / LEGAL IMPLICATIONS**

**Financial:**

The Metrolinx Quick Wins Funding program for transit improvements awarded the City of Hamilton \$29.8 million in 2009 for the purpose of making transit infrastructure improvements in the A-Line and B-Line corridors. A variety of projects associated with this funding are in the planning stages including the construction of a park and ride facility at the Mountain Transit Centre, and bus stop amenity improvements in the corridor.

It is proposed that, in addition to the existing projects, the Public Bike Share Transit Project also be funded from the available Quick Wins funding, for a total value of \$1,600,000, to cover capital and start-up costs, as outlined in the Public Bike Share Transit Business Plan (Appendix "A").

Using Quick Wins funding eliminates the need for a loan to fund the capital costs. In older systems, interest payments on the loan were prohibitive to operating the system in a revenue neutral fashion. Quick Wins funding will make the Public Bike Share System in Hamilton operationally self-sustaining, eliminating the inflated costs associated with loan repayment. The most profitable public bike share systems in other cities are those whose capital costs are covered through government funding and grants. With capital costs covered, sustainable operating revenues for the proposed Hamilton system are based upon three thousand (3,000) annual subscriptions and half (0.5) non-subscribed trips per station, per day, as outlined in Appendix "A".

**Staffing:**

It is intended that the actual operation of the bike transit system would be operated by a non-profit service provider or by the provider of the bike transit system through a service level agreement and contract for full system operation, maintenance and marketing of the system.

The Project Manager, Transportation Demand Management would act as the key liaison between the City and the System Operator.

Purchasing staff and Mobility Programs and Special Projects staff would work with vendors through an RFP process in order to award the contract.

Public Works staff would be required to allocate and manage station locations; however, the System Operator would be responsible for the operation and maintenance of the stations, bikes and supporting infrastructure.

**Legal:**

The service level agreement and contract with the system Operator will be developed by the City's Legal Services staff to ensure that the Operator will provide the required level of service. The agreement will also define the relationship between the City and the System Operator to ensure the smooth operation of the system and integration of the system with the existing transit network, fare media and other integration

considerations. If the recommendations in this report are accepted by Council, Public Works staff will work closely with Legal Services, Risk Management and Corporate Finance staff to ensure that the agreements are satisfactory to the City and result in a system that is operated in the best interests of the public.

## **HISTORICAL BACKGROUND**

The success of bike sharing in North America coupled with demand and commitment from cycling advocates, public transportation advocates, McMaster University, Mohawk College and members of the Smart Commute Hamilton Transportation Management Association necessitated an investigation into establishing a Public Bike Share System in Hamilton. Between 2009 and 2011, the City partnered with McMaster University, Mohawk College, Green Venture and Hamilton CarShare to develop:

- (a) A series of two (2) workshops open to the public and interested stakeholders in August of 2010 and November 2011
- (b) A physical demonstration of Bixi and B-Cycle technologies in front of City Hall
- (c) A feasibility study and market analysis as part of an internship research program with McMaster University Arts and Science and MBA students in 2009 and 2011
- (d) A functional analysis developed in partnership with Green Venture in 2011
- (e) A station location analysis developed in partnership with a Mohawk College student as part of their final capstone project in 2012

These documents are summarized in the Public Bike Transit Business Plan attached as Appendix "A" to this report. It was determined that Hamilton's urban population density, number of jobs per hectare, cycling culture, transit routes and mode split will support a next generation public bike share with up to forty (40) stations and three hundred and fifty (350) bikes as a kernel, from which to base a larger system in the future.

During the same period as our research was conducted, the number of public bike share systems in North America grew from four (4) in 2009 to twenty (20) in 2011 and continues to grow into 2012-2013. The number of worldwide systems now totals two hundred (200).

The public bike share transit project was presented to Metrolinx in October of 2012 as a Quick Wins project and received verbal approval from Metrolinx staff.



**Figure 1** - Bike Sharing Systems in North America in 2009 (4 systems) and 2011 (20 systems) – green cyclists icons represent operating systems and blue question marks represent planned systems

## **POLICY IMPLICATIONS/LEGISLATED REQUIREMENTS**

In October 2011, Council directed SMT to develop an organizational structure and community engagement strategy to support, over the long term, an integrated public transportation program for the City that encompasses provincial, inter-regional, inter-city, rapid transit, public transit, active transportation and transportation demand management no later than Q1 2012. As result, an 'integrated public transportation' program – Mobility Programs and Special Projects – was established by combining several individual public transportation related programs into one consolidated program that fits into the City's policies and principals. This is a new concept combining all modes of public transportation under one (1) umbrella.

TDM is an integral component of this new approach and the Public Bike Share Transit System unites these concepts showcasing the convenience, efficiency, cost effectiveness and ridership impact that a multi-modal transportation system can have on the City's transportation network.

This plan also satisfies the recommendations of the following policies and plans:

- (a) Transportation Master Plan recommendations and metrics to reduce single occupancy vehicle use by twenty percent (20%) of projected mode split in 2031
- (b) Downtown Transportation Master Plan TDM recommendations
- (e) Metrolinx Big Move #2: Enhance and Expand Active Transportation Metrolinx Big Move #4: Create an Ambitious Transportation Demand Management (TDM) Program

## **RELEVANT CONSULTATION**

Relevant internal consultation includes:

- Public Works - Mobility Programs and Special Projects
- Public Works - HSR
- Public Works - Central Fleet
- Public Health - Active Living Division
- Public Health - Health Protection Division
- City Manager's Office - Sustainability
- Corporate Services - Finance

Relevant external consultation includes:

- Metrolinx, Innovation and Smart Commute
- McMaster University, Office of Sustainability
- McMaster University, Students Union
- McMaster University, Institute of Transportation Logistics
- Mohawk College, Office of Sustainability
- Mohawk College, Students Union
- Mohawk College, Student researchers
- Green Venture
- Hamilton CarShare
- Environment Hamilton
- Public demonstration participants in August 2010
- Public Bike System representatives
- B-Cycle representatives
- City of Toronto, Cycling Infrastructure and Programs staff
- Capital Bike Share staff
- Chattanooga Bike Share staff
- Alta-Bixi staff

## **ANALYSIS / RATIONALE FOR RECOMMENDATION**

This innovative ridership enhancing infrastructure strategy is being proposed because examples across North America point to the success of multi-modal strategies to enhance transit use and act as a seamless extension to the public transit system. Cities such as Toronto, Montreal and Minneapolis are providing a transportation network that consists of integrated multi-modal nodes that facilitate cycling, pedestrian and transit connectivity. The Public Bike Share System plan is a part of the overall Quick Wins and rapid transit strategy, and its innovative nature helps fill a niche that traditional transit cannot provide – an ‘on demand’ transit service that facilitates connectivity to the main rapid transit spine in the most convenient way possible for the transit rider.

## **Market Survey, Consultation and Demographic Analysis**

The market survey of five hundred (500) people, conducted online, demonstrated that eighty four percent (84%) of respondents were interested in using a Public Bike Share System in Hamilton. The stakeholder group, consisting of the various groups listed in the “Relevant Consultation” section of this report, overwhelmingly supported the establishment of a 4<sup>th</sup> generation Public Bike Share System. The Business Plan, attached as Appendix “A”, examined demographic information, community characteristics and various Statistics Canada measures to determine there is a sufficient market of citizens to support a public bike share system of forty (40) stations and three hundred and fifty (350) bikes. It is predicted that three percent (3%) of the population in the service area would purchase annual public bike share memberships at the price of one (1) monthly HSR bus pass. This translates to three thousands (3,000) annual subscriptions and half (0.5) non-subscribed trips per station, per day.

## **Station Land Allocation**

Public Works staff, in partnership with the Hamilton Municipal Parking Service, Planning and Economic Development and land owners along the corridor, will require further consultation regarding the placement of stations. Stations can be placed in public spaces, on-street, private land or within the boulevard space so as not to block sidewalks. Stations are solar powered and do not require hydro connections or any fastening to the ground, nor do they require bollards to protect cyclists if properly located. All efforts will be made to place stations so that they are convenient for the user but do not interfere with traffic operations or pedestrian flows. This includes placing stations at intersection side streets rather than on main thoroughfares.

## **Ridership Impact**

It is predicted that eliminating “first and last mile” commute barriers will attract new riders to the A-Line and B-Line, by providing them with an effective means to travel to rapid transit stations. Detailed Canadian bike share data indicates that bike share systems are transit supportive, as they give single occupant vehicle (SOV) driver’s viable alternative options. The data indicates that bike share users are more likely to own a bike, take transit and less likely to own more than one car. With thirty five (35) to forty (40) stations strategically placed around the city, they can also be used to promote rapid transit, system maps and the HSR and its commitment to multi-modal connectivity. It also meets the demand of local residents who want to access the rapid transit system with no transfers from local to rapid transit lines.

It is important to note that, while there are already bike racks on busses, this does not accommodate riders who wish to pick up a bike and leave it at a station, rather than take it with them, as they are only using their bike to get to transit.

## **Next Steps for Implementation**

In order to properly implement the Public Bike Share Transit System, the following steps will act as a guide:

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1. Accept the Public Bike Share Transit Business Plan, approve the allocation of funding and notify the various departments involved of their potential role in implementation
2. Issue a Request for Proposals (RFP) process for the bike share hardware including stations, bikes and supporting infrastructure, contingent on selecting a suitable system operator and system sponsor, if required
3. Enter into a service level agreement with a system operator for a ten (10) year period that guarantees the proper and efficient operation of the system and guarantees the operation of the system will be revenue neutral to the City
4. Allocate Public Bike Share Station locations as outlined in the Public Bike Share Transit Business Plan (Appendix "A"), and in consultation with City departments and external stakeholders, ensuring minimal disruption to traffic operations
5. Deliver stations, bikes, tracking systems, payment systems and on-line resources required for full system operation

**ALTERNATIVES FOR CONSIDERATION**

Alternatives for consideration include:

- (a) Council may direct staff not to implement a Public Bike Share Transit program. This would be contrary to the information presented in the Public Bike Transit Business Plan (Appendix "A"), which states that such as system is feasible for the City of Hamilton.
- (b) Council may direct staff to carry out additional work, such as further research, marketing, or securing an operator and sponsor and then report back with more details prior to implementing the project. This option is not recommended because the Public Bike Transit Business Plan (Appendix "A") is robust and gives thorough consideration to implementation with a broad consultation of stakeholders. Furthermore, the project is more likely to succeed with clear Council direction so that potential sponsors and system operators are assured of Council support and that the implementation of the system has full Council authorization.
- (c) Council may direct staff to change the minimum operating term for the system operator service level agreement to be shorter than ten (10) years. This is not advisable, as it is predicted that a full ten (10) year cycle will ensure system stability and that the system is fully revenue neutral or profitable, taking into account station and bike replacement costs at the five (5) to seven (7) year milestone period.
- (d) Council may not wish to allocate Quick Wins funding to the Public Bike Share Transit System. This is not recommended as the project represents an integrated multi-modal strategy to operating public transportation services in the City. It is important to offer a variety of sustainable modes for citizens to facilitate access for those who wish not to use a personal automobile as their primary mode. It can also assist households that wish to complement the use of a primary personal automobile with other modes so that they can reduce the amount of

vehicles owned, thereby reducing the overall cost of vehicle ownership in the household.

**ALIGNMENT TO THE 2012 - 2015 STRATEGIC PLAN**

**Strategic Priority #1**

A Prosperous & Healthy Community

*WE enhance our image, economy and well-being by demonstrating that Hamilton is a great place to live, work, play and learn.*

**Strategic Objective**

- 1.2 Continue to prioritize capital infrastructure projects to support managed growth and optimize community benefit.
- 1.3 Promote economic opportunities with a focus on Hamilton's downtown core, all downtown areas and waterfronts.
- 1.4 Improve the City's transportation system to support multi-modal mobility and encourage inter-regional connections.
- 1.5 Support the development and implementation of neighbourhood and City wide strategies that will improve the health and well-being of residents.
- 1.6 Enhance Overall Sustainability (financial, economic, social and environmental).

**Strategic Priority #2**

Valued & Sustainable Services

*WE deliver high quality services that meet citizen needs and expectations, in a cost effective and responsible manner.*

**Strategic Objective**

- 2.1 Implement processes to improve services, leverage technology and validate cost effectiveness and efficiencies across the Corporation.

**APPENDICES / SCHEDULES**

Appendix "A"      Public Bike Share Transit Business Plan

# **Business Plan for Hamilton Bike Share Transit System**

Drafted in Partnership with:  
City of Hamilton and Green Venture

Peter Topalovic – Final Version, January 2013  
Matthew Sweet – Final Integrated Version, September 2012  
Matthew Sweet – Version 2.1, July 2012 - Updated with Station Location Analysis  
Peter Topalovic – Version 2.0, May 2012 – Updated data based on Bixi Toronto  
Pete Wobschall – Finalized Version, January 2012  
Dean Anderson – Version 1.1, Dec 30, 2011  
Dean Anderson – Version 1.0, Sept 22, 2011



## **EXECUTIVE SUMMARY**

City of Hamilton staff, community partners and interested stakeholders have been evaluating the implementation of a bike share transit program to feed the A-Line and B-Line transit corridors, encourage the use of sustainable modes of transportation, decrease residents' dependence on single-occupancy vehicles, increase physical activity in daily commuting amongst households and foster a culture of cycling in the City. The city conducted a feasibility study and coordinated an information session and bike share expo in August 2010 to identify and assess a variety of bike share program models, and to determine best suited models for Hamilton.

It was determined that the best suited model for a bike share program in Hamilton is a "4th Generation Model". This model includes a number of bikes housed at strategically placed stations, which are fully integrated with other transportation modes such as rapid transit, car share and conventional transit. Planning has begun for a 35 station 300 bicycle system for the City of Hamilton which will focus on providing a new and convenient method of accessing higher order transit modes along the B-Line and A-Line corridors, including GO Transit nodes. Bike sharing systems work best under a specific set of conditions and are typically used by a specific target demographic. By isolating those areas of the city where population demographics best match those that are identified as supporting bike share programs in other cities, and by identifying neighbourhoods within those areas in which opportunities to expand transit services exists, a set of 35 recommended station locations emerges.

Bike Sharing is quickly emerging as a desirable mode of travel that integrates seamlessly with transit and eliminates barriers to using transit such as the first and last mile of the commute. It offers a fast and convenient way to get to one's desired bus stop or station. Most major urban centres in North America, Europe and Asia have set up systems including Toronto, Montreal and New York City. However, in recent years a number of medium-sized urban centres such as Ottawa, Minneapolis, Chattanooga and Madison, Wisconsin, have set up moderately sized systems with much success.

City of Hamilton Transportation division staff, wishing to build on the success of other medium sized urban centres, approached Green Venture, Hamilton CarShare, City of Toronto staff who

manage the Toronto Bixi project, Mohawk College students and McMaster University students to develop a business plan which outlines the procurement, start-up, and operation a bike share program in Hamilton.

The anticipated target area is located within Hamilton's downtown to west end. This area boasts a total population of over 53,000 residents, with an additional 30,000 staff and students at McMaster University<sup>1</sup> and 21,000 staff and students at Mohawk College. It includes many commercial businesses and also attracts visitors and tourists. The Mohawk College Fennel Avenue Campus and McMaster University West Hamilton campus have a total student population of nearly 30,000 students.

This plan proposes that 300 bikes and 35 stations are purchased. The main factor affecting profitability of the bike share is the number of people who purchase subscriptions. In its initial stages, the program must build reserves that will be needed in future years for bicycle and equipment replacement due to age and potential expansion. This report will illustrate the sensitivity of the business case to the number of subscriptions sold and will propose a series of measures to guarantee revenues.

This business plan identifies the financial case for the City of Hamilton, and provides the necessary information for city officials to make an informed decision regarding the risk of committing funds to support this endeavour.

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<sup>1</sup> Census data used to determine populations does not include McMaster students that rent their properties.

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# **BACKGROUND, SITUATIONAL ANALYSIS AND SERVICES**

## **What is a bike share system?**

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A public bike share system consists of a number of shared bicycles that can be picked up and dropped off at various stations in a city. The bicycles are available for everyone to use on a short-term basis (usually 30 minutes or less) for a small fee. It is typically owned by the municipality, and operated by the municipal government or by a private company (either for-profit or non-profit) on behalf of the municipal government. Participation is open to the public through paid membership. Memberships, whose term can vary from daily to yearly, must be purchased before using the bicycles. People have many reasons for using public bicycles, ranging from commuting and shopping to recreation and tourism. Other cities with bike share systems have noted a marked increase in bicycle use (both public and private bikes) after a bike share system is introduced. This is due to the high visibility of the shared bikes leading to an increase in the bike culture in the city, which in turn is good for the health of the community.

The organization running the bike share system would be responsible for all aspects of the operation. This would include having employees to oversee the business, as well as technicians to maintain and repair the bikes. Bicycles often need to be re-distributed among the stations with a truck and trailer to account for migration of bicycles from some stations to others at certain times of the day. Some bike share organizations remove the bikes from the streets and put them into storage during the winter, while others leave them out all year round, which is what is proposed for the Hamilton area, as winters are mild.

## **Industry Overview**

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### **Comparison of other Bike Shares around the world**

In 2008, there were just over 200 bike share systems around the world. As of 2010, there were more than 350 bike share systems operating worldwide.<sup>2</sup> Paris, Lyon, Barcelona, Brussels, London, Minneapolis, Miami Beach, Washington DC, New York City and Melbourne, Australia

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<sup>2</sup> Ref: Peter Midgley, Bicycle-Sharing Schemes: Enhancing Sustainable Mobility In Urban Areas, United Nations Department Of Economic And Social Affairs, Commission on Sustainable Development, Nineteenth Session, New York, 2-13 May 2011

all have notable (and large) bike share systems. Within Canada, there are currently 3 bike share systems: Montreal (established in 2009 with 5000 BIXI bikes), Toronto (established in 2011 with 1000 BIXI bikes), and Ottawa (established in 2011 with 100 BIXI bikes).

As of 2004, no publicly-owned and operated smart bike sharing program anywhere in the world turned a profit in terms of revenues exceeding annual operating costs<sup>3</sup>; however, by 2012, with additional federal funding in the United States and the covering of capital costs in most new systems, including the system in Ottawa, most new systems break even. The issue with systems in 2004 were that most had to use operating costs to repay loans and interests. When capital costs are covered through grants and other programs, the loan interest payments can be avoided. This explains why more recently, London (UK), Miami Beach, and Minneapolis have all had first year revenues that exceeded their first year operating costs. This does not account for capital costs or costs associated with the planning and installation of the system.<sup>4</sup> Capital and start-up costs are above and beyond the annual operating costs, and present a significant barrier to implementation.

The city of Lyon, France, was considered less than friendly to bicycles in the past. Since the launch of the public bike sharing program there in 2005, bicycle trips are up 500%, a quarter of which are taken on the shared bikes. The bike sharing system is credited with raising the profile of cycling in the city, which has led to a snowball effect and dramatic increases in bicycle use.<sup>5</sup>

Let us consider the best attributes of the successful European and North American systems and adapt them to suit Hamilton's climate and demographics. The key elements of the most successful bike share systems include the following:

- **A robust bike:** Shared bikes are made for use on urban streets by all kinds of people. Bicycles must be sturdy, easy to ride and stop, and have lights and cargo carriers.
- **Easy access:** The system must be fast and easy to use for both annual subscribers and casual users such as tourists.
- **Online registration:** Subscribers sign up online. Memberships could be linked to bike shares in other cities.

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<sup>3</sup> Ref: DeMaio, Paul, and Gifford, Jonathan, *Will Smart Bikes Succeed as Public Transportation in the United States*, Journal of Public Transportation, Vol. 7, No. 2, (2004) p. 8

<sup>4</sup> Ref: <http://www.straight.com/article-398920/vancouver/grab-helmet-time-public-bike-share>

<sup>5</sup> Ref: Bike Sharing Guide – Transport Canada, 2009

- **Availability where/when needed:** A blanket of self-serve bike stations throughout the area allow people to conveniently take and return bikes where they live, work, eat, shop, go to school and access public transit. Maps at stations and online show availability at all times. Crews will maintain and re-distribute bicycles to where they are needed.
- **Modular and self-contained bicycle stations:** Solar powered, easily re-located stations are preferable to allow future flexibility and easy removal in winter months if desired.
- **Usage fees designed to encourage rapid turnover:** Fees escalate with time to ensure bikes are returned to service quickly and encourage usage for short-term trips.

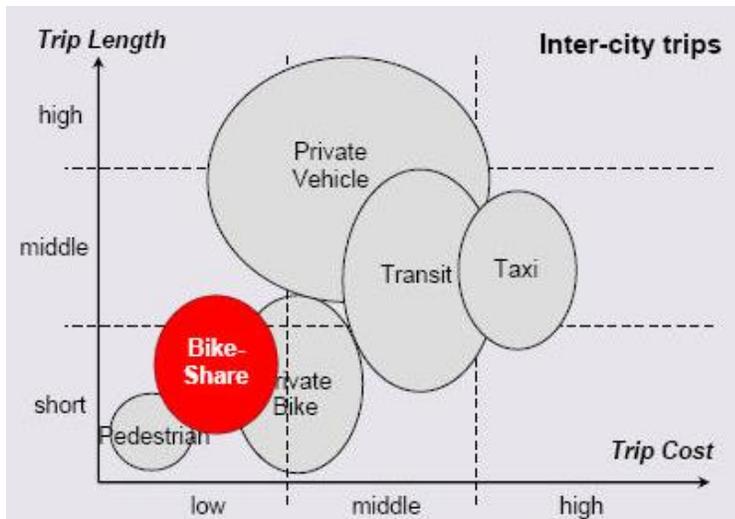
## Situational Analysis

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There are a number of trends that could affect the desire of people to participate in a bike share system. These include: rising energy costs, convenience, reduction of first and last mile commuting barriers to transit use, resource costs, increasing traffic congestion and resulting pollution, increasing environmental awareness, climate change, and physical activity/health consciousness.

Energy costs have risen steadily for many years in Canada, and are projected to rise more rapidly in the future. Energy costs are projected to rise much faster than the rate of inflation. From August 2010 to August 2011, gasoline prices rose over 30%. With increasing environmental awareness, people are becoming more aware of traffic congestion and the resulting pollution, along with the ill effects this has on overall health and climate change. These impacts are all motivating people to find alternate modes of transportation to the automobile.

Although travel distance by mode varies from country to country and city to city, most people are willing to walk up to 10 minutes. Cycling distances generally fall within the 1km to 5km range. Bike sharing can therefore fill an important niche in the urban transportation system in terms of trip length and costs as shown in Figure 1: Trip Cost vs. Length. This is especially true for trips that improve access to transit that are just over the walkable range to a transit stop. A bike share system can overcome barriers to transit use by reducing commute times from a residence to a transit stop or station, making transit a more appealing mode of transportation.



**Figure 1 - Trip Cost vs. Length**

### Market Study

Before implementing a bike share program, market research must be done to determine whether there is sufficient demand. A survey of residents and tourists, conducted by telephone, via the internet, talking to people in the field, or a combination thereof, would provide invaluable data to measure the level of support for a bike share system, and to quantify the potential users' willingness to pay for this type of service. A market study investigates the following:

- number of short trips and the mode of transportation used
- awareness of the public bicycle concept
- interest in using public bicycles, if they were available
- amount people are willing to pay to use public bicycles, if they were available
- support for dedicating existing road and parking space for public bicycles
- support for necessary methods (including public funding and advertising) to help fund public bicycles.

A survey with these types of questions was conducted in the Greater Vancouver area in 2008.<sup>6</sup> This questionnaire and results could be used as a starting point to develop a similar survey in Hamilton.

The City of Hamilton conducted an online survey of public opinion relating to a possible bike share in Hamilton in 2010. The results can be found in *Bike Share Feasibility Report, Dec 20,*

<sup>6</sup> Ref: Translink (2008). *Public Bicycle System Market Research January 17- 23, 2008*. Public document ([http://www.11bc.leg.bc.ca/public/PubDocs/bcdocs/435700/Public\\_Bicycle\\_System\\_Report\\_Feb08.pdf](http://www.11bc.leg.bc.ca/public/PubDocs/bcdocs/435700/Public_Bicycle_System_Report_Feb08.pdf)).

2010 by J. Bauman et al. The authors state that the results of the online survey are not statistically significant due to certain biases in the sample who responded to the online survey. The online survey was promoted by email, Listserves, websites and Facebook. The sample reached through these promotions, who actually took the time to complete the survey, come from a demographic that is more likely to use a bike share than the general population. Another survey was conducted in the fall of 2011 in the projected operating area. While small, this data, combined with previous data collected, indicates preliminary interest in bike sharing.

There is enough demographic data to support the operation of a public bike share system in Hamilton; however, there is an opportunity to augment the data collected with additional data gathered by a third party, if more research is requested. Unfortunately, due to the relatively new concept of bike sharing, it is difficult to get a valid set of un-biased data through market analysis, and results may not be conclusive. Municipal representatives in Toronto and Montreal caution that since bike sharing is not a well understood concept, a phone survey of the general public may not yield significant results. A strategy used in Toronto was to hold a bike share system membership drive to gauge support for the system before moving forward with implementation.<sup>7</sup> It was decided that using StatsCan and TTS (Transportation Tomorrow Survey) data would be sufficient in predicting usage. This usage is predictable provided that a minimum of 35 stations and 300 bikes are used, according to Toronto and Montreal representatives.

Beyond determining the overall feasibility of a bike share system in Hamilton, the “willingness to pay” data from the market survey will help determine the nature of the business model that could be used if the system were implemented. The data on general interest and willingness to pay will also help determine the service area and quantify the target audience for the system.

## **Barriers to Entry**

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As with most business endeavours, providing bike share services has barriers to entry. However, steps can be taken to mitigate or minimize the impacts of these barriers.

### **Barriers to Providing Bike Share Services**

- Competition
- Increased liability risk to the organization

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<sup>7</sup> Ref: City of Toronto (2010). Proposed Public Bicycle Program (PW32.7). Public document (<http://www.toronto.ca/legdocs/mmis/2010/pw/bgrd/backgroundfile-28853.pdf>).

- Cash flow
- Securing initial capital costs and ongoing sponsorships
- Community and political support
- Perception of safety

## **Competition**

A bike share program in Hamilton will not face any competition at present. There are currently no bike share programs in Hamilton and it is currently not easy to rent a bike in the City, although some bike shops do rent a small fleet of bikes. In other cities, bike share programs have led to increases in bicycle usage overall<sup>8</sup>, which will be a benefit to the local bike shops. Studies have shown shared bikes may run parallel to transit routes, but they have not been shown to reduce the level of people who purchase transit passes or use transit<sup>9</sup>. In Toronto and Montreal and other North American systems, the percentage of bike share usage in the target area mimics the percentage of transit ridership city wide.

## **Increased Risk to Organization**

Getting involved with any new venture presents additional inherent risks to the organization operating the bike share. These risks include: customer interactions, new health and safety considerations (accidents, collisions, etc.) to name a few. Insurance will likely be the biggest concern and is projected to cost somewhere on the order of \$30,000 to \$50,000 per year.

## **Cash Flow**

Memberships are paid up-front, providing some cash flow. It would be expected that this would be more heavily weighted to the spring months when people are more likely to purchase their yearly memberships. Weekly and one-day memberships will be used by tourists and casual users which will provide further cash flow throughout the cycling season. Advertising on bikes and bike stations will also provide a monthly cash flow during the bike season. There will likely be very little cash flow during the off-season.

Another method to raise funds annually is to enter into bulk yearly pass purchases with institutional partners and corporate partners including McMaster University and Mohawk College. These institutions currently have bulk transit pass programs and could easily support

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<sup>8</sup> Midgley, P, Bicycle-Sharing Schemes: Enhancing Sustainable Mobility in Urban Areas, United Nations Department of Economic and Social Affairs, May 2011.

incremental increases in fees in the respective student unions as these institutions saw value in a bike transit system for students.

### **Securing initial capital costs and ongoing sponsorships**

Public funding would be required in order to pay all of the upfront capital costs incurred to start the bike share program. Incurring debt to pay the capital costs is not acceptable as other bike share systems have shown that the income stream is not sufficient to service such a large debt.

Taking into account all of the sources of income, the projected bike share program in Hamilton will almost certainly run at a deficit for the first few years and could have a small surplus in the later years if residents use the system at rates projected in other cities with bike shares. See the Operating Budgets section for more detailed information on a projected 12 year cash flow.

## **Description of Services**

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It is recommended that the preferred model for the Hamilton community is a 4<sup>th</sup> Generation Bike Share system. This decision was based on several key considerations.

- 4<sup>th</sup> generation systems, such as BIXI, have proven successful in several different cities around the world, providing nearly instant returns and operational surpluses
- 4<sup>th</sup> generation systems minimize the risks of theft and vandalism which are prevalent in previous generations, by including GPS monitoring of all bicycles and requiring credit card access to the system
- Public Bike System Company, B-Cycle and other companies are prepared, as part of the cost of purchasing and installing a system, to work with the City of Hamilton in identifying the best layout of stations, and provide training or services for full operation of the system.
- 4<sup>th</sup> generation systems represent the most modern, sleek and “sexy” type of bike share available and has the best chance of being successful amongst the general public in Hamilton<sup>10</sup>
- A modern bike share system with fixed stations located at transit stops can help feed the transit system and make it quicker and more convenient to access rapid transit stations.

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<sup>9</sup> FourSquare Integrated Transportation Planning, Arlington County TDP: Capital Bikeshare – Service and System Evaluation, 2012

<sup>10</sup> Ref: J. Bauman et al, Bike Share Feasibility Report, Dec 20, 2010.

## Fully Automated

A 4<sup>th</sup> generation bike share system is fully automated. The user must already have a membership or purchase a day use pass at a bike share station using a credit card. When a membership is purchased, a damage deposit is put on the credit card. When a bike is checked out, the bicycle is tracked to the user so that any damages can be assessed to the last user of the bike.

## Easy to Use

Shared bicycles are designed to be easy to use, adaptable to users of different sizes, mechanically reliable, resistant to theft or vandalism and distinctive in appearance.

## Well Designed and Sturdy

Bike sharing systems use sturdy bikes that are designed to be used between 10 and 15 times a day in all weather conditions. They typically have the following features:

- A) a handlebar mounted bag rack or a basket
- B) an adjustable seat
- C) a sturdy frame with no top tube
- D) wide, air filled tires
- E) gears and brakes enclosed within the wheel hubs
- F) front and rear lights powered by a generator in the front hub
- G) an enclosed chain
- H) mudguards and reflective strips on the wheels

They are typically equipped with a bell, kickstand, portable lock and some type of tracking mechanism.<sup>11</sup>



## Discourage Theft

To discourage theft, bicycles typically have a single standardised design and a distinctive look in order to distinguish them from all other bicycles. In addition, to make them unattractive to

<sup>11</sup> Ref: Bike Sharing Guide – Transport Canada, 2009

potential thieves, they are made using non-standard components – wheels, tires, seat post, screws, bolts, and so on. As a result, the components are not interchangeable with regular, commercial bicycle parts. The drawback of using custom components is that they are likely to be more expensive than standard components, meaning that the initial cost of the bicycles and ongoing maintenance costs are higher.

### **Easily Integrated**

Most bike share systems use fixed stations, which are permanently fastened to the ground and hard-wired into the local electrical and phone systems. Montreal, Toronto and Ottawa BIXI systems have introduced portable modular stations. Service terminals and the bicycle stands are mounted onto sets of rectangular platforms to form two types of modules: main modules having a service terminal and three bicycle docks and secondary modules having only bicycle docks. Each station requires one main module while the number of secondary modules can vary, depending on the required number of bicycle docks at the given location. As the stations are solar powered and wirelessly

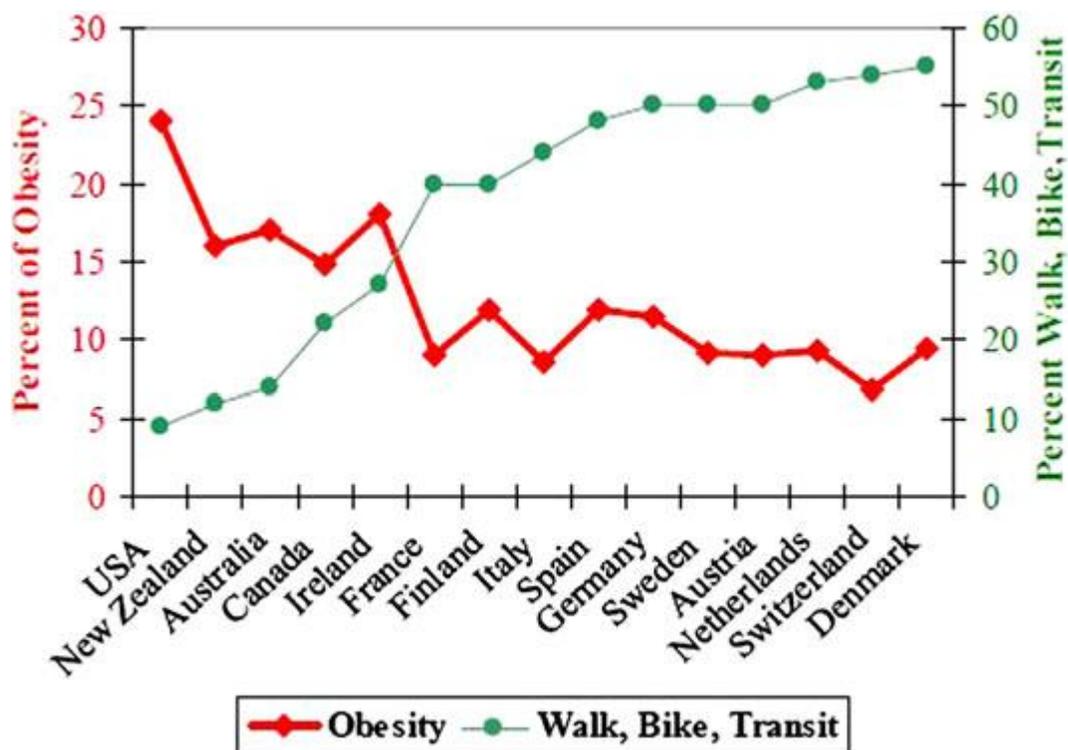


networked, they are completely self-contained and no wiring is required for installation. As a result, station installation consists merely of placing the modules in the desired location; there is no need for anchoring them to the ground. It is therefore time-, labour-, and cost-efficient. BIXI docking stations can be erected or disassembled in 20 minutes and they can be moved easily to respond to demand or to provide “mega” docking stations for special events.

The easy installation and removal of stations offers a number of advantages: the distribution of stations can be adapted on-the-fly to match actual demand, allowing the system to be rapidly optimized at little cost; stations can be placed at temporary locations for special events, such as festivals; and stations can be removed for the winter. However, this is only necessary in areas where snowfall is very heavy. Even in Montreal, a pilot to have stations remain active in winter months is underway.

## A Healthier Community

The implementation of a bike share system will ultimately decrease the community's reliance on automobile use, as it presents them with an alternative transportation option. A decreased reliance on automobile transportation, which can be seen as an increase in active transportation, has been linked to several environmental and health benefits. These benefits being lower levels of harmful emissions due to a decline in automotive use, an increase in physical and cognitive capabilities through the encouragement of exercise, and a greater sense of social cohesion throughout the community. Through the combination of these benefits, health care costs can be expected to decrease as well. Consequently, the residents of the City of Hamilton in areas served by the bike share transit system could improve their health and quality of life. Figure 2 shows data from major cities in North American and European countries and demonstrates the correlation between sustainable mode split such as increased cycling and obesity. While there are many factors that influence obesity rates, it is interesting to note that many of the cities in the countries that have the lowest obesity rates are more cycling friendly and have some type of bike share transit system.<sup>12</sup>



**Figure 2** - Percent of Obesity compared to Percent of walking, cycling and transit

<sup>12</sup> Topalovic, P., Carter, J., Topalovic, M., Krantzberg, G. (2012). Light Rail Transit in Hamilton: Health, Environmental and Economic Impact Analysis. *Social Indicators Research*, 108(2), p.329-350.

## **Aligned with Provincial Public Transportation Vision**

If the BIXI system is chosen, it may be an option to work with BIXI to allow Montreal and Toronto users to use the bicycles in Hamilton, and vice versa. An arrangement would need to be made as to how revenue sharing would be managed (e.g. a direct trade-off with an equal number of members sharing each way, so that no revenue sharing would be needed). This would need to be investigated further if this type of arrangement were to be put in place. This would also provide increased access to GO stations and regional transit, helping to meet the vision of Metrolinx's Big Move, specifically Big Move 2: Enhance and Expand Active Transportation and Big Move 4: Create an Ambitious Transportation Demand Management Program.<sup>13</sup>

## **Station and Bike Placement**

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The placement of bike stations reflects a balancing between program visibility, aesthetics and traffic and pedestrian flow. In order for the program to be successful, bike stations must be easy to find and located in places that users want to go. At the same time, narrow or very busy sidewalks may mean that there is limited room for bike stations.

Paris' general implementation rules include: placement of bike stations near transit stops and sticking to the average bike station density guidelines tested in the Lyon bike share of about 28 stations/square mile. This density, also referenced as one bike station every 300 meters or one bike station every 4-5 blocks, is the density needed to ensure that users can find a bicycle when they need one and return it easily when they are done.<sup>14</sup>

Bike station sizes would vary depending on the expected volume of traffic and proximity to other bike stations. Important factors include: population density, worker density, proximity to cultural or recreational attractions, and proximity to retail shopping opportunities. Importantly, bike share programs need to have more docking stations than bicycles (typically 40-50% more) to ensure that users can always find a place to leave their bicycle.

In general, 10 bicycles, parked at a bike station, can fit into one car parking space. Proposed general guidelines for the placement of bike stations are as follows. Bike stations should be placed:

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<sup>13</sup> Ref: Metrolinx (2008), "The Big Move" ([http://www.metrolinx.com/thebigmove/Docs/big\\_move/TheBigMove\\_020109.pdf](http://www.metrolinx.com/thebigmove/Docs/big_move/TheBigMove_020109.pdf))

<sup>14</sup> Ref: Atelier Parisien d'Urbanisme (APUR), "Etude de Localisation des Stations de Velos en Libre Service," December 2006; p. 48

- In areas of high population and employment density
- Close to educational institutions
- On wide sidewalks or in the roadbed. Bike stations should not impede pedestrian or vehicular traffic.
- With enough frequency to ensure program visibility and use
- Along existing or proposed bike lanes whenever possible
- Near train/transit stations, major bus stops, car share locations
- Near major cultural and tourist attractions
- Adjacent to major public spaces and parks.

An analysis of potential bike share station locations in Hamilton has been completed. Refer to the section of this document entitled “Station Location Analysis” for a more detailed look at determining the best locations for bike share stations.

### **Sidewalk Bike stations**

Bike stations placed on the sidewalk should be placed in line with other forms of street furniture and trees. Where possible, limit the intrusion of the bike stations into pedestrian pathways. Wide sidewalks and wide roadway medians could provide options for small bike stations. Bike stations could also be placed along the frontage of municipal parking lots and city property, and on private property (for example on college or university campuses) in partnership with landowners. As with Paris, underutilized space under viaducts and elevated railroads and roadways could also be used for bike stations.

### **Roadbed Bike stations**

Roadbed bike stations should be placed primarily on side roads, just off major roads to provide additional protection for riders and the bicycles themselves. Advertising panels on the bike stations could serve a double purpose, protecting on street bike stations from damage from cars while also drawing attention to the bike share program. Roadbed bike stations should be placed near to bike lanes and could potentially be placed in parking spaces adjacent to fire hydrants and serve a dual purpose of deterring parking in front of the hydrant.

Roadbed bike stations are beneficial because they do not impact pedestrian or vehicular traffic flows, and do not require costly modifications to existing storm drains and sewers. Roadbed bike stations would take the place of parking spaces, although the reduction in parking would be

minimal as it would be spread over a large area.

### **Bike stations in Existing Public Spaces**

Bike stations should be placed directly adjacent to major public spaces, such as Gore Park, the Farmers Market, City Hall and perhaps Pier 8 and Bayfront Park. It is best to place them in areas where late night foot traffic is higher and be sure they have 24 hour access. Bike stations should be a priority in or alongside parks and plazas near transit.



**Figure 3** - Examples of bike stations located on sidewalks, roadways and in public spaces <sup>15</sup>

<sup>15</sup> Ref: Bike Share Planning in Seattle and King County, Council Briefing, June 28, 2011

## **STATION LOCATION ANALYSIS**

Bike sharing has become a popular method to fill gaps in urban transportation networks. It has the potential to supplement existing public transportation networks. Short distance trips, representing either standalone or final connection trips that would otherwise be taken on transit, can be shifted to bike share. The result is a relatively low cost, quickly implemented alternative transportation system that promotes active lifestyles and environmental stewardship.<sup>16</sup>

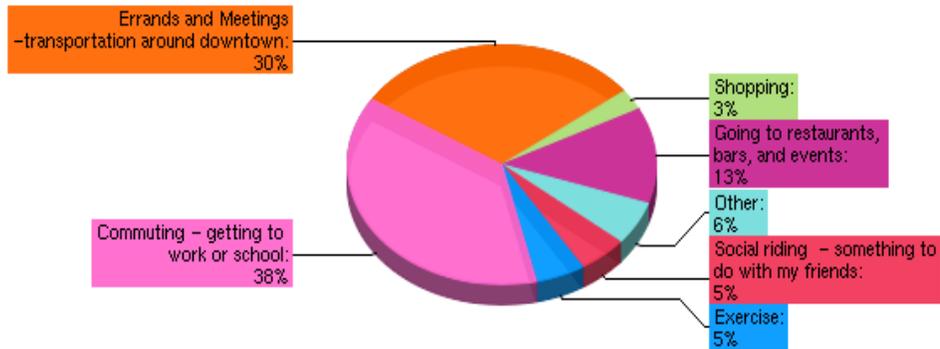
User surveys in Montreal show that the primary users of the Bixi system are young, educated professionals. Mean age of respondents was 35.9; median age was 33. 85% of respondents have a post-secondary education.

Several cities have conducted surveys of their bike share users to determine the primary users and uses of their system. Nice Ride in Minneapolis, MN contacted all of its annual membership holders after its first year of operation. The key findings of those user surveys are found below.

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<sup>16</sup> Midgley, 2011

### Most of the trips I take fall into this category:



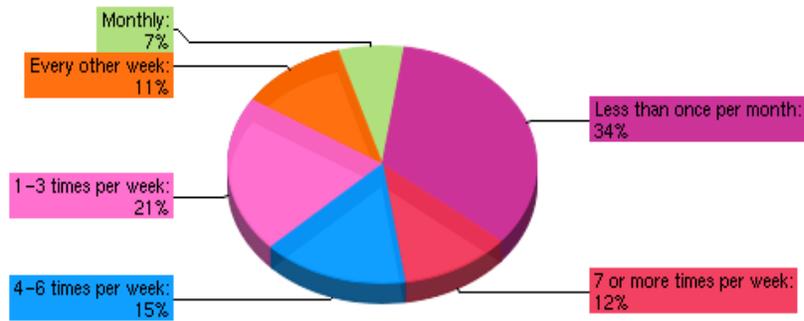
### What is your primary use of Nice Ride?



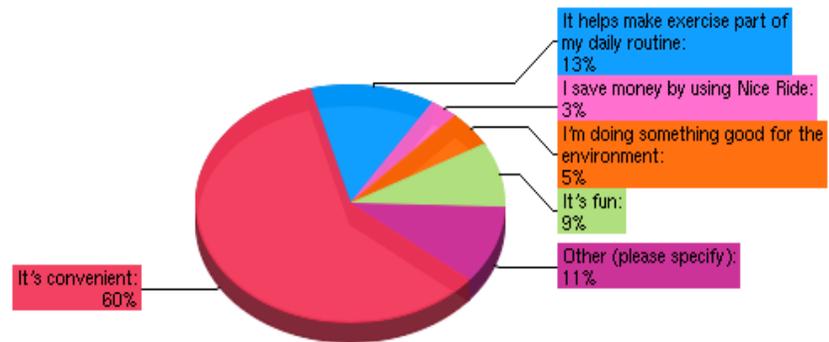
**Figure 4 - Nice Ride Survey Results - Uses**

Regular users of the Nice Ride system used the bicycles for a specific transportation purpose rather than for recreation. Work related trips account for over two-thirds of all trips.

**Before using Nice Ride, how often did you ride a bike?**



**What do you like most about Nice Ride?**



**Figure 5 - Nice Ride Survey Results - Frequency and Preference**

Nice Ride users are evenly split between regular cyclists and those who rarely rode before using the system. The clear benefit that drives users to the system is convenience.<sup>17</sup>

Bike share is proven to impact the travel patterns of users. Residents of Washington, D.C, home of Capital Bikeshare, report that bike share has changed their daily travel behaviour (45%) and led them to utilize transit more frequently (25%). Users of Capital Bikeshare report that the availability of the bike share system is a factor in their decision to drive less frequently (37%). Thus far, other cities have seen reasonable mode shift from vehicles after implementing a bike share system.

<sup>17</sup> Dossett, B, Nice Ride User Survey, Nice Ride Minnesota St. Paul, 2011.

Type of Trip Replaced	Bicing Barcelona	BIXI Montreal	Vélib' Paris	Vélo'v Lyon
<b>Bus or Metro</b>	<b>51%</b>	<b>33%</b>	<b>65%</b>	<b>50%</b>
<b>Car or motorcycle</b>	<b>10%</b>	<b>2%</b>	<b>8%</b>	<b>7%</b>
<b>Taxi</b>		<b>8%</b>	<b>5%</b>	
<b>Walk</b>	<b>26%</b>	<b>25%</b>	<b>20%</b>	<b>37%</b>
<b>Bicycle</b>	<b>6%</b>	<b>28%</b>		<b>4%</b>
<b>New Trip</b>		<b>4%</b>		<b>2%</b>

**Table 1 – Trip Type Replaced by Bike Share**<sup>18</sup>

Several cities are beginning to pursue bike share with a focus on extending, complimenting or enhancing their public transportation services. Nice Ride in Minnesota reports a 10% increase in transit ridership since the introduction of the bike share system. Capital Bikeshare in Washington, D.C's most frequently used trip avoids a circuitous transit route to more directly connect users to major points in the rapid transit network. In Barcelona, 37% of users of the Bicing system combine their bike share trip with another mode of transportation. This provides more evidence that bike share can be used effectively as an extension of existing public transportation systems. While the data in figure 6 shows a replacement of trips, it must be noted that this does not reflect trip chaining, where one part of the trip was replaced by a bike share trip, but the other leg of the trip still involves transit or other sustainable mode.

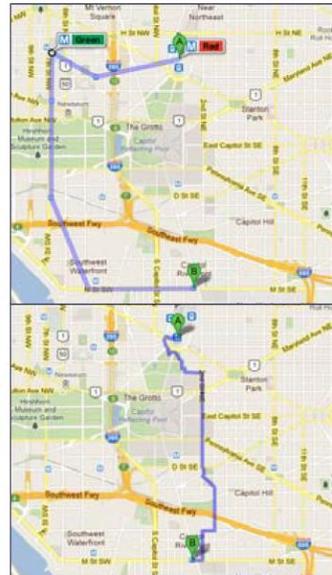
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<sup>18</sup> Midgley, 2011

# Avoiding Deviations

- Washington DC's Union Station
  - Most common 2011 origin/ destination for bikeshare trips to/from USDOT bikeshare station\*
  - For commuter rail/ Amtrak riders, avoids two transfers to/on Metrorail
  - Avoids \$2.15 in subway fare each way\*\*
  - Peak period six minute predicted time savings each way\*\*\*

\*Capital Bikeshare 2011 data presented at JDLand.com  
 \*\*Peak-of-the-peak non-discounted fare only, does not account for CaBi membership costs  
 \*\*\*Google Maps predicted travel time difference between modes at peak time period



**ETA** RESEARCH *Why? How? Future?*

**Figure 6 - Capital Bikeshare Most Common O/D Trip<sup>19</sup>**

Many cities are also exploring the concept of “co-locating” bike share stations with major higher order transit stops in order to provide greater options to their users. Some systems have begun to explore the possibility of “co-branding” their transit services and their bike share systems (Buck, 2012).



*All pictures courtesy of aodcao.com*

**Figure 7 - Capital Bikeshare Co-branding**

## Rationale for Data Collected

The following sets of data were collected based on the best practices and experience of other bike share systems worldwide. This data attempts to identify the areas of Hamilton in which people, who are most likely to use a bike share might live, work and play. Key identifiers include:

- population density

- household income level
- household age
- household education level
- short distance trip-making
- already using active modes of transportation
- proximity to key trip generators / attractors

In order to determine the areas of Hamilton best able to support a bike share system, data has been collected from the 2006 Census of Canada and the 2006 Transportation Tomorrow Survey. Further data collected to narrow down more specific locations will include the results of a bike use survey in the downtown core in strategic areas identified as anchors. Proximity to existing cycling infrastructure such as bike lanes and multi-use paths will also be considered as an important incentive to use the bike share system.

## **Identifying Suitable Wards for Bike Share**

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Most bike share systems worldwide focus service on the downtown core of their respective cities. This is due to the higher density of both population and jobs generally found in downtowns as well as the higher probability of short trips using active modes of transportation. Looking at the data from the 2006 Census of Canada and 2006 Transportation Tomorrow Survey, an area that includes Wards 1, 2, 7 and 8 emerge as the most likely to support a bike share. Ward 1 includes Westdale / Ainslee Wood neighbourhoods and McMaster University. Ward 2 includes the downtown, Kirkendall and Strathcona neighbourhoods. Ward 7 includes Concession Street and surrounding neighbourhoods. Ward 8 includes Mohawk College, St Joseph's mountain campus and surrounding neighbourhoods.

### **Population Density**

Ward 2 has overall the highest population density in the City of Hamilton. Ward 1 has lower density but the presence of McMaster University skews the data. The jobs present at this institution and student population in excess of 30,000 makes up for the difference in density.

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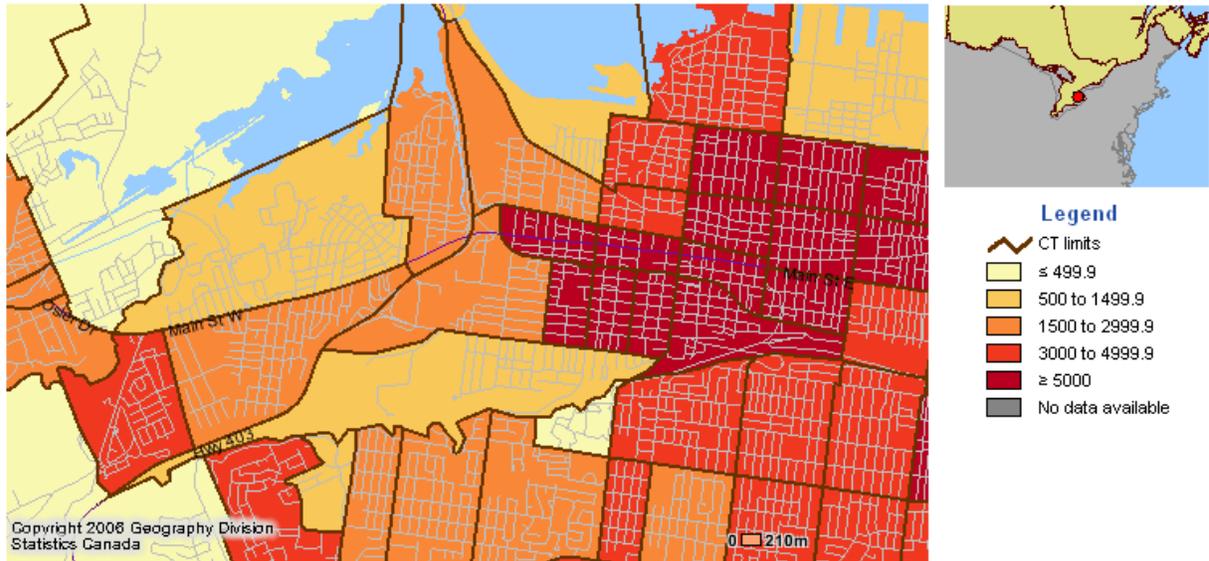
<sup>19</sup> Buck, D, Transit with Bikesharing: Overview of Practice and Potential, US Department of Transportation, 2012.  
[http://www.bareiss.net/bikewelondon/webinar\\_darrenbuck\\_usdot.pdf](http://www.bareiss.net/bikewelondon/webinar_darrenbuck_usdot.pdf)



Statistics Canada / Statistique Canada

### Population density persons per square kilometre, 2006

Locator map



**Figure 8 – Population Density**

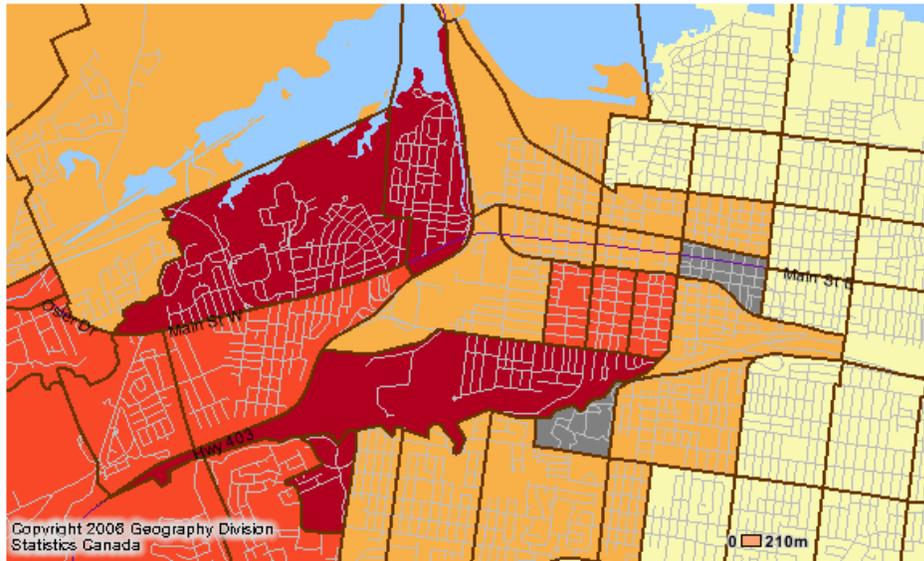
### **Educational Attainment**

Ward 1 has a higher proportion of post-secondary educated residents than the average in Hamilton. Ward 2 is lower but still slightly above average compared to the surrounding wards. Overall the City of Hamilton has a lower proportion of residents with post-secondary education than many other cities.



Statistics Canada / Statistique Canada

### Educational Attainment - % University Certificate, Diploma or Degree



### Locator map



### Legend

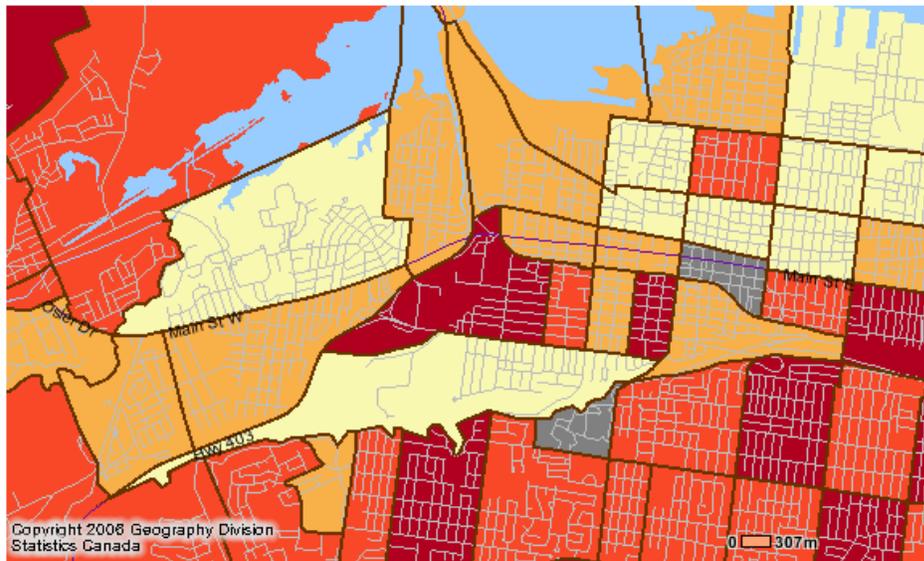
- CT limits
- ≤ 18
- 19 to 33
- 34 to 51
- ≥ 52
- No data available

Figure 9 – University Level Educational Attainment

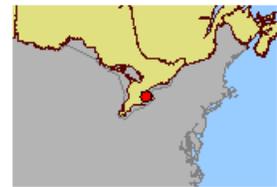


Statistics Canada / Statistique Canada

### Educational Attainment - % College, CEGEP or Other Non-university Certificate or Diploma



### Locator map



### Legend

- CT limits
- ≤ 16
- 17 to 21
- 22 to 26
- ≥ 27
- No data available

Figure 10 – Non-University Post-Secondary Educational Attainment

## Existing Travel Patterns

A good proportion of residents in Wards 1 and 2 have a daily commute less than 5 kilometres in length. This distance of commute is ideal for active modes including cycling.



Median Commuting Distance by Place of Residence

Locator map

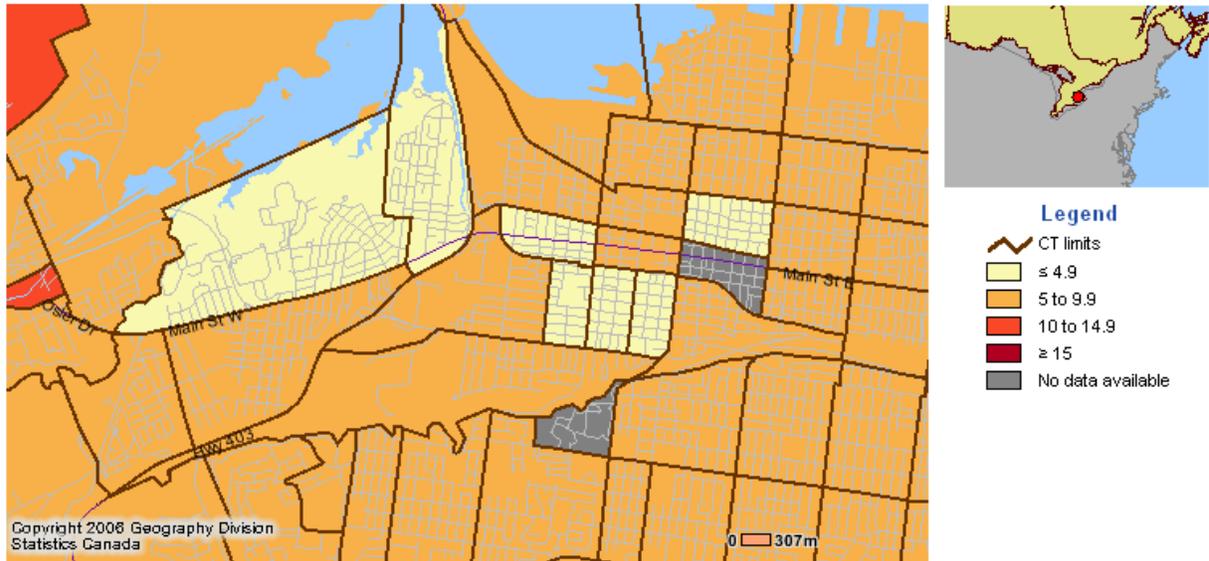


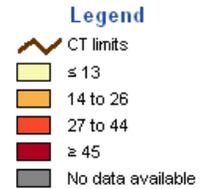
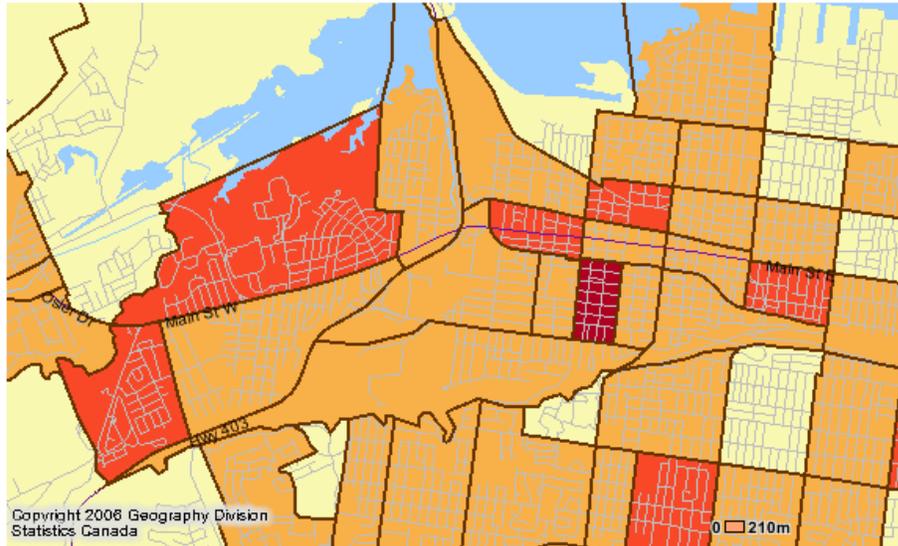
Figure 11 – Commute Distance

TTS data on active transportation modes shows that these wards have the highest proportion of internal trips among all in the city (same origin ward as destination ward).

Ward	Internal Walking Trips	Internal Cycling Trips	Internal Transit Trips
1	8353	1575	3763
2	5920	217	2614
7	6163	201	2182
8	5012	149	1450
Next Highest	4855 (Ward 4)	197 (Ward 3) *	1109 (Ward 6)

\*Ward 12 shows a high number of internal cycling trips in the TTS dataset (363); this finding is not supported by other data

Table 2 – TTS Data on Trips using Active Modes



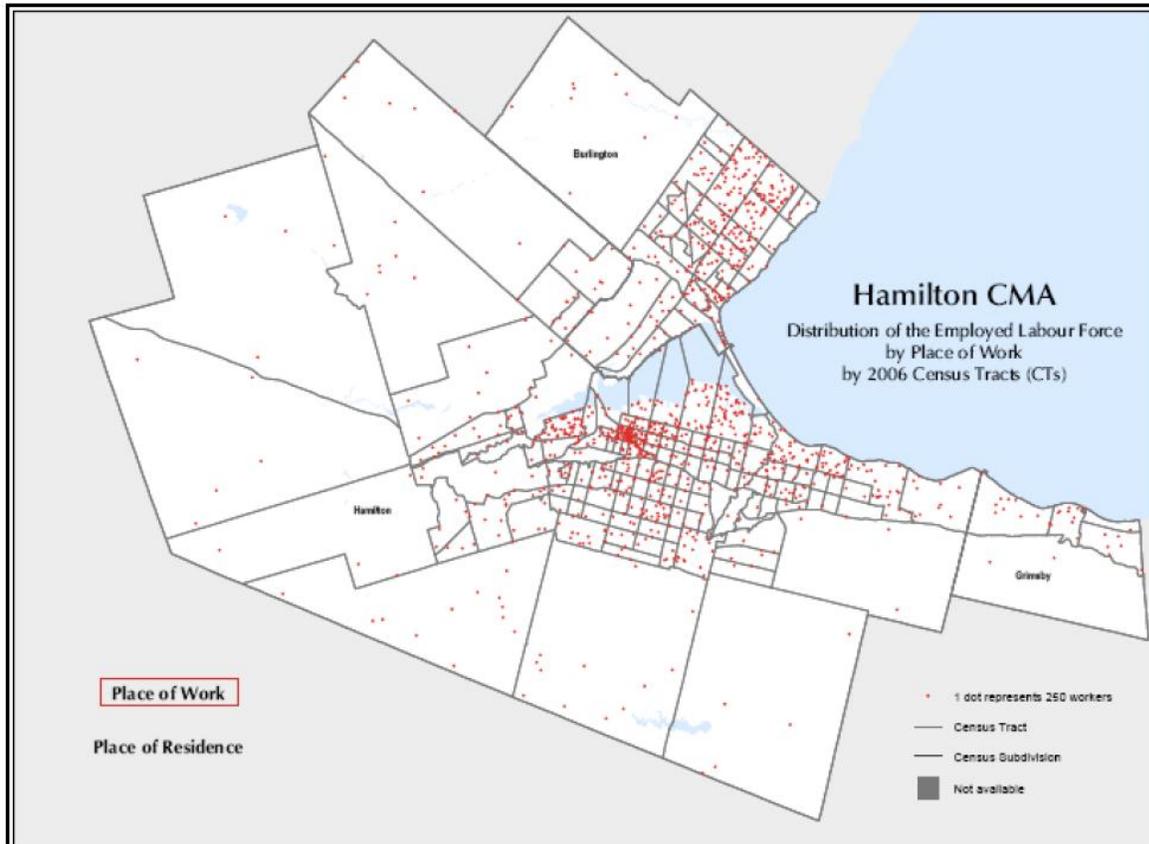
**Figure 12 – Employed Workforce using a Sustainable Commute Mode**

**Job Density**

Downtown Hamilton has been clearly identified as the job centre of Hamilton. A 2010 survey showed that over 23,000 jobs are located in the downtown, in an area referred to as the Downtown Community Improvement Project Area. This area is within Ward 2. The combined density in the CIPA is 189 people and jobs per hectare. McMaster University and Hospital in Ward 1 represent a major job node in the city as well.



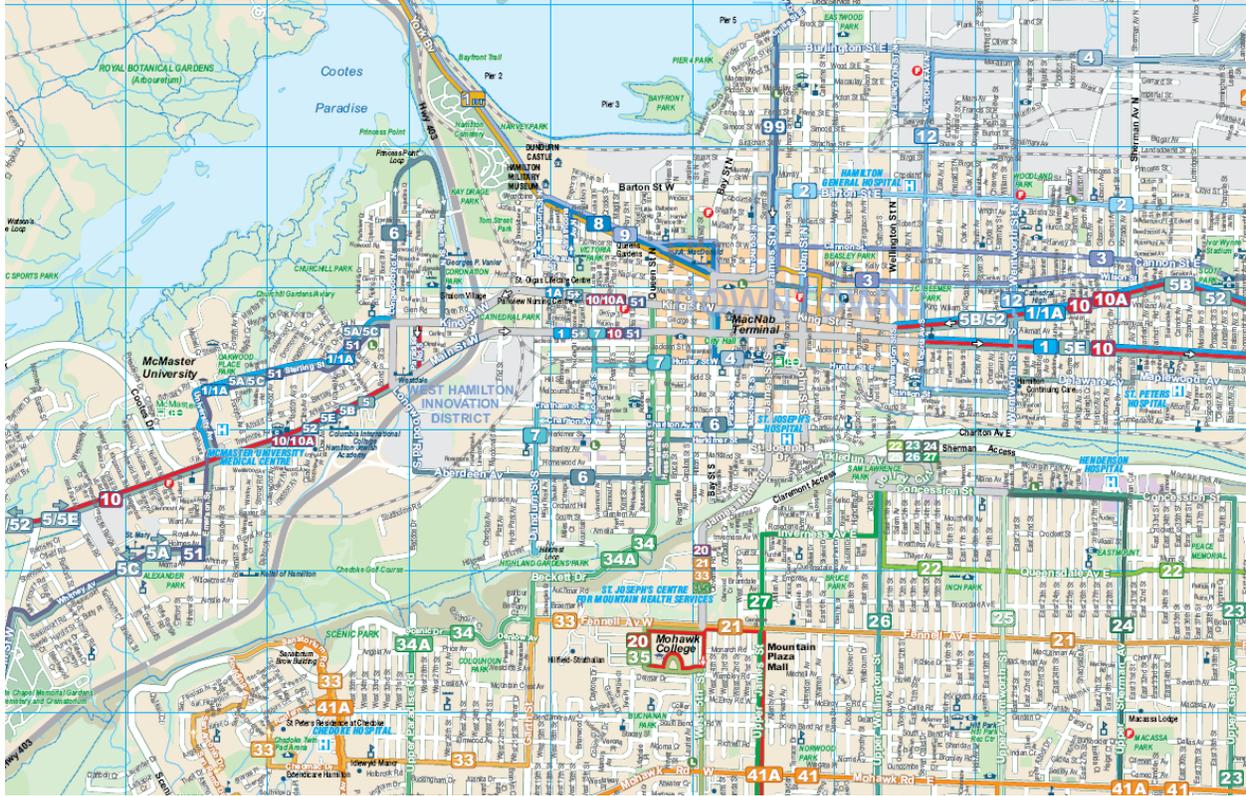
**Figure 13 – Downtown Community Improvement Project Area**



**Figure 14 – Job Distribution, City of Hamilton**

### **Transit and Cycling Network**

Transit service in the downtown area is extensive. Routes from Hamilton Mountain all terminate at the downtown MacNab Terminal. Several east-west routes traverse downtown as well, with some terminating at the Hunter St GO terminal. Areas of opportunity exist related to the existing transit service. There are very few routes which travel north-south in the downtown and Westdale areas. This creates several situations in which transit users must take circuitous routes to access express B-Line services along King and Main Street. Neighbourhoods in these circumstances should be prioritized for bike share stations as a means to access higher order transit services, such as express B-Line bus service and GO Transit service. Bike share presents a more cost effective alternative to providing conventional connecting bus service to higher order systems.

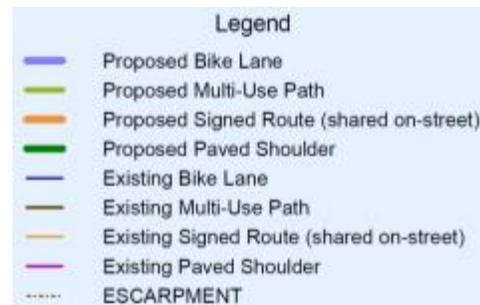


**Figure 15 – Transit Network**

Cycling infrastructure in Hamilton continues to expand and improve. The City was awarded the Bicycle Friendly City certification at the Silver level by the Share the Road coalition. Although at the moment the amount of on-street painted bike lanes is still limited in some areas of the city, off-street multi use paths include the newly opened rail trail linking Kirkendall neighbourhood with Westdale neighbourhood.



**Figure 16 – Cycling Infrastructure, Existing and Planned**



### Housing Stock

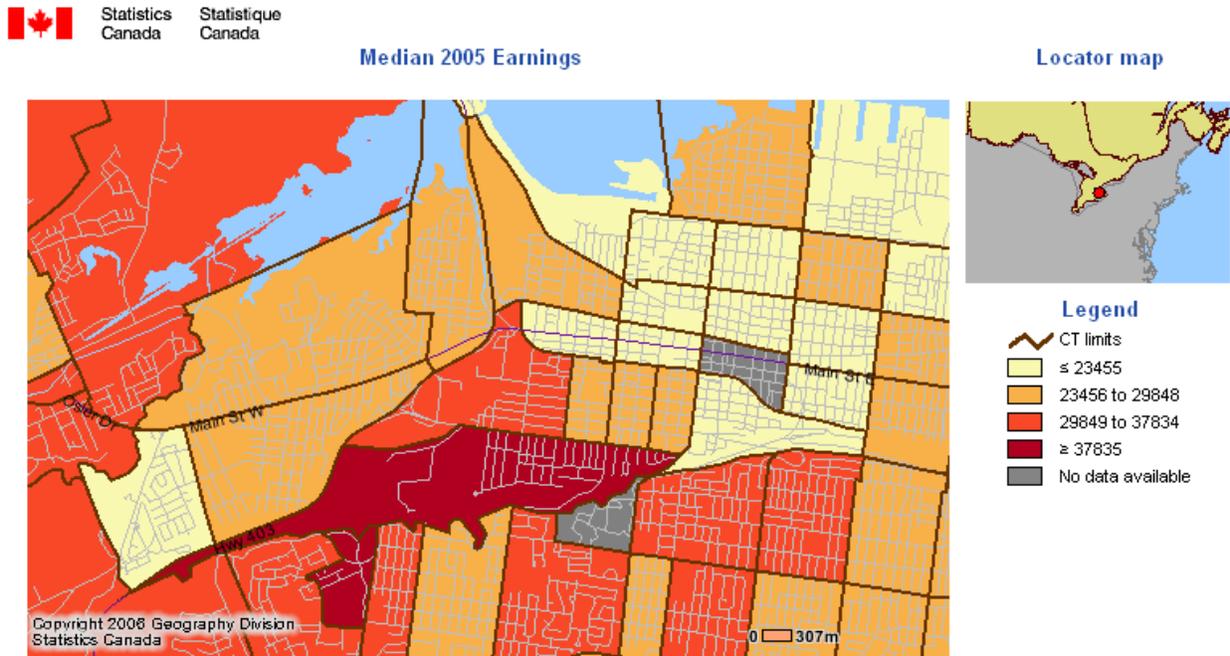
Ward 2 has a higher proportion of apartment dwellings than the other wards. Apartment dwelling represents not only higher density but also a style of living which is not entirely suitable to storing a personal bicycle. Apartment dwellers may be more willing to use a bike share due to the convenience of not having to get their personal bicycle from their apartment or storage unit to the street.

Ward	House	Apartment	Townhouse
1	7089	5324	217
2	4223	12301	273
7	5552	860	64
8	2414	171	0

**Table 3 – Housing Stock by Ward**

## Age and Income

Median income is low in nearly all areas of Hamilton under consideration. Low income levels are a recognized issue in the city overall. Strategies for inclusivity and accessibility for all income levels will increase the potential market for bike share.



**Figure 17 – Median Income Levels**

Wards 1 and 2 have a higher proportion of residents between the ages of 20 and 40 than the rest of Hamilton overall. This age group is more likely to use bike share.

	Ward One 2006	Ward Two 2006	Hamilton 2006
Total Population	100%	100%	100%
0 to 4 yrs	4.7%	5.1%	5.3%
5 to 9 yrs	4.3%	3.9%	5.8%
10 to 14 yrs	4.4%	3.9%	6.6%
15 to 19 yrs	6.1%	5.4%	6.9%
20 to 24 yrs	10.1%	9.4%	6.8%
25 to 29 yrs	8.4%	10.3%	6.0%
30 to 34 yrs	7.1%	8.6%	6.1%
35 to 39 yrs	7.1%	7.3%	6.9%
40 to 44 yrs	7.2%	7.8%	8.2%
45 to 49 yrs	7.0%	7.1%	8.1%

**Table 4 – Age Ranges in Wards One and Two**

## **Ward Analysis Conclusions**

Several factors contribute to the selection of Wards 1 and 2 as the most ideal for supporting a bike share system in Hamilton at this time. The data outlined above shows several favourable characteristics of these areas. The key factors supporting Wards 1 and 2 are their high density of jobs and residents relative to other wards, the higher proportion of younger residents and households, the high proportion of apartment dwellings, and the high number of internal trips already using active modes of transportation. Ward 1 also features a high level of educational attainment.

Wards 7 and 8 also have many favourable characteristics for bike share, although not as strong as Wards 1 and 2. This report will therefore focus on providing station location recommendations for a service area in Wards 1 and 2 and for Mohawk College. There is one major reason for this decision. The size of the proposed system in Hamilton is 40 stations. When proposing station locations, with consideration for best practices which show that station density is a key success factor, it becomes challenging to extend a 40 station system beyond two wards. Keeping stations as close to 400 meters apart where practical, restricts the opportunities of extending the initial system to locations on Hamilton Mountain. The topographical challenge of the Escarpment also means that placing individual stations at Mountain locations is less feasible. Isolated stations will either be completely unused, or will be used to the point that bicycle redistribution to continue serving those stations becomes overwhelming. A plan to service Mohawk College and St. Joseph's Hospital Fennell Avenue campus must include provisions to rebalance the system and ensure a majority of bikes do not end up in the lower city area leaving no bikes on the escarpment.

## **System Size**

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Based on experiences in Europe, most public bicycle system vendors recommend providing one bicycle for every 13 to 20 expected annual subscribers.<sup>20</sup> The number of subscribers can be estimated based on the residential, employment, and student populations within the service area.

For example, the business plan for the Minneapolis NiceRide public bicycle system assumes that 7% of the student population of about 50,000, 5% of the residential population of about

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<sup>20</sup> Ref: NiceRide Business Plan, 2008

100,000, and 3% of the employee population of about 200,000 within the service area will take out annual subscriptions, which adds up to 14,500 anticipated annual subscribers. It was determined that 1,000 bicycles, or 14.5 subscribers per bicycle, would be an appropriate number to have for the launch of the system. When the NiceRide program was launched in the summer of 2010, it was scaled down to 700 bikes, or one bike for every 20 expected subscribers.

Within this proposed service area, there are approximately 52,000 residents, and a student population at McMaster University of approximately 24,000. Using this model, Hamilton would have an expected demand for approximately 300 bicycles. An additional 50 bikes would be required to swap out damaged bikes that need service, bringing the total number of bikes to 350. It should be noted that NiceRide sold 1,200 annual memberships in its first year and found that their bike share system balanced best with only 600 of their 700 bikes put into service.

Based on the recommendations of Bixi and the City of Toronto, estimates of a 2% level of membership in the service area and an ideal bike per 7 users ratio, a system operating with an excess of 200 bikes is desirable (220). With consideration for the fact that operating costs do not vary significantly as systems get larger, and the fact that the goal for full cost recovery requires a greater number of members than the 2% minimum, a total number of bikes in the system of 300 is proposed, with an additional 50 bicycles required for repair and swap out stock.

## **Station Location Rationale**

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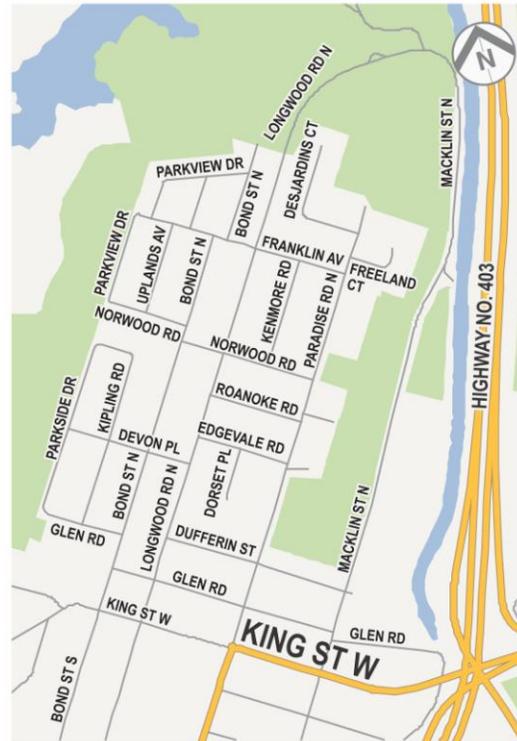
Having identified Wards 1 and 2 as the best suited for a bike share system consisting of 40 stations, specific areas in those wards will be identified as most suitable for a bike share system which focuses on extending access to B-Line bus service and A-Line service with the additional service to Mohawk College. Suitable areas will meet some or all of the following criteria:

- Existing HSR services feed the A-Line and B-Line east/west corridor, but are infrequent or follow a circuitous route; therefore, a bike share might provide a quicker and more convenient transportation method to and from B-Line stops.
- Existing HSR services do not directly feed the B-Line east/west corridor.
- Existing HSR services are often over-capacity; therefore, a bike share might become a suitable alternative for some users taking short trips.

## Areas of Opportunity for Bike Share as Extension of HSR Services

### Westdale North

The neighbourhood north of King St to Princess Point along Longwood Road scores well on several of the demographic indexes for bike share suitability. In terms of existing HSR services and access to the B-Line corridor, #6 Aberdeen route provides access to the B-Line at Main and Longwood. However, in order to get to Main Street using the Aberdeen route, users must first ride northbound to Princess Point and then return southbound along Macklin. Princess Point is also a recovery point for HSR operators meaning that buses frequently stop there for several minutes before proceeding. Bike share can offer a more direct route to the B-Line stop at Main and Longwood. There are also recreational cycling opportunities at Princess Point which may be an advantage.

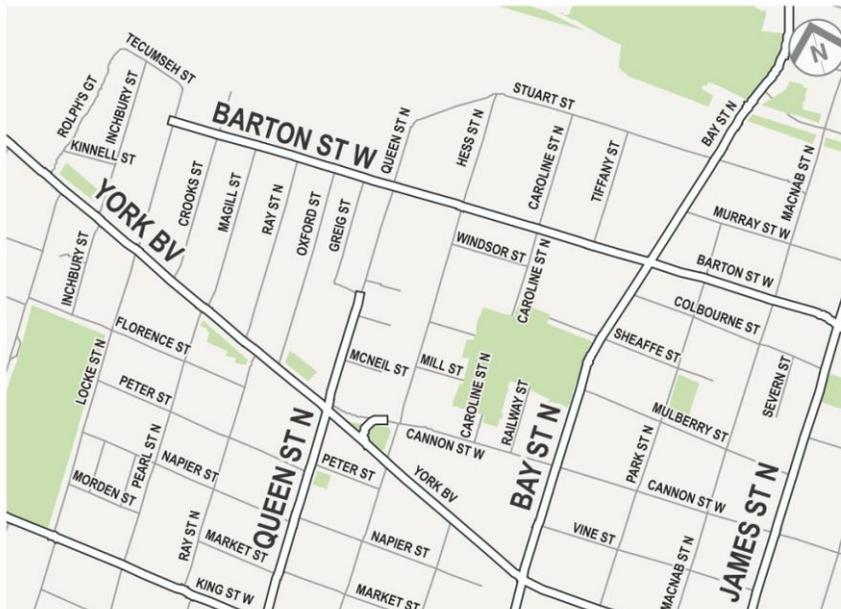


### Westdale North - Bike Share User Demographics

- Educational Attainment
- Median Age
- Existing Trip Making
- Cycling Infrastructure

## Strathcona North and North End

The north end neighbourhood west of James Street has some HSR service at its edges, but very little direct access to the B-Line corridor. #8 York and #4 Bayfront routes provide access to the B-Line downtown. Both routes are circuitous, particularly leaving



downtown to reach the north end as both run south on James Street to Hunter Street then return north on Bay Street. Neither route runs through the centre of the neighbourhood. Bike share can provide direct connections to the B-Line corridor. This neighbourhood is also the future home of a new GO station / platform on James Street North. There are also recreational cycling opportunities at Bayfront Park which may be an advantage.

### Strathcona North / North End – Bike Share User Demographics

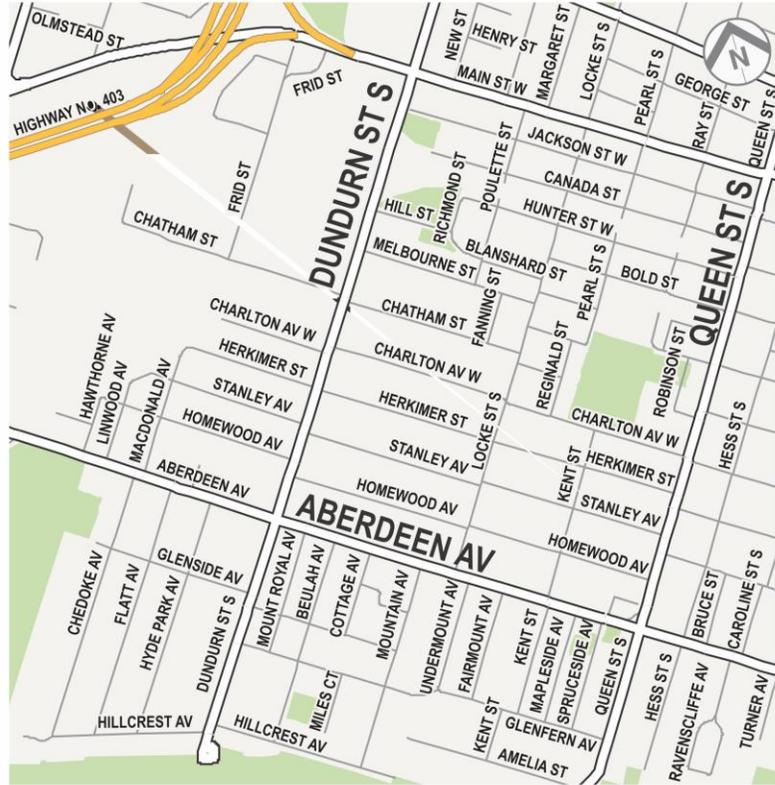
- Median Age
- Cycling Infrastructure

## Kirkendall

Kirkendall South exhibits many of the desirable demographic characteristics which suggest good usage of a bike share system. It is served directly by two HSR routes, #6 Aberdeen and #7 Locke. The Aberdeen route provides a direct connection to the B-Line corridor at the Main and Longwood stop. However, while it does connect to B-Line stops downtown, the route is circuitous and downtown focused. The Locke route provides a direct connection to the B-Line corridor at the Main and Queen stop. However, the route is underutilized and circuitous as well. Bike share can provide direct connections to the nearby Dundurn B-Line stops. In addition, residents in this neighbourhood frequently express a desire for a direct transit connection to McMaster University, which can be provided for with bike share by utilizing the newly opened Rail Trail extension across Highway 403.

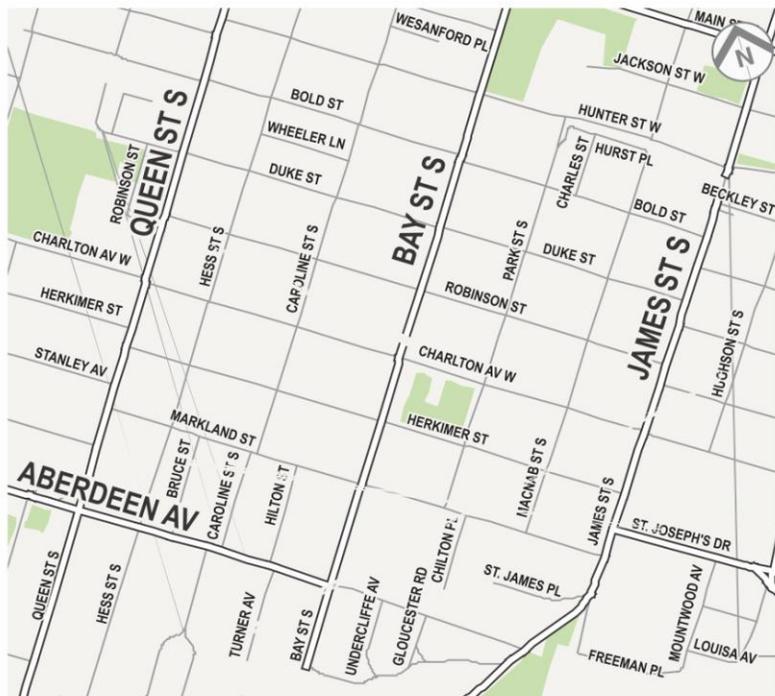
Kirkendall – Bike Share User Demographics

- Population Density
- Educational Attainment
- Median Income
- Cycling Infrastructure
- Commercial Areas



**Durand**

Durand is a high density neighbourhood which is well suited to cycling trips. Transit service within the neighbourhood includes the #6 Aberdeen and the #34 Upper Paradise routes which run southbound along Queen and northbound along Hess. Both of these routes do service the B-Line corridor; however the Upper Paradise route operates along the edge of the neighbourhood, while the Aberdeen route suffers from a



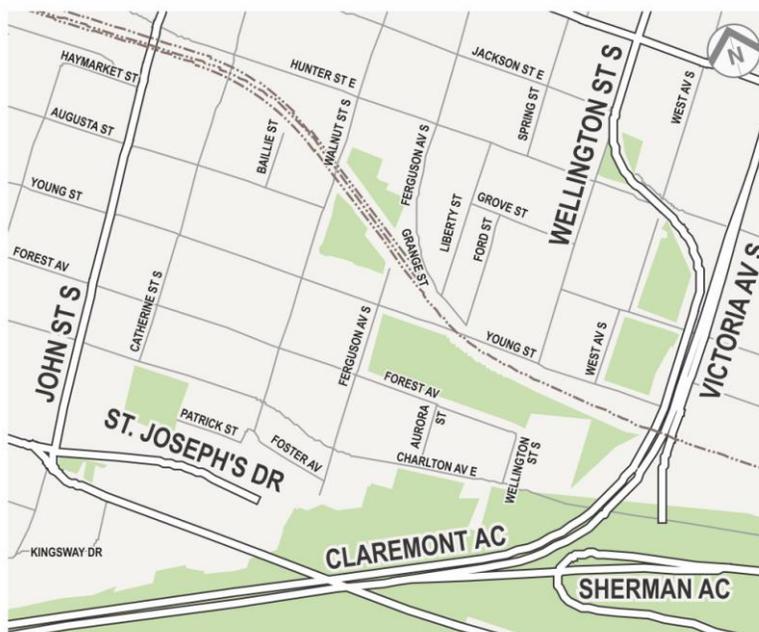
circuitous route to and from the B-Line stops. Bike share can provide direct connections to B-Line stops including the MacNab terminal and Hunter Street GO Station.

#### Durand – Bike Share User Demographics

- Population Density
- Educational Attainment
- Housing Stock
- Trip Making

#### Corktown

Corktown neighbourhood lacks effective and direct connections to the B-Line corridor. Multiple routes travel northbound on John Street from the mountain towards downtown; however, users must walk a full block in order to make an eastbound connection, and bypass the B-Line stop at King and Hughson for a westbound connection due to all mountain routes travelling directly to the MacNab terminal. The closest



southbound transit service from the B-Line corridor to the Corktown neighbourhood is on James Street. Bike share can provide more direct connections to and from B-Line stops.

#### Corktown – Bike Share User Demographics

- Population Density
- Median Age
- Employment Areas
- Cycling Infrastructure
- Housing Stock

## Station Locations

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Potential station locations will be developed in two stages. Firstly, anchor stations will be selected with a focus on providing service at B-Line stops and other major trip generators. Next, neighbourhoods identified above will be provided with stations in a way that attempts to create the most desirable station density of one station within 400 - 500 meters of another, as a maximum. The proposed system map is shown below and shows all the stations with an overlay of the A-Line and B-Line, along with key stations in red.

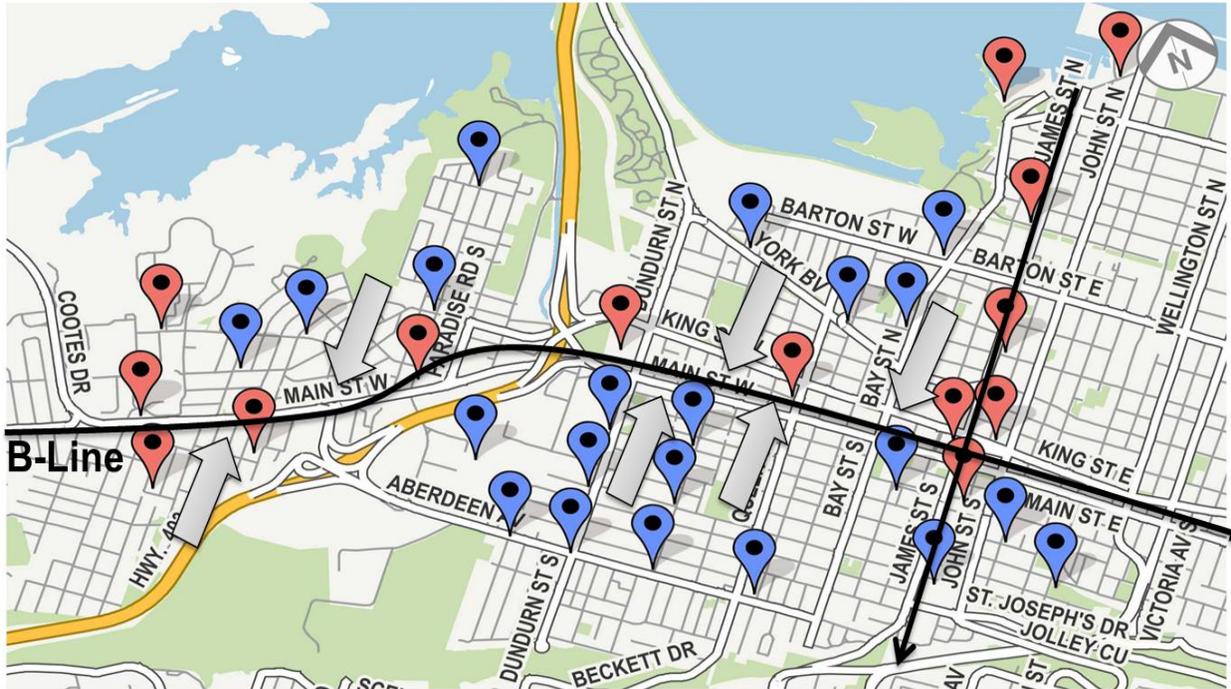


Figure 18 – Proposed Station Locations for Hamilton

## Anchor Stations

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### B-Line Transit Stops

B-Line transit stops between John / Hughson and McMaster University are given a bike share station. In the case of Queen and Dundurn Streets, one station is shared between the two B-Line stops (eastbound and westbound) in order to save on stations. Main at John and King at Hughson are both given a station each as the eastern most stations in the system.

### Transit Terminals

The MacNab Transit Terminal and the Hunter Street GO Terminal are each given a bike share

station, in anticipation of high usage and connection to higher modes of transportation to points within and outside the city.

### **McMaster University**

McMaster is given its own bike share station in anticipation of high student uptake with trips originating from across the bike share network.

### **Noteworthy Stations**

Some station locations have been selected which do not necessarily align with the criteria of extending greater access to the B-Line corridor. These are discussed below.

### **St Joseph's Healthcare, Charlton Campus**

St Joseph's is given a bike share station in recognition of being one of the largest employment sites in the downtown area. It also fills a gap in the bike share system network between Durand and Corktown stations.

### **McMaster Innovation Park**

MIP is given a bike share station in recognition of being a growing employment area and a showcase area in the city of Hamilton.

### **Westdale**

Westdale neighbourhood has excellent transit service with frequent service on several routes. Despite this level of service, buses are often overcrowded with students from McMaster. Adding bike share stations to the network in the Westdale neighbourhood compliments and enhances the existing transit services rather than extending them; there is an opportunity to relieve some of the pressure on the existing transit services. This also fills a gap in the network between Westdale North and McMaster University.

### **Mohawk College**

Mohawk College is a major hub of activity in close proximity to the primary service area, with the major boundary of the escarpment between the two. The A-Line rapid transit corridor services Mohawk College and can be fed using bike share in much the same fashion as other service areas are feeding the B-Line corridor. This is a consideration for the second phase of the system.

## **Noteworthy Omissions**

### **Ainslee Wood South**

Ainslee Wood South has many desirable characteristics for bike share generally. In this phase this area of the city is given minimal stations because of the presence of a direct, frequent bus service through the neighbourhood in Route 5 along Emerson and Whitney, which provides connections to the B-Line corridor and is itself a major east-west route.

## **Conclusions of the Station Location Analysis**

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The City of Hamilton is well positioned in many ways to introduce a successful bike sharing system. The cycling culture in the city is growing, in conjunction with the continued improvement and expansion of the city's cycling infrastructure. The introduction of a bike sharing system has the potential to drive continued improvements in cycling infrastructure and increase the profile of cycling in the city overall. The downtown core is showing signs of a true revival, led by an influx of young artists and professionals seeking affordable real estate and a better quality of life in a dense urban setting. This demographic is very likely to embrace bike sharing. The density of both residents and jobs in the downtown gives this area the potential to support a bike share program. The presence of McMaster University offers a huge potential pool of users for a bike sharing system. Finally, the introduction of a Bixi bike sharing system in Toronto in 2011 has given many residents of Hamilton their first glimpse at what bike sharing is. Having a successful system on our doorstep provides better evidence to the general public that this is a concept that works and has a chance in Hamilton.

There are several factors working against Hamilton. The projected size of the initial phase of the bike sharing system in Hamilton may act as a severely limiting factor in the program's success. A 40 station system can only effectively service a small portion of the city. In order to engage stakeholders from across the city, there needs to be an opportunity for those stakeholders to feel as though this program will personally impact them. If only a handful of stakeholders are projected to have a station set up close to their home or place of work, it limits the ability of the program to fully engage the entire city.

The Escarpment presents a challenge to a bike sharing system, although it is not a unique challenge to Hamilton. In Montreal, Mont Royal stands between Bixi users and more stations at

the top of the mountain. Barcelona has experienced issues with bike share users only riding bikes downhill into the centre of the city, but very rarely riding back uphill out of the centre of the city. In the initial phase of bike share in Hamilton, locations at the top of the Escarpment would be less feasible until greater densities of stations are available; this would be an identified priority in a future phase. Individual stations in isolated locations do not fit with a bike share system. These stations either become completely unused or, in the case of a theoretical location on the Escarpment, are consistently empty because bikes are taken from the top of the Escarpment down to the lower city, but are not brought up the Escarpment with the same frequency. Bixi is successful at the top of Mont Royal because the system continues with multiple stations at the same level of density as in the rest of the city, while Barcelona offers an incentive to its users to ride bikes back uphill.<sup>21</sup> With an initial 40 station system, only Mohawk College's campus can be serviced and would need special attention in order to ensure that bicycles are balanced above and below the escarpment. Facilities which would offer greater support to stations above the Escarpment include more bike-friendly stairs, stations at the top and bottom of mountain access stairs, and a specific HSR pass which permits travel from the bottom of the Escarpment to the top when using bike share.

Finally, low income accessibility is a significant issue in the City of Hamilton. Income levels in Hamilton are generally low, although areas where bike share stations are being recommended in this report are generally higher than areas where stations are not being recommended. Part of a long term strategy of the bike share system in Hamilton should be ensuring accessibility of the system to those of lower incomes. For example, Community Bicycle Network's bike share program which ran in Toronto until 2006 granted memberships in exchange for volunteer hours.<sup>22</sup> Another option is to further integrate the bike share system with the bus system through a combined bus and bike monthly pass marketed and priced as an affordable transportation option.

## **Recommendations**

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Based on the findings of this report and best practices worldwide, with respect to proposed station locations for a bike share system to be implemented in the City of Hamilton, consider the following recommendations.

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<sup>21</sup> Midgley, 2011

<sup>22</sup> Metrolinx, Bike Share Best Practices Investigation, Sept 2009.  
[http://www.smartcommute.ca/media/uploads/pdf/bike\\_share\\_best\\_practices\\_2009.pdf](http://www.smartcommute.ca/media/uploads/pdf/bike_share_best_practices_2009.pdf)

- Bike sharing systems are an extension of existing public transportation systems and as such should be planned and delivered with the primary goal of providing transportation options to the public to be used for a variety of trip purposes;
- Convenience is critical to the success of a bike share system; stations must be kept reasonably densely placed and redistribution of bicycles throughout the system must be diligently completed;
- Isolated stations should be avoided; bike sharing is different from bike renting, therefore planning station locations that encourage users to return bicycles to a station within a short period of time is the goal;
- In the initial 40 station phase of the City of Hamilton's bike sharing system, stations should only be placed within the areas highlighted in this report; future expansion of the system beyond 40 stations will allow for geographic expansion of the network of stations;
- Stakeholders who will not be serviced directly by the initial phase of the bike share system should be given the option of directly contributing to the expansion of the system by purchasing / sponsoring a station and bicycles;
- Stakeholder and community feedback is both highly desirable and highly required in order to ensure engagement in the bike sharing program, and in order to finalize station location recommendations;
- Modern bike sharing stations are modular and portable, therefore no station recommendation is set in stone; if a location is not working, re-evaluate and investigate alternatives.

## OPERATING BUDGETS

### Pricing

As bicycles are not the default travel mode choice for most people, bike share membership and user fees must stay low in order to attract users. Offering the first half-hour for free, and providing a 15 minute grace period to riders who arrive at their destinations only to find the bike station full, are necessary for a successful bike share program and should be included in Hamilton. In addition, the policy of charging small (\$1-2) escalating fees for additional half-hours should also be included in order to deter lengthy uses and keep bicycles in circulation. These measures are commonly adopted in most other bike share programs.

The price elasticity of bike share programs is not well understood. Determining the level that users are willing to pay is a critical issue to explore before setting membership fees. Generally, bike share system yearly fees in North America are usually the price of one monthly bus pass, which varies by municipality.

The financial estimates in this report are based on the assumption that a Hamilton bike share program could charge a similar amount to that currently charged in Montreal for BIXI use. This report recommends that the membership and user fees charged by the BIXI program in Montreal serve as guidelines for a Hamilton program; about the price of one monthly transit pass.

City	Daily	Weekly	Monthly	Annual
Paris	\$2.10	\$9.95		\$48.50
London	\$1.60	\$7.85		\$70.50
Barcelona				\$36.90
Minneapolis	\$5		\$30	\$60
Montreal	\$5	\$12	\$28	\$78
Toronto	\$5	\$12	\$40	\$95
Ottawa	\$5	\$12	\$28	\$78
<b>Hamilton (proposed)</b>	<b>\$5</b>	<b>\$12</b>	<b>\$29</b>	<b>\$87</b>

**Table 5 – Typical Pricing of Public Bike Share Systems Worldwide**

### **Price Stability**

As it is difficult to predict future costs, current pricing guides have been used in this document and it will be necessary to closely monitor the industry and make adjustments as required on an ongoing basis. In the case of the 12 year cash flow analysis, a 3% annual inflation rate has been assumed. Membership price increases have been set at a 5% increase every third year beginning in year three.

### **Annual Membership**

The financial analysis for this report assumed an initial annual membership fee of \$87. Montreal and Toronto currently charge \$78 (with no winter access) and \$95 (includes access year round) respectively. With some contribution to the revenue streams from advertising and supplemented by grants in the early stages, these rates may make a bike share program self-supporting at larger scales.

### **Daily, Three Day and Monthly Membership**

As daily passes are likely to be used most by visitors or for recreation uses, this report recommends daily membership rates that are comparable to other cities. The financial analysis used for this report assumed a daily membership rate of \$5, a three day rate of \$12, and a monthly membership rate of \$29. A security deposit of \$250 is used by BIXI in Montreal and Toronto

### **Credit Card Alternatives**

The credit card requirement inherent in advanced bike share programs could pose some problems for lower income Hamiltonians who might otherwise use the program. Prepaid cards used exclusively for the bike share system could be an alternative option for those who do not have a credit card. While these types of cards often have substantial transaction or maintenance fees, the city or bike share operator may be able to negotiate with the card provider to keep the fees low.

### **Advertising Revenue**

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Advertising can contribute significant income to the bike share program. Advertisements can be placed on the bikes themselves as well as the bike stations, at the storefront/repair shop and on the vehicles and trailers.

Velo Toulouse was the first bike share program to run advertising on the bikes themselves. HSBC Bank reportedly purchased one year's worth of on-bicycle ads on 1,000 bicycles for \$1 million. It is worth noting that this bike share program is open year-round.<sup>23</sup> TELUS is a title sponsor of the 1,000 bike BIXI system in Toronto. As such, they reportedly contributed \$1,000,000 towards the capital cost and also pay an advertising fee of over \$100,000 annually to keep their logos on the bikes.

In the case of a smaller bike share program in a smaller city like Hamilton, it would seem reasonable that on-bicycle advertising could generate somewhere in the order of \$200 per bike per year, or \$40,000 per year total. The capital contribution for such a system would be at a rate of \$1000 per bike for a total of \$350,000.



**Figure 19** – Bycyklen bicycles in Copenhagen display advertising on wheels and frames<sup>24</sup>

## Warehousing and Inventory Requirements

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Bikes and bikes stations need to be stored in an indoor warehouse in the winter months. Space would be required for 350 bikes on 40 stations. The required footprint will be roughly equivalent to 40 parking spaces or approximately 5,000 square feet. More space would be required if the maintenance and re-distribution vehicles and trailers were to be kept in the warehouse as well.

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<sup>23</sup> Ref: JCDecaux & HSBC; “PRESS RELEASE: HSBC Wraps Velo Toulouse;”

<sup>24</sup> Ref: Bike Sharing Guide – Transport Canada, 2009

It would be worth pursuing a donation in-kind of warehouse space from the city in order to reduce costs in this area.

## **Bicycle Maintenance and Repair Depot**

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An indoor location will be required for performing maintenance and repairs on bicycles. It must be large enough to house an inventory of spare parts as well. The location would require parking for the vehicles and trailers during the operating season. Ideally, it should be centrally located to minimize travel time to the bike stations. A space of approximately 1,000 square feet should be sufficient.



**Figure 20 – Typical Bicycle Maintenance and Repair Depot** <sup>25</sup>

## **Operations / Materials Suppliers**

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After the vendor demonstrations were conducted in 2010, BIXI was clearly seen as the preferred supplier for a bike share system in Hamilton by the delegates and community who

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<sup>25</sup> Ref: Bike Share Planning in Seattle and King County, Council Briefing, June 28, 2011

attended. Other suppliers could still be considered. Costs outlined in the following sections represent the costs of a system supplied by BIXI unless stated otherwise and prices are based on publicly stated pricing of the system and are therefore subject to fluctuation.

### Start Up Costs

Initial start-up costs will include capital costs of bikes and stations as well as launch costs.

The following table shows estimated capital costs to start up a bike share with 350 bicycles and 40 bike stations in Hamilton. Initial capital costs are based on pricing for a system supplied by BIXI.

**Table 6 – Estimated Capital Costs**

<b>Initial Equipment Purchase</b>			
	<b>Units</b>	<b>Price/Unit</b>	<b>Total Price</b>
Bicycles	300	\$1,070.00	\$321,000.00
Stations	35	\$30,000.00	\$1,050,000.00
Docks	560	incl above	
Shipping			\$34,000.00
System cards	4000	\$2.75	incl
Total Equipment Price			\$1,405,000.00
Taxes			\$16,860.00
Installation			incl
Training			incl
<b>Total Equipment Costs</b>			<b>\$1,421,860.00</b>
Start-up Costs (from sheet on next tab)			\$225,310.00
<b>Total Cost to become operational</b>			<b>\$1,647,170.00</b>

The following table shows estimated costs to launch a bike share in Hamilton. These costs should be approximately the same, regardless of the supplier chosen for the capital equipment.

**Table 7 – Estimated Launch Costs**

**Start-up Costs**

<b>Item</b>	<b>Cost</b>
Re-distribution vehicle	\$25,000.00
Re-distribution trailer	\$10,000.00
Maintenance vehicle	\$20,000.00
Maintenance trailer	\$10,000.00
Marketing/Promotional expenses for launch	\$75,000.00
Bike dock location study	\$0.00
Maps of bike dock locations	\$5,000.00
Traffic barriers and other location related expenses	\$10,000.00
Winter storage location costs	\$0.00
Office admin expenses	
- Exec Director - 3 months prior to launch	\$5,880.00
- Operations Mgr - 3 months prior to launch	\$13,650.00
- Website development	\$42,000.00
- Maintenance & repair tech - 1 month prior to launch	\$3,780.00
Legal	\$5,000.00
<b>Total Start-up Costs</b>	<b>\$225,310.00</b>

Capital costs were previously estimated at \$3,000 to \$3,200 per bike for a BIXI system, while operating costs were estimated at \$1,500 per bike per year.<sup>26</sup> The current estimates are higher than these figures.

Montreal's BIXI system has 2,400 bikes and 300 stations. Its capital cost was \$15 million (\$6,250/bike). Capital costs have been reduced since implementation in Montreal, which was the first BIXI bike share program. Minnesota Nice Ride installed a BIXI system in 2010 with 65 stations and 700 bikes. The capital cost of this system was \$3 million (\$4,285/bike).

BIXI's operating costs in Montreal are estimated at \$1,500 per bike per year. A smaller system has higher costs per bike as fixed costs are distributed among a smaller number of bikes. It is

<sup>26</sup> Ref: Hamilton Bike Share Feasibility Study, N.Harper, J. Bauman

estimated that Hamilton's capital costs would be approximately \$5,800 per bike while operating costs would be approximately \$2,250 per bike per year.

## **Estimated Target Market Capture**

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In order to complete a financial analysis, it is necessary to forecast the demand for the service. It is very difficult to forecast the demand for a new product such as a bike share, but it is a critical piece of information that is needed to determine the financial viability of the business.

A previous figure showed an analysis used by NiceRide Minnesota to determine their system size, and its implications in sizing a system for Hamilton. We could use these projected usage rates to determine the number of subscribers, and in turn, the amount of revenue generated from subscriptions. NiceRide has now been operating for 2 years, and they have shared some of their subscription data on their website. In 2010, they attracted 1,295 annual subscribers versus the 14,500 they projected to get in the longer term. In their second year, they increased their system size from 700 bikes at 65 stations to 1,200 bikes at 116 stations and doubled their number of annual subscribers to approximately 2,600.<sup>27</sup> If this linear growth rate continues, it will take 10 years to reach the number of subscribers projected in their business plan. Scaling down the number of subscribers for a system in Hamilton which is about half the size of the original NiceRide system would allow us to come up with some projections for Hamilton's business case.

BIXI has shared information regarding the subscription rates for the system they run in Montreal. They state that 8 percent of the resident population in the area serviced by the bike share will purchase annual memberships. It will take time for Hamilton to build up to these levels. For the purpose of this business plan, we have assumed that the number of subscribers will grow linearly to achieve this uptake rate by the fifth year of operation.

These two projected subscription rates can now be used to gauge the financial viability of a bike share system in Hamilton. Projected cash flow for the business over a number of years is outlined in the following section. As further information is gathered in future market studies, these spreadsheets can be modified accordingly. They can also be used to perform "what-if" analyses for various scenarios when considering system expansion.

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<sup>27</sup> Ref: NiceRideMN.org website

## **Twelve-Year Operating Budgets**

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Determining the financial viability of a bike share system requires looking out over an extended time period. The bike share could attract enough subscribers to turn a profit in one year, but show a loss in a subsequent year, even after increasing its number of subscribers. This is due to the fact that equipment wears out and needs to be replaced at some point. This business plan looks out over a twelve year period to take into account a complete cycle of replacement of the equipment.

Financial planning must take into account that the bicycles will wear out and need to be replaced after approximately 5 to 7 years of use. This results in a large expense in the fifth to seventh year of the program. See Table 3 for a projected schedule of necessary replacements. The bike stations will need replacement at some point as well, likely around the 10 to 12 year point. These replacement costs have a large impact on profitability of the program. Any operating profits in early years should be set aside to pay these replacement costs as they arise.

A cash flow analysis was performed for both of the projected subscription rate scenarios outlined in the previous section. Revenues and expenses are shown in Tables 9 and 10 for the two scenarios over a twelve year period. Figures 9 and 10 illustrate the projected profit or loss and the resulting accumulated reserve account balance for each scenario.

BIXI's projected rates leads to a business that breaks even in the third year and generates sufficient profits in years four through six to repay the losses of the first two years. This business model is seen to be self-sustaining over a twelve year cycle.



**Table 9 – Estimated Cash Flow with BIXI's Projected Uptake Rates**

<b>Estimated Cash flow (12 years)</b>	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Year	1	2	3	4	5	6	7	8	9	10	11	12
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
<b>Revenue</b>												
Yearly subscriptions	\$118,500.00	\$244,110.00	\$356,029.55	\$379,831.91	\$400,118.38	\$412,121.93	\$424,485.59	\$437,220.16	\$450,336.76	\$463,846.87	\$477,762.27	\$492,095.14
Daily subscriptions	\$20,000.00	\$20,600.00	\$21,218.00	\$21,854.54	\$22,510.18	\$23,185.48	\$23,881.05	\$24,597.48	\$25,335.40	\$26,095.46	\$26,878.33	\$27,684.68
3 day subscriptions	\$6,000.00	\$9,270.00	\$12,730.80	\$13,112.72	\$13,506.11	\$13,911.29	\$14,328.63	\$14,758.49	\$15,201.24	\$15,657.28	\$16,127.00	\$16,610.81
Monthly subscriptions	\$2,900.00	\$4,480.50	\$6,153.22	\$6,337.82	\$6,527.95	\$6,723.79	\$6,925.50	\$7,133.27	\$7,347.27	\$7,567.68	\$7,794.72	\$8,028.56
Hourly usage (over 30 min)	\$13,000.00	\$22,660.00	\$31,283.82	\$33,218.90	\$34,890.77	\$35,937.50	\$37,015.62	\$38,126.09	\$39,269.87	\$40,447.97	\$41,661.41	\$42,911.25
Sponsors	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
Advertising	\$20,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
<b>Total Revenue</b>	<b>\$220,400.00</b>	<b>\$381,120.50</b>	<b>\$507,415.39</b>	<b>\$534,355.89</b>	<b>\$557,553.39</b>	<b>\$571,879.99</b>	<b>\$586,636.39</b>	<b>\$601,835.48</b>	<b>\$617,490.55</b>	<b>\$633,615.26</b>	<b>\$650,223.72</b>	<b>\$667,330.43</b>
<b>Expenses</b>												
Spring Installation costs	incl											
<b>Employees:</b>												
Exec Dir - Part time commitment (20%)	\$13,440.00	\$13,843.20	\$14,258.50	\$14,686.25	\$15,126.84	\$15,580.64	\$16,048.06	\$16,529.50	\$17,025.39	\$17,536.15	\$18,062.24	\$18,604.10
Operations Manager	\$54,600.00	\$56,238.00	\$57,925.14	\$59,662.89	\$61,452.78	\$63,296.36	\$65,195.26	\$67,151.11	\$69,165.65	\$71,240.62	\$73,377.83	\$75,579.17
Bicycle Repair Technician	\$49,140.00	\$50,614.20	\$52,132.63	\$53,696.60	\$55,307.50	\$56,966.73	\$58,675.73	\$60,436.00	\$62,249.08	\$64,116.55	\$66,040.05	\$68,021.25
Storefront and Repair Shop rent	\$15,600.00	\$16,068.00	\$16,550.04	\$17,046.54	\$17,557.94	\$18,084.68	\$18,627.22	\$19,186.03	\$19,761.61	\$20,354.46	\$20,965.10	\$21,594.05
Warehouse to store bikes during off-season												
Bicycle Repair Tools	incl											
Bicycle Maintenance Contract												
Customer service, etc, provided by BIXI	\$22,000.00	\$22,660.00	\$23,339.80	\$24,039.99	\$24,761.19	\$25,504.03	\$26,269.15	\$27,057.23	\$27,868.94	\$28,705.01	\$29,566.16	\$30,453.15
Website upkeep	\$10,000.00	\$10,300.00	\$10,609.00	\$10,927.27	\$11,255.09	\$11,592.74	\$11,940.52	\$12,298.74	\$12,667.70	\$13,047.73	\$13,439.16	\$13,842.34
Marketing/promotional expenses	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00
Insurance (ballpark estimate)	\$50,000.00	\$51,500.00	\$53,045.00	\$54,636.35	\$56,275.44	\$57,963.70	\$59,702.61	\$61,493.69	\$63,338.50	\$65,238.66	\$67,195.82	\$69,211.69
Legal fees	\$2,000.00	\$2,060.00	\$2,121.80	\$2,185.45	\$2,251.02	\$2,318.55	\$2,388.10	\$2,459.75	\$2,533.54	\$2,609.55	\$2,687.83	\$2,768.47
Replacements due to theft and vandalism	\$20,000.00	\$20,600.00	\$21,218.00	\$21,854.54	\$22,510.18	\$23,185.48	\$23,881.05	\$24,597.48	\$25,335.40	\$26,095.46	\$26,878.33	\$27,684.68
Replacements due to end of lifespan of bicycles	\$0.00	\$0.00	\$0.00	\$0.00	\$106,336.27	\$10,952.64	\$16,921.82	\$17,429.48	\$17,952.36	\$91,282.34	\$26,543.18	\$31,200.69
Parts replacement on bicycles	\$3,500.00	\$5,407.50	\$5,569.73	\$5,736.82	\$5,908.92	\$6,086.19	\$6,268.77	\$6,456.84	\$6,650.54	\$6,850.06	\$7,055.56	\$7,267.23
Battery replacements	\$0.00	\$0.00	\$100.00	\$400.00	\$1,000.00	\$400.00	\$100.00	\$100.00	\$400.00	\$1,000.00	\$400.00	\$100.00
Replacement of kiosks	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27,672.16	\$114,009.31	\$293,573.97	\$120,952.47	\$31,145.26
Administration	\$40,017.00	\$40,992.51	\$41,997.29	\$43,032.20	\$44,098.17	\$45,196.12	\$46,327.00	\$47,491.81	\$48,691.56	\$49,927.31	\$51,200.13	\$52,511.13
Contingency												
Capital Reserve Contribution												
<b>Total Expenses</b>	<b>\$330,297.00</b>	<b>\$340,283.41</b>	<b>\$348,866.91</b>	<b>\$357,904.92</b>	<b>\$473,841.34</b>	<b>\$387,127.86</b>	<b>\$402,345.30</b>	<b>\$440,359.82</b>	<b>\$537,649.59</b>	<b>\$801,577.87</b>	<b>\$574,363.86</b>	<b>\$499,983.21</b>
<b>Debt Service</b>												
<b>Profit or Loss for the Year</b>	<b>-\$109,897.00</b>	<b>\$40,837.09</b>	<b>\$158,548.48</b>	<b>\$176,450.97</b>	<b>\$83,712.05</b>	<b>\$184,752.13</b>	<b>\$184,291.09</b>	<b>\$161,475.66</b>	<b>\$79,840.95</b>	<b>-\$167,962.60</b>	<b>\$75,859.86</b>	<b>\$167,347.22</b>
<b>Reserve Account Balance</b>	<b>-\$109,897.00</b>	<b>-\$69,059.91</b>	<b>\$89,488.57</b>	<b>\$265,939.54</b>	<b>\$349,651.59</b>	<b>\$534,403.72</b>	<b>\$718,694.81</b>	<b>\$880,170.47</b>	<b>\$960,011.42</b>	<b>\$792,048.82</b>	<b>\$867,908.68</b>	<b>\$1,035,255.90</b>
Inflation rate	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Price of one new bike	\$1,000.00	\$1,030.00	\$1,060.90	\$1,092.73	\$1,125.51	\$1,159.27	\$1,194.05	\$1,229.87	\$1,266.77	\$1,304.77	\$1,343.92	\$1,384.23
Interest rate	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%

**Table 10 – Estimated Subscriber Rates**

Subscription Numbers																										
Year	2012 rates		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023	
	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars
<b>Revenue</b>																										
Yearly subscriptions	\$ 79.00	1500	\$118,500.00	3000	\$244,110.00	4248	\$356,029.55	4400	\$379,831.91	4500	\$400,118.38	4500	\$412,121.93	4500	\$424,485.59	4500	\$437,220.16	4500	\$450,336.76	4500	\$463,846.87	4500	\$477,762.27	4500	\$492,095.14	
Daily subscriptions	\$ 5.00	4000	\$20,000.00	4000	\$20,600.00	4000	\$21,218.00	4000	\$21,854.54	4000	\$22,510.18	4000	\$23,185.48	4000	\$23,881.05	4000	\$24,597.48	4000	\$25,335.40	4000	\$26,095.46	4000	\$26,878.33	4000	\$27,684.68	
3 day subscriptions	\$ 12.00	500	\$6,000.00	750	\$9,270.00	1000	\$12,730.80	1000	\$13,112.72	1000	\$13,506.11	1000	\$13,911.29	1000	\$14,328.63	1000	\$14,758.49	1000	\$15,201.24	1000	\$15,657.28	1000	\$16,127.00	1000	\$16,610.81	
Monthly subscriptions	\$ 29.00	100	\$2,900.00	150	\$4,480.50	200	\$6,153.22	200	\$6,337.82	200	\$6,527.95	200	\$6,723.79	200	\$6,925.50	200	\$7,133.27	200	\$7,347.27	200	\$7,567.68	200	\$7,794.72	200	\$8,028.56	
Hourly usage (over 30 min)	\$ 2.00	6500	\$13,000.00	11000	\$22,660.00	14744	\$31,283.82	15200	\$33,218.90	15500	\$34,890.77	15500	\$35,937.50	15500	\$37,015.62	15500	\$38,126.09	15500	\$39,269.87	15500	\$40,447.97	15500	\$41,661.41	15500	\$42,911.25	
Total Revenue			\$160,400.00		\$301,120.50		\$427,415.39		\$454,355.89		\$477,553.39		\$491,879.99		\$506,636.39		\$521,835.48		\$537,490.55		\$553,615.26		\$570,223.72		\$587,330.43	
Price Increase rate			3%		3%		3%		3%		3%		3%		3%		3%		3%		3%		3%		3%	
Yearly subscription price with inflation		\$ 79.00		\$ 81.37		\$ 83.81		\$ 86.33		\$ 88.92		\$ 91.58		\$ 94.33		\$ 97.16		\$ 100.07		\$ 103.08		\$ 106.17		\$ 109.35		
Daily subscription price with inflation		\$ 5.00		\$ 5.15		\$ 5.30		\$ 5.46		\$ 5.63		\$ 5.80		\$ 5.97		\$ 6.15		\$ 6.33		\$ 6.52		\$ 6.72		\$ 6.92		
3 day subscription price with inflation		\$ 12.00		\$ 12.36		\$ 12.73		\$ 13.11		\$ 13.51		\$ 13.91		\$ 14.33		\$ 14.76		\$ 15.20		\$ 15.66		\$ 16.13		\$ 16.61		
Monthly subscription price with inflation		\$ 29.00		\$ 29.87		\$ 30.77		\$ 31.69		\$ 32.64		\$ 33.62		\$ 34.63		\$ 35.67		\$ 36.74		\$ 37.84		\$ 38.97		\$ 40.14		
Hourly usage rates with inflation		\$ 2.00		\$ 2.06		\$ 2.12		\$ 2.19		\$ 2.25		\$ 2.32		\$ 2.39		\$ 2.46		\$ 2.53		\$ 2.61		\$ 2.69		\$ 2.77		
Yearly subs based on 8% uptake in 3rd year																										

# MARKETING PLAN AND PROMOTIONAL STRATEGY

Key elements of other bike sharing programs have included the following:

- A unique brand for the local bike share (could still be linked to bike shares in other cities).
- Launching the program with a major promotional program to:
  - create awareness of the program and get subscribers
  - promote education about safety
  - create a cycling-friendly culture that shows bicycles belong on urban streets with cars

Traditional methods such as brochures and a bike share specific website can be used. The total cost of marketing efforts is estimated at approximately \$50,000 annually. BIXI can provide a website similar to the ones used in Toronto and Montreal for a cost of approximately \$42,000. Annual upkeep charges of approximately \$10,000 would also apply.

The bikes themselves and the bike stations will go a long way toward creating awareness of the bike share program. The use of very bright colours on the bikes could be beneficial.

Even without a promotional effort, launching a new bike share in Hamilton will get major local media coverage.

Marketing activities and success rates should be monitored on an ongoing basis and adjusted as required. This could result in ceasing activities that are not producing results, and/or widening activities to include other tactics, including but not limited to paid advertising.

Developing a detailed marketing plan was outside of the scope of this business plan. A detailed marketing plan will need to be developed once upfront capital costs begin to be secured and the initiative looks viable enough to validate time spent developing a detailed marketing plan.

## **Marketing Strategies**

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Promotional activities will occur as outlined below. An emphasis on low cost items and “required” (brochures and website) tactics will be completed first. Higher cost items such as

trade shows and community events will be individually assessed on their success. Decisions may be made to alter the work plan and budget based on successes (e.g. reduce trade show totals and increase community events).

### **Brochures**

Develop a brochure as a hand-out piece in a two-sided card format for distribution at events, through partners, etc. Make brochures available at bike share stations, tourist info booths, hotels, motels, major attractions, and any other locations where local residents will have access to them.

### **Website**

A new website dedicated to Hamilton Bike Share would need to be created. It could be created and run independently by the bike share. Alternatively, BIXI has offered to develop a website if Hamilton goes with their system. The estimated cost for the website is \$42,000. The BIXI website would be similar to the ones used by BIXI in Montreal and Toronto. The site allows users to purchase memberships and also includes a map showing station locations, number of available bikes and empty bike docks. The site also allows users to check availability using their favourite mobile devices.

The website is a key element in the marketing and operation of the bike share program, as it allows users to optimize their usage of the bikes.

### **Trade Shows**

It may be worthwhile to set up a display and engage attendees at trade shows. The Hamilton Home Show sees 10,000 visitors and could be one of the trade shows attended. Display space could be shared with other City of Hamilton initiatives to reduce costs.

### **Community Events**

In order to promote a bike share program, consider setting up a display to engage attendees at community events (defined as events put on by community or neighbourhood groups). Although the attendance at community events is much lower than trade shows, the attendees are more likely to be included in the target audience. Community events generally have between 50-200 attendees.

### **Miscellaneous Promotional**

This involves covering the labour and nominal materials costs for a variety of promotional activities including those listed below.

Miscellaneous activities do not necessarily have specific target audiences associated with them. The main purpose of the miscellaneous promotional costs is to support other promotional activities by putting partnerships and collaborations in place to successfully achieve the targets from the promotional activities listed above.

Miscellaneous activities may include, and may not be limited to:

- Sharing notices, newsletter articles, website announcements, etc. distributed via other community organizations and other Bike Shares.
- Paid advertising on TV, radio or newspapers.
- Working to get TV spots on morning shows (CHCH), Cable14, Public Service Announcements (PSA's) etc.
- Social media promotion through Facebook, Twitter, YouTube videos, Blogs, etc.
- Articles included in community publications such as newspapers and newsletters.
- Bus advertising inside and outside of the bus fleet.

## **FINANCING PLAN**

Securing financing will be a major project unto itself. Financing will be required to pay for the capital costs and the start-up costs for the bike share program. Other bike shares around the world have received financing from many sources, such as federal, state or provincial governments, the city or region, corporate sponsors and private financing.

Annual operating costs are largely paid for by the bike share users, but in many cases, these costs are subsidized by city or regional governments.

Bike Share programs do not generate sufficient revenues to repay initial capital costs, so these must be borne by some type of sponsors, either government bodies or corporations. Capital costs are estimated at approximately \$1.8 million for a Hamilton bike share system. In other cities, large corporate sponsors have given up to \$1 million to be the title sponsor of the bike share program. This puts their name on the bicycles and the bike stations. Since Hamilton is a medium-sized city with a smaller bike share system, \$350,000 may be more appropriate.

Advertising on bike stations is another source of revenue, generating six figure incomes for some large city bike share programs. Some cities do not allow this for aesthetic reasons. In other cases, the municipality may already have contracts with companies, giving them the sole right to operate the street furniture (any structures which contain advertising such as billboards, bus shelters, benches or other signage) within the city.

Major local businesses and institutions which operate within the bike share area should be approached to sponsor a bike station at their business location. This would service their employees' needs as well as others in the immediate area. Promoting health and wellness of employees would be only one of the benefits to the employer. In return for sponsoring a bike station, the business would receive a certain number of free annual subscriptions for their employees.

Businesses to approach should include: McMaster University, McMaster Innovation Park, Mohawk College, Horizon Utilities, City Hall, Sheraton Hotel, tenants of the Federal Building and Provincial Building, Boards of Education, GO Transit, St. Joseph's Healthcare and others.

## **Bulk Pass Purchases**

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In lieu of station sponsorships, corporate partners could choose to purchase bulk subscriptions for their employees at a discounted price. If a minimum number of subscriptions are purchased by local businesses, a bike station could be located in the area to serve their needs. It is expected that McMaster University and Mohawk College's bulk bus programs would be complemented by a bulk bike share pass program. The cost per student of a bulk bike share annual pass would be \$25 which would represent a 70% discount off the total price of the regular annual pass. In order to secure these bulk purchase agreements, the students unions at both institutions will need to be approached and approved by the student assemblies or by referendum.

Any additional revenues generated by bulk pass agreements, over and above the necessary reserves that are required for replacement costs, will be used to improve service around both institutions thereby growing the system to meet the needs of the users in those areas.

# IMPLEMENTATION PLAN

## **Stakeholders**

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It is important to identify all of the stakeholders and get feedback early in the process of planning a bike share program. Stakeholders typically include: politicians, planners, transportation authority, parking authority, traffic and roads departments, police, merchants, car share operators, university and colleges, community groups, and the general public.

Input is needed from stakeholders to determine their vision and commitment in terms of support, advocacy and funding. Without substantial support and funding from community partners, a bike share system will likely not succeed. In a smaller city such as Hamilton, this community support is essential.

## **Administration and Operational Structure**

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This business plan could be implemented by a new or existing non-profit organization. In either case, the non-profit organization could collaborate with existing non-profits to make use of their strengths and reduce costs. This could be achieved through shared employees and office space, reducing overhead and administrative costs. For example, perhaps an arrangement could be made with existing non-profits such as Green Venture and Hamilton CarShare to form a management team or Board of Directors to lead the Bike Share organization. This non-profit would be contracted by the City to operate the bike share system and guarantee a level of service that is acceptable and based on the operating contracts of other existing Canadian systems.

A second option would be to contract the provider of the bike share system infrastructure to also operate the system with a service level agreement. This type of arrangement has been popular in the recent system developed in the United States through such providers as Alta-Bixi.

## **Administrative Structure**

The preferred model is that the bike share should be managed by the City and operated by a non-profit organization through a service level agreement. The non-profit would be responsible for all aspects of the operation of the bike share.

An advisory committee should be created to help guide and support the progress of the non-profit. This committee should be made up of city leaders such as councillors, city staff (representing departments such as planning, public works, HSR), members from organizations such as CarShare, the Hamilton Cycling Committee, and others.

Functions of the advisory committee would include:

- Identify community needs for public transportation services.
- Identify changes and trends in the local economy that affect the city's public transportation needs.
- Assist in identifying marketing and promotional opportunities for the bike share in Hamilton.
- Provide local knowledge, relevant background and or expertise.
- Review and provide input into the business plan.
- Identify future industry and environmental trends impacting the program.
- Facilitate opportunities for cooperative relationships with business and industry.
- Identify community or business resource people.
- Plan and assist in public relations programs and events.
- Participate in special events related to the bike share.
- Recommend strategies for strengthening relationships within the community.
- Actively support community fund-raising campaigns.
- Serve as an ambassador for the bike share system in the community.

## **Work Plan**

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The following list outlines the major tasks that would need to be completed for the planning and implementation of a bike share system in Hamilton.

- Present the business plan to Council and have it approved
- Secure capital and start-up funds through the Metrolinx Quick Wins fund in the order of \$1.75 million dollars
- Build support with stakeholder groups and execute the marketing plan to ensure residents in the phase 1 bike share service area are aware of and understand the benefits of the bike transit network.
- Determine administrative structure of the Bike Share; e.g. determine merits of operating

under an established non-profit, establishing a new not-for-profit including a board of directors or using an established system operator such as Alta-Bixi.

- Ensure the service level agreement with the operator includes professional services to assist with marketing, accounting, legal, design and public relations.
- Arrange multi-year sponsorship contracts to help offset operating losses and fund future capital expansion
- Secure corporate sponsors for bike stations or sell bulk memberships to local companies and institutions. This includes working with institutional partners to develop bulk pass agreements to serve the needs of students and staff at those institutions
- After financing is arranged, secure the operator contracts
- Order bikes and bike stations from supplier of choice, using an RFP process
- Develop and establish a website.
- Purchase vehicles, trailers, tools and other required equipment.
- Lease, or arrange in-kind space for maintenance and repair depot.
- Lease, or arrange in-kind warehouse space for off-season storage if required.
- Prepare locations for bike stations.
- Develop detailed marketing plan.
- Install bike stations.
- Launch the new bike share system.

## **Human Resources**

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A bike share in Hamilton could use the following human resources to execute this business plan.

- **Board of Directors** (assuming a new non-profit or other governing body is established specifically for Bike Share) – This could be made up of a shared board from other non-profits such as Green Venture, Hamilton CarShare and others.
- **Executive Director** – estimated as approximately a 25% time commitment during the start-up phase. The executive director of a non-profit such as Green Venture or

Hamilton CarShare could possibly take on this added responsibility.

- **Program Manager** – full-time commitment, year round. Primary responsibilities would include running the day-to-day operations, managing personnel and coordinating marketing efforts. The program manager would likely spend more time in the off-season securing sponsors and advertisers.
- **Bicycle Repair Technician** – full-time commitment, during the operating season (April to November). In the NiceRide bike share program, three repair technicians work full-time to maintain the fleet of 700 bicycles. In Hamilton's case with 200 bicycles, one repair technician should be able to handle the workload.

If the workload permits, the repair technician could take on the responsibility of re-distributing the bikes from full stations to empty stations as required. This activity is typically carried out in the evenings. Bicycle re-distribution requires the use of a vehicle and trailer. The trailer would need to be customized to carry the bicycles securely. Figure 25 shows a small vehicle and trailer used by the Velib bike share in Paris.



**Figure 21** – Bicycle Redistribution Vehicle, Paris<sup>28</sup>

Large bike shares often hire staff to develop and maintain a website and also set up their own customer service department within their organization. In the case of a smaller system such as Hamilton's, this would not be cost-effective.

Customer service can be provided by BIXI if their system is implemented. BIXI has quoted a

<sup>28</sup> Bike Sharing Guide, Transport Canada, 2009.

current price of \$110 per bicycle per year to provide this service. BIXI can create a website similar to the ones being used in Toronto and Montreal. This allows users to access maps showing station locations and bike availability at each station in real time using their handheld electronic device. The cost has been quoted as \$42,000 to create this website, and approximately \$10,000 per year to maintain and update it.

# APPENDIX A – RESIDENTIAL AND BUSINESS DEMOGRAPHICS

## Census Data for Hamilton

Census Data by area in Hamilton

<http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/prof/92-597/index.cfm?lang=eng>

Census Tract	Area	Pop'n (number)	Pop'n Density (number/sq km)	25-34 yo (number)	35-44 yo (number)	Median income all private households (\$)	Univ Cert, Diploma or Degree (number)	% of total pop'n with Univ Ed (Percent)	Total employed labour force 15 years and over (number)	% of total pop'n Employed (Percent)	Work in census subdivision of residence (number)	% of total pop'n work in subdiv (Percent)	Transp to work walk or cycle (number)	% of total pop'n walk or cycle (Percent)
0036.00	Hunter to King, James to Wellington	2542	7022	465	375					0%		0%		0%
0037.00	Hunter to King, Queen to James	2586	8176	520	385	18368	690	27%	1060	41%	605	23%	175	7%
0038.00	Aberdeen to Hunter, Bay to James	3668	10985	680	415	29318	990	27%	1665	45%	1050	29%	325	9%
0039.00	Aberdeen to Hunter, Queen to Bay	5140	14860	1315	845	34366	1745	34%	2890	56%	1730	34%	585	11%
0040.00	Aberdeen to Hunter, Locke to Queen	2037	5958	395	365	46977	570	28%	1230	60%	835	41%	245	12%
0041.00	Hunter to King, 403 to Queen	2134	5201	455	285	37961	535	25%	1180	55%	640	30%	245	11%
0042.00	Mtn to King, 403 to Locke	2730	1837	465	490	53522	645	24%	1630	60%	930	34%	210	8%
0043.00	Ewen to Longwood, 403 to Main	3633	1910	485	470	45025	1180	32%	1810	50%	910	25%	210	6%
0044.00	Mtn to Ewan, 403 to Main	4585	3751	815	550	40290	1320	29%	2200	48%	1330	29%	215	5%
0045.00	CNIB to Longwood, N of Main	3351	1063	400	340	80906	1575	47%	1960	58%	1305	35%	560	17%
0046.00	Churchill Pk to 403, N of 403	3212	2570	480	525	48334	1230	38%	1585	49%	935	29%	260	8%
0047.00	King to York, 403 to Queen	2871	2333	405	410	35004	510	18%	1355	47%	745	26%	225	8%
0048.00	King to Cannon, Queen to James	1761	4754	370	300	25736	235	13%	665	38%	425	24%	160	9%
0049.00	King to Cannon, James to Wellington	2597	5861	405	365	25513	285	11%	800	31%	460	18%	180	7%
0063.00	Cannon to tracks, James to Wellington	3182	5587	470	520	29213	220	7%	1200	38%	645	20%	160	5%
0064.00	Cannon to tracks, Queen to James	1821	3193	275	290	37772	210	12%	790	43%	450	25%	150	8%
0066.00	Tracks to lake, Bay to Wellington	5252	3603	730	795	43450	380	7%	2325	44%	1430	27%	240	5%
	All of this area	53102	5216	9130	7725	39485	12320	23%	24345	46%	14425	27%	4145	8%
Hamilton	All of Hamilton Metro area	692911	505	83290	106025	60567	117800	17%	347485	50%	180815	26%	19010	3%
Ontario	All of Ontario	12160282	13	1535650	1916405	60455	2417330	20%	6164245	51%	3056365	25%	389105	3%

## APPENDIX B – WEB RESOURCES

### Background

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The Bike-Sharing Blog  
[www.bike-sharing.blogspot.com](http://www.bike-sharing.blogspot.com)

### Bicycle Sharing Systems

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Barclays Cycle Hire  
London  
[www.tfl.gov.uk/cyclehire](http://www.tfl.gov.uk/cyclehire)

Bicing  
Barcelona, Spain  
<http://www.bicing.cat>

BIXI  
Montreal, QC  
[www.montreal.bixi.com](http://www.montreal.bixi.com)  
Toronto, ON  
[www.toronto.bixi.com](http://www.toronto.bixi.com)  
Ottawa, ON  
[www.capital.bixi.com](http://www.capital.bixi.com)

Bycyklen  
Copenhagen, Denmark  
[www.bycyklen.dk](http://www.bycyklen.dk)

Capital Bikeshare  
Washington, DC  
[www.capitalbikeshare.com](http://www.capitalbikeshare.com)

DecoBike  
Miami Beach, FL  
[www.decobike.com](http://www.decobike.com)  
Melbourne Bike Share  
Melbourne, Australia  
[www.melbournebikeshare.com.au](http://www.melbournebikeshare.com.au)

NiceRide Minnesota  
Minneapolis, MN  
[www.niceridemn.org](http://www.niceridemn.org)

Vélib  
Paris, France  
[www.velib.paris.fr](http://www.velib.paris.fr)

Vélo'v  
Lyon, France  
[www.velov.grandlyon.com](http://www.velov.grandlyon.com)

Villo!  
Brussels, Belgium  
<http://en.villo.be/>

## **Car Sharing**

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Community Car Share  
Hamilton, ON  
<http://communitycarshare.ca/>

## APPENDIX C – CASE STUDIES

BIXI has put together several case studies on their website. They can be viewed at the following web address:

<http://www.bixisystem.com/what-we-achived/case-studies/>

NiceRide Minnesota shares a lot of information on their website at:

[www.niceridemn.org](http://www.niceridemn.org)

Minnesota Nice Ride financial statistics for their first year of operation, with 65 stations and 700 bikes:

- Capital cost of \$3 million (\$4,285/bike).
- Their business plan estimated the system's annual operating expenses at \$1.5 million for 1,000 bicycles and 75 bike stations (\$1,500/bike per year).
- Actual first year Revenue was \$300,000.
- Revenue Sources:
  - 29,077 x \$5 for 24 hr subscriptions = \$145,385
  - 1,295 x \$60 annual subscriptions = \$77,700
  - Other usage fees = \$77,000
- Total Revenue = \$300,000 as given in NiceRide presentation (this is \$429/bike in the first year)

# **Bike Share Feasibility Report**

*Compiled and Revised*

Jesse Bauman  
(McMaster University)  
Matthew Sweet  
Peter Topalovic  
Alan Kirkpatrick

December 20, 2010

## **Executive Summary**

This document is composed of two distinct components; the bulk of the document is a feasibility study produced by McMaster B. Arts and Science student Jesse Bauman; the additions are the executive summary and the Appendix which serve to add the context of developments in the planning of a bike share system by City of Hamilton staff since the completion of the initial feasibility study.

Bike Share systems have developed from highly informal borrowing models to the current so-called 4<sup>th</sup> generation bike share systems which feature GPS tracking of bikes, credit card and membership payments, and portable docking stations.

Smart Commute Central York performed its own feasibility study on implementing a bike share system in Newmarket, upon which the Bauman feasibility study is based. The Bauman study recommends a library-lending model for bike share in the City of Hamilton. It also recommends sending out requests for proposals from bike share companies, investigation of potential capital funding opportunities, and development of a marketing campaign in advance of implementation.

In August of 2010, the City of Hamilton welcomed representatives from Bixi and Bcycle, bike share operators from the cities of Montreal, QC and Denver, CO respectively, to demonstrate their systems and technologies to stakeholders and the general public. Both of these systems are considered to be 4<sup>th</sup> generation bike shares.

**Feedback from that expo strongly favoured investigating a 4<sup>th</sup> generation bike share model for the City of Hamilton.**

# Introduction

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## Project evolution

In partnership with Smart Commute Hamilton and Metrolinx, the City of Hamilton presents this report in order to consider the feasibility of a public bike share system (PBS) in Hamilton. This report builds on research conducted by Metrolinx and Smart Commute Central York, who also considered the opportunities and challenges relevant to a potential bike share in the Town of Newmarket. Smart Commute Central York produced three reports. This reports uses their Phase 3 Final Report as a model and builds upon the research contained therein. The Phase 3 Final Report was the feasibility study completed by York Region for the Town of Newmarket. The Phase 1 and Phase 2 Final Reports provide background research, establish best practices for public bike systems and other relevant criteria for gauging feasibility; this report also builds upon the research completed in those two Reports, and largely focuses on the Smart Commute Hamilton-McMaster Bike Share Proposal, drafted in the summer of 2009.

## Project Relationship to Provincial Policy Initiatives

This report continues certain objectives highlighted by a number of provincial releases, most recently *The Big Move*, the 2008 regional transportation plan for the GTHA. Included in that plan are goals such as Big Move #4, which is to “complete walking and cycling networks with bike-sharing programs,” and Priority Action 2.2, to “create pilot bike-sharing programs in major urban centres.” *The Big Move* grew from the comprehensive 2005 *Places to Grow* report, which included downtown Hamilton as one of its urban growth centres. As an urban growth centre, downtown Hamilton is designated as an important area for investment and planned growth; to develop major transit infrastructure; and to serve as a high density major employment centre. *Places to Grow* identifies and supports “a transportation network that links urban growth centres through an extensive multi-modal system.” This report considers a public bike share system in the described policy climate. A PBS in Hamilton should address the majority of the policy goals outlined above.

## Project Relationship to Hamilton Goals and Initiatives

This report describes a public bicycle system that would support and align with numerous City goals, visions and initiatives. The most important are described below:

*Cycling Master Plan* builds upon the previous “Shifting Gears Master Plan” from 1992, and guides development and operation of Hamilton’s cycling infrastructure for the next 20 years. Its underlying philosophy is that every cyclist should be able to reach a network of trails without traveling more than one kilometre. The Plan demonstrates the City’s serious commitment to cycling as a viable mode of transportation, and to providing comprehensive and accessible cycling infrastructure. Bike Share supports two of three core policies of the plan, which are to “build awareness and promote the benefits of walking and cycling,” and to “continue to improve and expand on the existing network of pedestrian and cycling infrastructure.”

*Corporate Strategic Plan* imagines Hamilton as “the best place in Canada to raise a child, promote innovation, engage citizens and provide diverse economic opportunities.” The Strategic Plan includes two focus areas: fostering Environmental Stewardship and creating a Healthy Community. A bike share system would provide action for those two areas in particular, thus contributing to the realization of the Plan.

*Innovate Now! Public Works Strategic Plan* is the articulation of the goals of Public Works to gain recognition as “the centre of environmental and innovative excellence in Canada.” One of the four immediate objectives is to make Public Works a “leader in ‘greening’ and stewardship in the City” by helping to reduce the environmental footprint of transportation in Hamilton. Public Bike Share supports that directive.

*Transportation Master Plan* directs and regulates development of transportation infrastructure, and demand management, in Hamilton. Bike Share directly relates to the 2007 Plan, which includes as key objectives “a choice of integrated travel modes, emphasizing active transportation (walking and cycling), public transit and carpooling.”

*Transportation Demand Management Work Plan* is a part of the Strategic and Environmental section of Public Works, which focuses on promotions and initiatives that reduce the number of single occupancy vehicles on the road in Hamilton. The Plan lists a bike share system as a project.

*Public Health Services Strategic Plan/Hamilton Walks* includes six focus areas, which emphasize improving local air quality and improving the overall health of communities through physical activity. Active and Safe Routes to School are Public Health Service programs that promote walking and cycling. Healthy Living Hamilton, with support from Public Health Services, organizes Hamilton Walks. In addition to those already discussed, Hamilton Walks’ goals are to make walking a viable choice for transportation.

*Clean Air Hamilton* is an organization of academics, government employees and local industry and community members, whose purpose is to improve air quality in Hamilton. One of Clean Air Hamilton’s objectives is to promote “behavioural changes amongst individuals living and working in Hamilton.” A bike share supports that goal by providing alternative opportunities, and sustainable modes of transportation.

*Commuter Challenge* is an annual initiative whose primary goal is to reduce dependence on single passenger automobile trips. Hamilton runs events for Commuter Challenge, which are rapidly growing in popularity. A public bike system shares the same objectives.

*Vision 2020* is a collective imagining of Hamilton’s future, conceived by citizens, City council, businesses and organizations. It has been updated every five years since its adoption in 1992. The Vision acknowledges that it is imperative to consider the interconnected economic, social and environmental impacts of our decisions, and is based on four basic principles, which include: “fulfillment of human needs” and “maintenance of ecological integrity.” Bike share supports at least those two foundational principles.

## Project Relationship to Existing Cycling Culture in Hamilton

It is important to consider the extent to which a ‘cycling culture’ exists in Hamilton. The following outlines those committees, organizations or initiatives that demonstrate a commitment to cycling as an alternative mode of transportation, with an emphasis on the groups who seem capable of sustaining such a commitment.

### *Hamilton Cycling Committee*

According to their terms of reference (last updated June 2002) the HCC’s purpose is to "advise the City Government on all matters related to cycling, to monitor implementation of the Hamilton Cycling Plan

[and] to participate in planning for bicycling facilities" among other things. A member from the HCC should be included as a stakeholder. The HCC's stated purposes strongly align with our research agenda and should be beneficial in design and implementation.

#### *HSR's Bike N' Bus Program*

All HSR buses now feature external racks, so that each bus can carry two bicycles at a time. This new feature allows public transit users to extend trips and combine modes of transportation, making both cycling and bussing more attractive and feasible.

#### *Hamilton Cycling Club*

The Hamilton Cycling Club organizes various group rides – racing, recreation, training and touring. They are a strong part of the cycling community in southern Ontario, and introduce many in the region to cycling in its many forms. Including a member from the HCC could be helpful in marketing the bike share, and as a liaison with other parts of cycling community.

#### *Transportation for Liveable Communities*

TLC is a working group of the Ontario Public Interest Research Group (OPIRG) McMaster. As a group they advocate for greater access to alternative transportation, emphasizing the link between those forms of transportation and healthy livable cities. A bike share network aligns with those goals, and should be supported by TLC, who could also be helpful promoting the program.

#### *MACycle Co-op and Recycle Cycles*

MACycle and Recycle Cycles offer affordable used bicycles for sale, in addition to providing repair assistance to community members. The former tends to service McMaster University and the surrounding community, whereas Recycle Cycles tends to attract more residents from downtown Hamilton. Both promote cycling as an alternative mode of transportation, and look to make cycling more accessible and affordable for people who might otherwise choose different means of transportation. The current MACycle Director is a research consultant for the bike share program and can act as a liaison to the McMaster community.

#### *Local Bike Shops*

There are 14 bike shops in Hamilton, Dundas, Ancaster, Waterdown and Burlington. Some provide rental services on a small scale already. It is imperative that some business owners be included as stakeholders.

## **Market Analysis**

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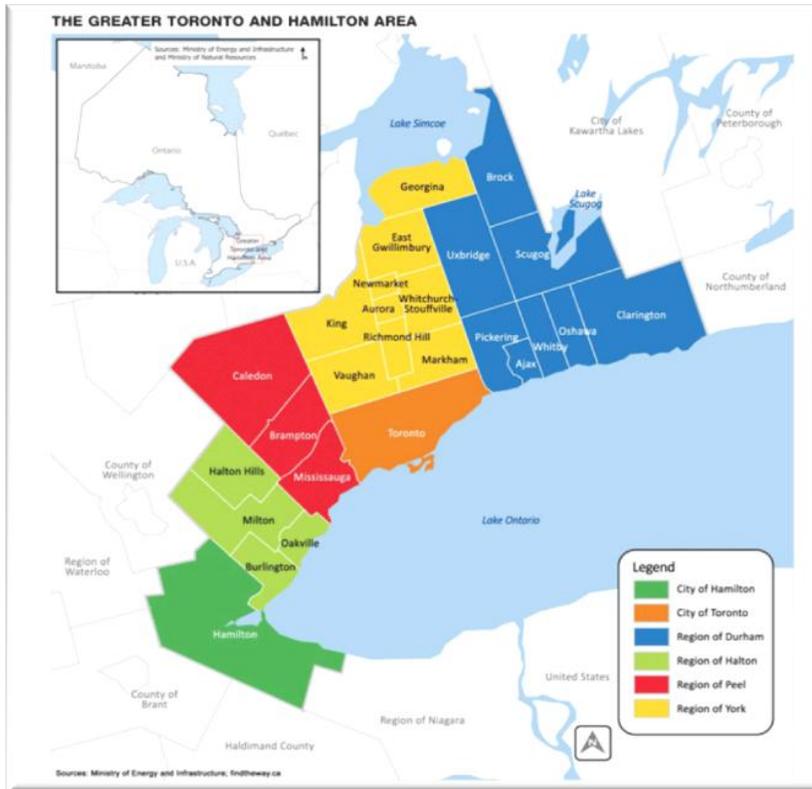
The market analysis presented in this Report examines the City of Hamilton, as well as the Downtown Hamilton urban growth centre (as identified in the 2008 *Big Move* document) and focuses on indicators deemed relevant to a potential PBS. Chapter 6 includes a discussion of relevant market indicators.

### **Profile of the City of Hamilton**

This section of the report profiles the City of Hamilton and relevant data for the Downtown Hamilton urban growth centre.

The City of Hamilton is the fourth largest in Ontario, as of 2006.<sup>1</sup> Hamilton Downtown is highly concentrated, particularly around the Jackson Square shopping centre. Over 23,000 students are enrolled at McMaster University, which is located on the West end of the city, approximately five kilometers from

Jackson Square. A prominent escarpment runs East-West through the Southern part of the City, but this Report does not consider a PBS that includes kiosks located on the “Mountain.” **Figure 1** shows Hamilton’s position in the GTHA.



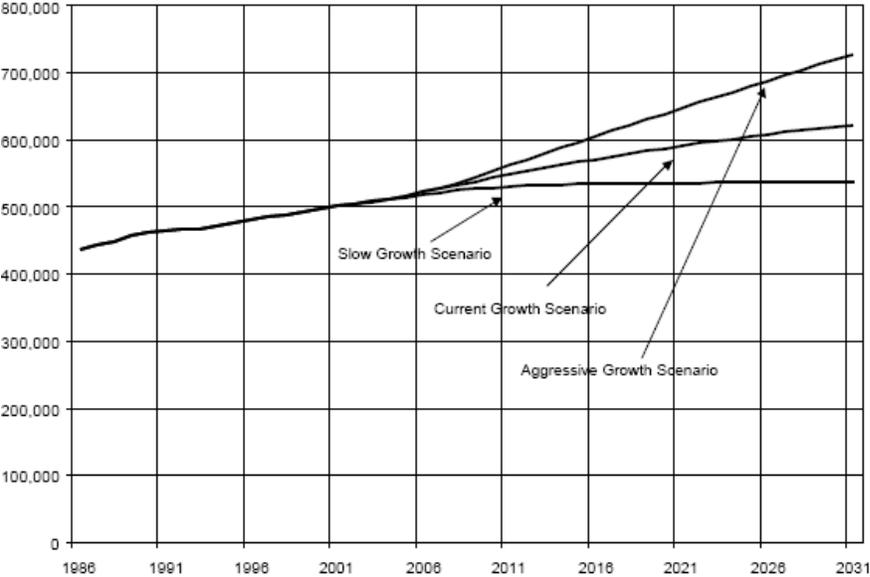
**Figure 1 – Location of the City of Hamilton within GTHA**  
 Source: Ministry of Energy and Transportation (<http://www.findtheway.ca>)

The central urban growth centre in Hamilton, referred to hereafter as Downtown Hamilton, is bounded by the escarpment on the South, Barton street on the North, Sherman avenue on the East and Queen street on the West. As shown in **Figure 2**, Downtown Hamilton includes the Hamilton GO and HSR Stations, the Main Branch of the Hamilton Public Library, Lloyd D. Jackson Square and Hamilton City Centre.



**Figure 2: Downtown Hamilton Urban Growth Area**  
 Source: Microsoft Live Search Maps (2010)

Figure 3 presents population growth in the City of Hamilton, and demonstrates the City’s considerable growth in the past, and suggests similar growth in the future.



**Figure 3: City of Hamilton Total Population, Actual 1986 to 2001, Projected 2002 to 2031**  
 Source: Statistics Canada and the Centre for Spatial Economics

Table 1 presents demographic information for the City of Hamilton. Long term (i.e. 2021-2031) modal share projects are displayed in Table 2 and historical weather data is presented in Table 3. Cycling policies, programs, infrastructure and partners for the City are shown in Table 4. Together, those three tables suggest a potential market for a PBS in Hamilton, and the discussion of opportunities and threats in Section 6.2 builds upon the information presented here.

**Table 1: Key Demographic Indicators for the City of Hamilton**

Description	City of Hamilton	Hamilton Downtown (Urban Growth Area)
Population <sup>1</sup>	504,599	50,812
Population Density (per square kilometre) <sup>1</sup>	451.6	6,633.4
Employment Density (per square kilometre) <sup>2</sup>	1,070.0	No data.
Total Land Area (square kilometer) <sup>1</sup>	1,117.21	7.66
Median Age of Residents <sup>1</sup>	39.6	38.1
Percent of the Population Between Ages of 15 and 54 <sup>1</sup>	56.12%	61.60%
Median Household Income (2005) <sup>1</sup>	\$66,810	\$38,343
Location of Employment for the Residents <sup>1</sup>	At home: 5.52% Outside Ontario: 0.51% No fixed address: 9.90% Municipality of residence: 59.06% Different county: 25.01%	At home: 4.15% Outside Ontario: 0.44% No fixed address: 11.37% Municipality of residence: 57.95% Different county: 26.09%
Modes of Transportation used by Residents <sup>3</sup>	Walk: 7.21% Cycle: 0.66% Transit: 11.10% Motor Vehicle: 80.86% Other: 0.17%	Walk: 0.06% Cycle: 0.49% Transit: 10.44% Motor Vehicle: 88.85% Other: 0.16%
Percent of Trips that are Short Distance (0-5km) <sup>3</sup>	No data.	66%
Average Number of Vehicles Owned by each Household <sup>3</sup>	No data.	1.2

**Table 2: Long-Term (2021 to 2031) Modal Share Projections:<sup>4</sup>**

Description	Modal Share
Single Occupancy Vehicle Trips	52%
Municipal Transit	12%
Walking or Cycling	15%
Annual Transit Rides Per Capita	80-100

*Sources:*

<sup>1</sup> 2006 Statistics Canada Census Data ([www.statcan.gc.ca](http://www.statcan.gc.ca)).

<sup>2</sup> 2006 Retrieved from Hess, P., A. Sorenson & K. Parizeau. (May 2007). Urban density in the Greater Golden Horseshoe. Centre for Urban and Community Studies, University of Toronto.

<sup>3</sup> 2006 Transportation Tomorrow Survey (<https://www.jpint.utoronto.ca/drs/index.html>)

<sup>4</sup> [Hamilton Transportation Plans, Opportunities and Constraints](http://www.metrolinx.com/Client%20Documents/1/cityofhamilton0707.pdf)  
(<http://www.metrolinx.com/Client%20Documents/1/cityofhamilton0707.pdf>)

**Table 3 : Historical Weather Data for the City of Hamilton**

Days with minimum temperature:													
<=0°C	28.7	25.4	23.5	9.6	0.37	0	0	0	0.19	3.2	14.2	25.6	
Days with snowfall:													
>=0.2cm	11.1	9	5.1	1.5	0	0	0	0	0	0.04	2.5	8.9	
Days with rainfall:													
>=5mm	5.5	4.7	8.9	11.7	11.8	10.6	10.7	10.7	11.7	11.7	12.1	7.8	

Source: Government of Canada – Canada’s National Climate Archive; Historical weather data (from 1971 to 2000) for Hamilton Royal Botanical Gardens weather stations

(<http://www.climate.weatheroffice.ec.gc.ca/>).

**Table 4 : Cycling Polices, Programs, Infrastructure and Partners in the City of Hamilton**

Transit Service	
Lower-Order Public Transit Service	33 Hamilton Street Railway bus routes
Higher-Order Public Transit Service	GO Transit bus service Go Transit rail service (downtown Hamilton station) “A-line” and “B-line” Express HSR Routes Proposed Light Rail Rapid-Transit System (feasibility analysis stage)
Cycling and Transit Integration	
Bike Racks on Buses	Entire GO Transit network Entire HSR network
Bicycle Parking	Hamilton GO station (downtown) provides secure bike storage for annual fee GO Centre and McMaster stations provide covered bicycle racks Smart Commute Hamilton has secure bike parking in two downtown parking garages Metrolinx has committed \$166,987 for secure parking in the City
Potential Community Partners: Governments, TMAs and Transit Agencies	
Government	Metrolinx Ontario Ministry of Transportation Transport Canada City of Hamilton Hamilton Public Libraries
Smart Commute TMA	McMaster University Mohawk College City of Hamilton Hamilton Health Sciences Horizon Energy Smart Commute Hamilton
Transit Agency	GO Transit Hamilton Street Railway Hamilton Car Share

## Online Survey of Public opinion

With input from Metrolinx, Smart Commute Hamilton and the City of Hamilton, study consultants developed an on-line survey that collected public opinion relating to a possible PBS in Hamilton as well as general attitudes towards cycling and transit in the city. The survey was distributed widely, by e-mail, through various institutional list-servs (City of Hamilton, Smart Commute Hamilton, McMaster Students Union, Outdoor Club and Sustainability Office, and OPIRG McMaster) website advertising (Transportation for Liveable Communities, SCH, “Raise the Hammer”) and shared on Facebook.

Questions related to cycling in Hamilton asked about potential barriers to cycling in the city, and areas of improvement. Regarding the possibility of a PBS, questions asked about general interest and knowledge of PBS, desirable kiosk location and expected nature and frequency of use. There were 496 respondents. We should acknowledge certain biases in the results: an individual requires computer and internet access to complete the survey; to gain access to the survey an individual must either frequent the aforementioned websites or receive those list-servs -- in general these people come from a demographic that might be relatively open or sympathetic to bicycle travel; and, having learned of the on-line survey, an individual must be moved to take the time to complete the survey. The results are not statistically significant, but nonetheless suggest a large group of individuals interested in a PBS in Hamilton, and as the survey results demonstrate, committed and willing to participate. Moreover, we were able to approximate where respondents live in Hamilton, and to our surprise, it appears that the majority of respondents were not McMaster University students. The results are therefore important to this Report. Select graphs from the survey and a complete summary of results can be viewed in Appendices B and C.

## Summary of Key Online Survey Findings

- 84% of respondents were interested in using a PBS in Hamilton;
- 22.2% of people reported making less than five short trips (<5kms) a week, and 23.1% and 18.8% of people, respectively, said that they made between six and 10, and 11-20 short trips weekly;
- The largest “barrier” to cycling in Hamilton was insufficient on-road cycling facilities (79.5%) followed by feeling uncomfortable riding on the roads and the winter (both 61.1%), and concern about bicycle theft and security (42.6%);
- 33.9% of respondents would use a PBS a few times a month, and 26.5% would use the service a few times a week;
- 17.1% of respondents said they would not be interested in using the service;
- 56.4% of respondents said they would be “Very Likely” to use a PBS at no cost, and 23.2% responded “Somewhat Likely”;
- At a cost of \$1 a day, 29.3% responded “Very Likely” and 30.1% said “Somewhat Likely”;
- Numerous rental locations (87% of respondents) and availability at transit stations/bus stops (63.5%) were reported as the most important features of a PBS in Hamilton;
- Respondents expected to use a PBS for “errands and appointments” (68.8%), “shopping” (54.2%) and “recreation” (51.6%);
- “McMaster University” (57.5%), “Transit Stations” (57.1%) and “Downtown Hamilton – Gore Park/Jackson Square” (51.7%) were ranked as the most important rental locations;

- 74.4% of respondents are “Strongly in favour” of sharing existing road space to accommodate a PBS in Hamilton; and,
- 43.1% of respondents are “Strongly in favour” of using outdoor advertising to finance a PBS

*There were also a number of significant relational correlations:*

- Younger respondents (in the 18-25 and 26-30 years old categories) make more short trips, suggesting a positive alignment, in Hamilton, between typical PBS users and typical PBS use;
- 18-25 year olds were most likely to use a PBS a few times a week;
- Commuters who reported driving alone seven days a week most often responded “Not at all likely” to potentially using a PBS;
- Of respondents who have no bicycle, 62.5% reported that it is “Very likely” that they would use a free of charge PBS, 22.5% said it was “Somewhat likely”;
- 33.3% of respondents without bicycles reported that it is “Very likely” they would use a PBS and 35.9% said it is “Somewhat likely”

## Hamilton Bike Share Market Evaluation

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This section reviews the experiences of other groups and organizations that have developed or delivered similar bike share systems. Considering processes, planning, and design decisions helps to discern best practices and potential challenges for the Hamilton case. This section borrows from research and analysis found in the Phase 3 Report for the Newmarket Bike Share Program.

### Operational Models

Research from Phase One of the Newmarket Study reveals four broad types of bike share systems, based upon review of international PBS implementation. As bike share systems are growing in popularity, there may be systems, not yet reviewed, which could lend valuable insight to the Hamilton model. Presently, there are four types, as identified in the Newmarket Report, related to this study.

#### **Community Bike Share (member-based)**

This model employs either a limited number or one rental location. Bicycles are typically simple, off-the-shelf recycled or refurbished models. Program personnel register users manually (though in some cases on-line bike rental requests are possible), sign bicycles in and out, and where it is needed, request maintenance. Typically, an annual registration fee and membership is required. This tends not to cover operating costs, and bicycles can be rented for one to three days.

While a municipality might act as funding partner or sponsor, a local community group or charity typically acts as the lead agency. That group's staff or volunteers handle day to day rental and billing, as well maintenance and repair duties. The latter are sometimes outsourced to a local bicycle shop. The same community group coordinates marketing efforts in concert with local partners and sponsors. Government covers the operating subsidy, or else corporate grants and sponsorship. When labour is provided by volunteers, operating costs can be quite minimal, mainly bicycle parts and printing costs.

#### **University or Employer Bike Share**

This model is similar to the community bike share, but offers membership to university students or employees instead of offering registration to the general public. Again, a small number of lending stations (1-5), and simple everyday bicycles are employed. System personnel manually register users, lend and return bikes, and request mechanical service. Students or employees borrow bikes, free of charge, for one or two days. The university model gets funding from general university resources or a student levy, whereas company or organization funds provide support for the employee model.

Program planning and implementation is led by the university (e.g., sustainability office) or employer (e.g., workplace health committee) who is responsible for day to day rental and billing. The university or employer is also responsible for hiring technical personnel and volunteer recruitment, or contracting an organization to take care of maintenance. Marketing can be outsourced, or else is the responsibility of university/employer.

#### **Public Smart Bike or Call-a-Bike (fee for use, Public-Private Partnership)**

This model employs numerous stations throughout an urban area. Stations are able to automatically process payment, rent and return bicycles and communicate mechanical updates. Bicycles are purpose built, meaning they are sturdy, rugged and otherwise specifically suited to urban commuting. A central computerized tracking system handles registration, billing and mechanical service dispatch. There are

significant personnel requirements, for system management, bike repair and redistribution, and marketing. After the registration fee, bicycles are free to rent for a half hour, after which rates increase exponentially. Bicycles are available for rent and return anywhere throughout an urban area in the Call-a-bike model. There are no fixed locations or stations and access to bikes is through mobile phone (the bike lock code is sent through SMS). Bikes are similar to the Smart Bike system described above, but also include Radio Frequency Identification (RFID) tags which allows tracking of bikes and aids in redistribution. This system has similar personnel demands, for management, repair, distribution and marketing. Usage is billed by minute, in addition to the membership fee.

The lead agency is usually the local municipality or the public transit operator, who generally outsources all operations – registration, day-to-day rental and billing, maintenance and repair – to an advertising company. Marketing efforts are led by the municipality or public transit operator. Billboard advertising space is granted to an advertising company in return for system operation.

### **Public Smart Bike or Call-a-Bike (fee for use, public funding)**

This model resembles the public-private partnership model, but the public model does not outsource operations to an advertising company. Therefore the municipality or transit operator does not lose advertising revenue, but it must then subsidize the program from its own revenue streams. This might require private advertising or sponsorship, or relevant transportation related fees and taxes. The bicycle fleet might be designed “in-house” or purchased “off the shelf” from a vendor.

### **Local vs. Area-wide Operations**

Further analysis of these systems and examination of specific case study examples of existing programs demonstrated that these four types of systems can be further classified into two categories: (1) the small-scale bicycle lending library; and (2) the large-scale fee-for-use system.

Type 1 is typically a localized bike lending program for a specific target group (bike share members, university students and staff or workplace employees). This means that the user base is constrained by some variable (e.g., employment or membership).

This type of system is referred to as a *local system*. These systems usually have just one rental location, are free to use, have fairly long rental periods (from a few hours to a few days) and are generally only available during working hours (not 24 hours per day). System administration and billing (if applicable) is usually completed manually by system personnel, and bikes are simple off-the-shelf consumer models or recycled donations. Generally speaking, the funding subsidy comes from general expenditures (a university’s or an employer’s) and/or grants.

Type 2 is a more widely available bike share system for the general public (commuters, tourists and others). This type of system is therefore referred to as an *area-wide system*, and lacks the constraining variable which partially defines Type 1 systems. These systems provide dense coverage of rental locations, are available 24 hours per day and free to use for the first half hour, though costs increase rapidly beyond the first half hour to encourage short-term use. Bicycles are custom designed for the system, and administration and billing is automated. In general, funding subsidies are provided from public sources, either through government expenditures or advertising revenue.

## Residential Target Market

Important Resident Target Market (RTM) indicators, according to best practice research, are:

- Presence of young people;
- Presence of university/college campuses;
- Presence of major places of commerce and employment; and
- Presence of major interest points (museums, theme parks, etc.).

In the City of Hamilton 56.12% of the population is between the ages of 15 and 54; in the Hamilton Downtown Urban Growth Area that number is slightly higher, at 61.60%. Marketing should target this key group. McMaster University should be included, though it falls outside of the Downtown Urban Growth Area. Although Mohawk College satisfies numerous RTM indicators, its physical isolation suggests that its inclusion in a PBS should occur at a later phase, once the program is firmly established. Hospitals, public libraries and major places of commerce and employment should also be targeted.

## Recommended Operational Model(s)

Best practice research demonstrates that a large-scale ‘smart bike’ system with a dense network of stations, or a large-scale ‘call-a-bike’ system with numerous bikes are best-suited to communities with a minimum population of 200,000 people. Given the current population of Hamilton, this model will be considered in a different report (forthcoming).

Also due to the cost of those more technologically advanced models, the three sub-types of the local system described above also deserve consideration. The university system is not desirable because of the locations of McMaster University and Mohawk College outside of the downtown, as well as the goal of making the public bike share accessible to individuals outside those institutions. For that same reason, the employer based system is also less preferable, and Smart Commute Hamilton should consider the more public option of a community-based type of system. This report pursues the latter options, while another report considers the smart- or call-a-bike system.

## Advantages

The public, community based system has numerous advantages: start-up capital costs are relatively low; longer lending periods appeal to people who may want to cycle as part of a longer trip chain; and making the system available to a large portion of the general population promotes active transit and cycling in particular.

## Disadvantages

Generally, limited number of rental locations makes one-way trips difficult; the lack of automation in the registration and rental system requires more personnel hours relative to the size of the system, and might discourage casual users; and, longer lending periods can mean that there are fewer bikes available to borrow at any given time.

## Hybrid Model

Because Hamilton has a relatively dense downtown core, and large education and health institutions outside that area, Smart Commute should follow the basic recommendations of a small-scale community based model, but should consider incorporating elements of the larger scale system. While it may not be economically feasible to have a large number of bike stations, incorporating technology typical of smart-bike systems should prove beneficial. This could be financially feasible partly due to the existing capabilities of the library’s tracking system. Some elements may still be manual – such as registering users and reporting bike repair requirements – but sign-in/out procedures could be partially automated.

## Proposed Hamilton Pilot Project

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*(NOTE: SINCE PUBLICATION THE “SMART BIKE” 4<sup>TH</sup> GENERATION MODEL OF BIKE SHARING SYSTEMS HAS BEEN SELECTED BY PUBLIC WORKS AS ITS PREFERRED MODEL, PLEASE SEE APPENDIX FOR MORE INFORMATION)*

Smart Commute Hamilton and the City of Hamilton have proposed to implement a bike share pilot program in the City of Hamilton. The “Hamilton Pilot Project,” as a public bike share, aims to raise the awareness of citizens and facilitate a shift towards cycling in particular and sustainable transportation in general. The 2009 “Smart Commute Hamilton-McMaster Bike Share Proposal” outlined a potential PBS in Hamilton that would collaborate with Hamilton Public Libraries. This report recommends a phased implementation starting no earlier than the spring of 2011.

### Outline for library hybrid model

#### *Phase One Outline*

Phase one should begin with development of a Hamilton PBS Task Force, a group that would administer the project. This Task Force could be made up of representatives from partner organizations and those involved in PBS Stakeholder Meetings. In addition to Task Force development, the first phase also includes: hiring a full time project coordinator; finalizing business and marketing plans; finalizing hub locations by formalizing community partnerships; developing website and program materials; and, most importantly, releasing a Request for Information (RFI) or Request for Proposal (RFP) to relevant PBS corporations so as to obtain a workable physical solution to the check in/out procedure.

#### *Phase One Development*

##### Docking Stations

Tentatively, stations would be comprised of a physical docking station with an RFID-enabled padlock and reader/antenna. The final design of this docking station is uncertain until designs are submitted in response to the Smart Commute RFI/RFP. Electronic locking technology is versatile, and any mechanical lock can be programmed so as to track use and further secure the system. Potential “docking station” designs include RFID-enabled padlocks on bike lockers or programmable U-Locks and traditional bike racks. Due to cost and streetscaping issues, bicycle lockers are not recommended. Following conversations with the Buffalo Blue Bike coordinator, this report advises against leaving bicycles outside, overnight, in downtown areas with low foot traffic. That coordinator also suggested partnering with organizations willing to house bicycles overnight, in problem areas. More detailed information concerning bike, locks, keys and RFID technology is included in **Appendix A**. The following implementation actions remain:

- Design, release and respond to RFI/RFP;
- Secure physical locations for hubs;
- Purchase hardware;
- Install physical stations and RFID reader/antenna at each location. Integrate docking technology with website and library network;
- Train library staff to use integrated PBS/Library software
- Ensure system design allows PBS Coordinator administrative access to network; and
- Launch website, which allows users to check location/status of bicycles throughout network.

### Staffing

Due to uncertainty inherent in PBS development, it is impossible to define Coordinator's exact duties. The following is a tentative list:

- General administration of Hamilton PBS;
- Liaising with Task Force and SCH;
- Marketing strategy and material development;
- Collecting, disseminating, analyzing usage data;
- Managing bicycle maintenance – supervising volunteers or completing work individually;
- Acting as “spokesperson” for PBS: responding to inquiries from media, public, users and responding accordingly; and
- Preparing and presenting an annual report and regular frequent reports

Hamilton Public Library could also support the program in the following ways:

- Administering user registration and the borrowing/return of RFID keys;
- Responding to questions from library members;
- Maintaining, charging and programming the RFID keys;
- As per library policy, contacting users who do not return bicycles in time, and taking appropriate punitive measures (fines, etc.); and
- Maintaining communication with Coordinator.

### Promotion

As stated earlier in this Report, marketing is widely accepted as a key element in successful PBS systems. A marketing strategy should include the following:

- Create, advertise and distribute a map, which identifies locations of bike stations along with key destinations and relevant attractions within the City of Hamilton. Should also contain information about trails, route suggestions and other cycling facilities within the City;
- Development of digital materials, to distribute amongst institutions identified in Phase Three Outline and include on PBS website;
- Development of print materials to distribute: posters, pamphlets, flyers and “rave cards”; and,
- An approach to obtaining sponsorships and advertising agreements for Hamilton PBS.

### *Phase Two Outline*

Various measures to improve the quality, efficacy and efficiency of the system will be taken during this phase. Feedback from the user base and independent assessments should be pursued, and if necessary software updated. Other PBS coordinators highlight the importance of flexible software as PBS development is difficult to estimate. Depending on program success and funding, additional hub locations and bicycles could be added to the fleet during this phase. Development of a reporting schedule to Task Force will begin, as will Task Force monitoring.

### *Phase Two Development*

The following indicators could be used to measure the success of the program, and to identify areas that are successful or demand greater attention:

- Quantitative and qualitative account of promotional materials, distribution of said materials, and number of individuals reached by materials;
- Total user information: number of registered users at a designated time (after one week, month, year);
- Average membership usage rate: number of member borrowings/total number of members at a certain time (for example, the lunch hour, averaged over certain time period);
- Average fleet usage rate: the number of borrowed bikes or total number of bikes at certain times;
- Bicycle utilization rate: number of hours each bicycle is used compared to hours of availability;
- Bicycle/station vandalism/theft statistics
- User cycling habits: how often members use PBS vs. other modes of transit, tracked over a time period; and,
- Program adherence to budget.

### *Phase Three Outline*

This phase will be similar to the second phase. Reporting and monitoring by Task Force will continue, and those procedures should be formalized. This report suggests monthly reports to the Task Force; reports should identify website statistics, budget updates, number of bicycle loans from each location, number of registered users as well as issues identified and resolutions, etc.

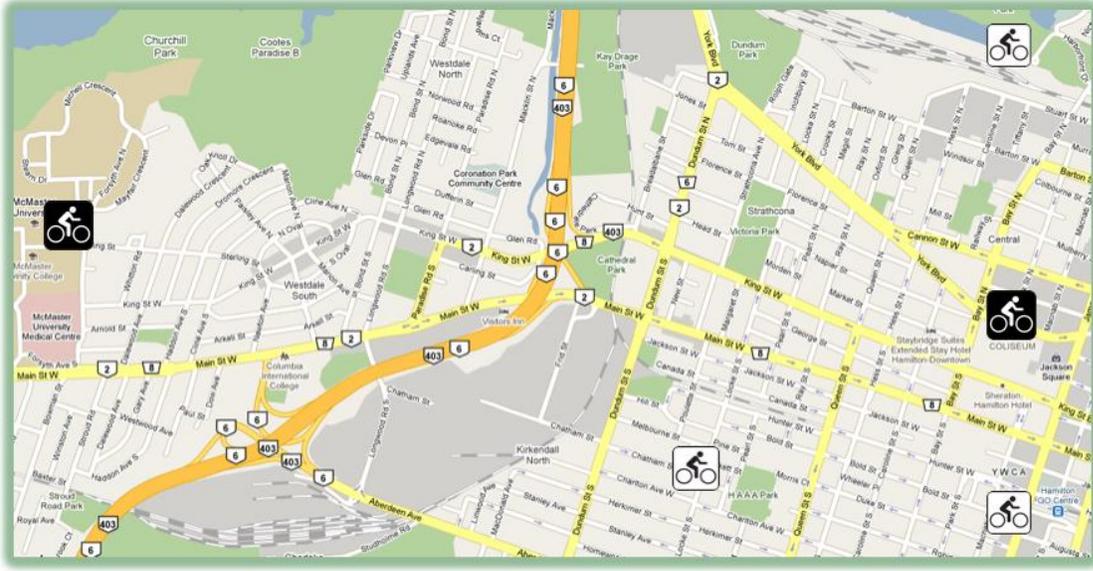
Through all three phases, PBS should be promoted through radio and local television media, presentations, Library communications (newsletters, list-servs, etc.), posters, regional and City websites and list-servs, Task Force member websites and list-servs, social networking sites, and local websites and blogs (for example, “Raise the Hammer” and “Transportation for Livable Cities”).

### ***Outstanding Issues of Concern for Library Model:***

- Liability insurance (and age limit for borrowing bicycles);
- Equipment insurance;
- Funding model, and source of funds;
- Potential for revenues; and,
- Secure partnerships with organizations willing to host bicycles overnight (especially relevant for downtown locations, unless heavy foot traffic)

### **Kiosk Location Map**

The following map outlines desired hub locations. As always, the more hubs available the greater chance for program success. McMaster University and the HPL Main Branch are, given the RTM indicators, obvious hub locations. Depending on funding available, this report also recommends placing hubs on Locke Street South, at the Go Station on Hunter Street, at the Waterfront Park and downtown Dundas (not shown on map, due to scale).



Legend:



: Priority Hubs



: Secondary Hubs

Source: Google Maps

## Project

### Case Study Review

This section of the Report includes a summary of research done on pre-existing PBS in the Phase One Newmarket Report. The Newmarket study team examined six current PBS and the Toronto Community Bicycle Network’s BikeShare program, which is no longer running. Those systems are sufficiently similar in scope to Hamilton to be reviewed here.

Lessons learned, successes and challenges revealed in the case study systems are briefly reviewed in the table below. More detailed information can be found in the Newmarket Phase One Report, Chapter 3 and

Appendix Table A-1 (online, at: <http://www.smartcommute.ca/resources>).

Brief Description	Particular Successes and Challenges
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**University of Toronto's Bikechain  
(Toronto, ON)**

Bikechain started in 2008, and rents bicycles to students, staff and faculty at the University of Toronto. Bicycles are rented for up to two days, and extended at staff's discretion. Requires \$25 deposit to rent a bike but there is no membership fee. Rentals are available at the Bikechain shop in the Koffler Student Services Centre.

According to Bikechain staff, successful implementation requires:

- Devoted, committed and skilled mechanics who are willing to devote the long hours necessary to repairing and maintaining bikes
- Accessible and highly visible location (which Bikechain lacks)
- Constant funding source – Bikechain accomplishes this with a student levy

Bikechain has found it difficult to expand due to limited bike storage and few locations for new bike racks.

The coordinator reports that it is difficult to balance maintenance demands with potential growth.

Liability is an issue, since insurance can be expensive and might require wearing a helmet (which is difficult to provide).

<p><b>Blue Urban Bike Program (Carrboro, NC)</b></p>	<p>Since 2006 the Blue Urban Bike (BUB) program has run year-round. BUB has nine “BUB Hubs” around Carrboro and Chapel Hill, North Carolina. Each hub is located in a local business and requires an employee to check bicycles in and out through the exchange of a key for a membership card. There is a \$10 annual fee, which allows members to rent bicycles for up to 24 hours at a time. Members must return a bicycle to the hub from where it was rented.</p>	<p>Requires business partners who are willing to provide in-kind employee time for check in and out of rental bicycles, which saves BUB resources.</p> <p>Trips are necessarily one way, because bikes must be returned to hub of origin, which makes the network less convenient.</p>
<p><b>Buffalo Blue Bicycle Program (Buffalo, NY)</b></p>	<p>Begun in 2006, the Buffalo Blue Bicycle (BBB) uses old or unused bicycles donated, left over from police auctions or collected from the garbage. Membership is either \$25 for a seasonal fee (May to October) or a donation of six hours of volunteer service towards the BBB program. BBB reports, on average, 14 rentals per bike per season.</p>	<p>BBB estimates that the program’s success is due to university and college students, who make up around 60% of program membership.</p> <p>BBB identified the check-in/check-out process as a large challenge. Program administrators developed a website to keep the system accessible and simple.</p> <p>Other institutions have taken the initiative to contribute to and expand the program. The University of Buffalo is planning a second workshop on campus, and the Psychiatric Centre has integration the blue bicycles into their wellness program.</p> <p>Due to a heavy reliance on volunteers BBB had to modify their bike fleet so as to reduce maintenance demands. Bicycles were converted to single-speed and retrofitted to have “slime” tires to reduce flats.</p>
<p><b>Community Bicycle Network’s</b></p>	<p>This program ran from 2001 to 2006, and in its last year was the largest and most successful PBS in North America (Bixi, in Montreal, is the largest). CBN’s BikeShare had 150 bikes, 16 hubs and over 400</p>	<p>BikeShare was extremely popular with users, local and national media, and the general public in Toronto. Media helped to increase the profile of the organization in the city. BikeShare signed up over 2000 members in the six years the program ran.</p>

members. Using a web-based computer tracking system, BikeShare employed a full-time coordination and a part time mechanic. Cafes and community centres throughout downtown Toronto volunteered staff at each hub and managed check in and out of bicycles. Membership cost \$25 or four hours of volunteering with CBN or other community agencies.

Bicycles were recycled, painted yellow and standardized with a single-speed drive train, basket, lock, bell and reflector. CBN volunteers redistributed bicycles using bicycle trailers and cargo bikes. In 2003, CBN reported that, on average, each bike was borrowed over 15 times, and each member borrowed a bike at least six times.

CBN was unable to wean itself from grant money and so never reached financial self-sufficiency. BikeShare was unable to recover expenses through user fees. When grants from public and private ran out the system was forced to shut down and most bikes were sold.

## Best Practice Review and the Hamilton Pilot Actions

The following list summarizes general best practices, based upon interviews and a literature review borrowed from the Newmarket Phase One Report. That list is contrasted with actions related to the Hamilton pilot proposal.

	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>
<b>System Planning</b>	<ul style="list-style-type: none"> <li>• Minimum of one year to plan and test system before launch</li> <li>• Preferable to phase the implementation process</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>• Recommended launch in Spring 2011 or later should allow for at least year of planning; original document developed in Summer 2009: "Hamilton-McMaster Bike Share Pilot Proposal"</li> <li>• Phase One describes launch of initial kiosks; Phase Two and Three describe possible expansion, monitoring and amendment</li> </ul>
<b>Stakeholder Consultation</b>	<ul style="list-style-type: none"> <li>• City of Hamilton residents, employees, students, visitors</li> <li>• Public transit riders</li> <li>• Bicycle retailers/rental businesses</li> <li>• Residents/businesses near PBS kiosks: individuals, or through ratepayers' associations and business improvement areas</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>• BikeShare committee includes Smart Commute Hamilton members, the Hamilton Cycling Committee; updates on Feasibility Report have been provided at SCH meetings</li> <li>• Should be advertising directed towards HSR and GO riders, at stop locations and transit centres, as well as contact information for input</li> <li>• Contact Freewheel Cycles in Dundas, which offers limited rental services, and should include retailers in BS Committee</li> <li>• Given limited scale of PBS in Hamilton, likely unnecessary</li> </ul>
	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>

<b>Research and Needs Assessment</b>	<ul style="list-style-type: none"> <li>• Assess/define target groups as well as potential service area</li> <li>• Examine community need</li> <li>• Gain municipal commitment to sustainable transportation, for example in policies and budgets</li> <li>• Ensure a safe and convenient cycling infrastructure, or resource commitment to improving urban cycling conditions</li> <li>• Gain sufficient resources (capital and operating costs)</li> <li>• Ensure there is sufficient urban space for kiosks</li> <li>• Conduct best practice research</li> <li>• Select technology and system</li> <li>• Develop business strategy</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li></li> <li>✓</li> <li>✓</li> <li></li> <li></li> </ul>	<ul style="list-style-type: none"> <li>• Current approximation of service area will be further refined through Phases Two and Three, additional collaboration with BikeShare Committee and public consultations</li> <li>• On-line survey distributed to local residents, with constructive results</li> <li>• Smart Commute Hamilton and Metrolinx are primary supporters of PBS</li> <li>• Presently, concerns regarding cycling infrastructure downtown, but recently updated Cycling Master Plan</li> <li>• Detailed budget, confirmation of funding and in-kind support, and estimate of potential revenues</li> <li>• Given the City's support and limited number of kiosks, this is likely</li> <li>• Summarized in this report; further research available in Newmarket Phase One Report</li> </ul>
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	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>
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<b>Partner Recruitment</b>	<ul style="list-style-type: none"> <li>Gain support of Regional Transportation Authority</li> <li>Local Municipality</li> </ul>	✓	<ul style="list-style-type: none"> <li>Feasibility Report supported by Metrolinx</li> </ul>
	<ul style="list-style-type: none"> <li>Public Transit Operator</li> </ul>	✓	<ul style="list-style-type: none"> <li>Feasibility Report a joint project with City of Hamilton and Smart Commute; no city councillors on BikeShare committee</li> </ul>
	<ul style="list-style-type: none"> <li>Smart Commute</li> </ul>	✓	<ul style="list-style-type: none"> <li>Some involvement through Smart Commute Hamilton; stronger relationship necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Relevant businesses (bicycle repair shops, car-sharing operators)</li> </ul>		<ul style="list-style-type: none"> <li>Feasibility Report supervised by Smart Commute Hamilton</li> </ul>
	<ul style="list-style-type: none"> <li>Local cycling groups, non-profit organizations and municipal cycling advisory committees</li> </ul>	✓	<ul style="list-style-type: none"> <li>Retailers should be included on committee, relationship with Hamilton CarShare should be further developed</li> </ul>
	<ul style="list-style-type: none"> <li>Local community centres, and public libraries</li> </ul>		<ul style="list-style-type: none"> <li>Hamilton Cycling Committee involved with BikeShare committee, TLC invited; strong relationship with MACycle Co-op at McMaster University</li> </ul>
	<ul style="list-style-type: none"> <li>Bicycle manufacturers, suppliers and industry associations</li> </ul>	✓	<ul style="list-style-type: none"> <li>Positive and committed working relationship with HPL</li> <li>Still to be recruited as potential sponsors</li> </ul>

	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>
<b>System Selection and Design</b>	<ul style="list-style-type: none"> <li>Successful PBS are simple and quick to access and use, so should maximize convenience and ease-of-use</li> <li>Multiple payment and registration options (on-line, phone, kiosk or cash)</li> </ul>	✓	<ul style="list-style-type: none"> <li>Integrating with library system so as to develop self-service kiosk is goal of system</li> <li>Registration would be at library or online, and</li> </ul>

	<ul style="list-style-type: none"> <li>• A “Smart Bike” system with multiple locations throughout an urban area requires a minimum population of 200,000</li> <li>• For smaller communities or service areas (as would be the case with the system described in this Report) a unique, manual system that more closely resembles a community PBS might be ideal</li> <li>• Integrating a PBS access card with a pre-existing transit pass</li> </ul>		<p>fees would be handled analogously to library fines</p> <ul style="list-style-type: none"> <li>• A Smart Bike system is not the focus of this Report, though Hamilton’s total population is sufficient</li> <li>• This Report describes a custom designed, hybrid-type model which combines automation with an, at least initial, small scale</li> <li>• Current goal is to integrate with library card, though use with new “Presto” card should be considered</li> </ul>
<b>Bicycle Design</b>	<ul style="list-style-type: none"> <li>• Bicycles must be distinctive and clearly branded</li> <li>• Bicycles must be simple, durable and unattractive to thieves</li> <li>• If planning a Smart Bike system it is necessary to ensure a sufficient number of bicycles per inhabitant (typically one bike per 150-200 people in target area).</li> </ul>	<p>✓</p> <p>✓</p>	<ul style="list-style-type: none"> <li>• Eventually system design will incorporate those characteristics</li> <li>• N/A</li> </ul>

	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>
<b>Station Design and Layout</b>	<ul style="list-style-type: none"> <li>• Smart Bike systems require a high density of kiosk locations so as to maximize convenience; the optimal spacing is typically between 300 and 500 meters</li> <li>• Kiosks should be installed at major destinations and transit stations within PBS area. General criteria for determining station locations are: <ul style="list-style-type: none"> <li>o Population density;</li> <li>o Employment density;</li> <li>o Proximity to transit stations;</li> <li>o Proximity to bicycle routes;</li> <li>o Proximity to educational institutions; and</li> <li>o Proximity to museums, parks, libraries, and</li> </ul> </li> </ul>	<p>✓</p> <p>✓</p>	<ul style="list-style-type: none"> <li>• N/A</li> <li>• Kiosk locations will be primarily influenced by those factors; McMaster University, the HPL’s Main Branch are obvious locations and depending on number of kiosks in Phase One, salient</li> </ul>

	<p>other public facilities.</p> <ul style="list-style-type: none"> <li>• Park-and-ride lots should be taken into consideration when determining kiosk location, as they can encourage completing car trips by bicycle</li> <li>• Every kiosk location should include a map of nearby stations</li> <li>• If possible, incorporate a solar power supply on kiosks</li> <li>• In colder climate where snow removal is an issue, fully fixed kiosks can be problematic</li> </ul>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>points between those two will be considered</p> <ul style="list-style-type: none"> <li>• An effort will be made to include kiosks near major transit centres, particularly the GO Station; there are no major park and ride stations in Hamilton</li> <li>• An effort will be made to provide a system map at each kiosk</li> <li>• Kiosk design will try to include a solar power supply</li> <li>• As Hamilton receives considerable snow, kiosks will either be designed so as to be movable, or else integrated into streetscape so they are not obstructions</li> </ul>
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	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>
<b>System Security</b>	<ul style="list-style-type: none"> <li>• GPS technology to track bicycle location</li> <li>• Real time computerized tracking to identify individual user associated with specific borrowed bicycle</li> <li>• Theft and vandalism presents a unique challenge for every different PBS, and requires a degree of trial and error; as more PBS are rolled out, success stories will be shared</li> </ul>	<p>✓</p> <p>✓</p>	<ul style="list-style-type: none"> <li>• GPS will be considered, budget permitting</li> <li>• The HPL provides the ability to follow users and track bicycles</li> <li>• This challenge will be ongoing.</li> </ul>
<b>Cyclist Safety</b>	<ul style="list-style-type: none"> <li>• PBS operator has responsibility to keep its users safe; because it might be impossible to put every user through a safety program, other cycling safety campaigns should align with system launch</li> <li>• A safety waiver is necessary</li> </ul>	<p>✓</p>	<ul style="list-style-type: none"> <li>• Marketing and launch materials should include safety information</li> <li>• Part of registration process includes necessary safety waiver</li> </ul>

<b>Business/Funding Model and Pricing</b>	<ul style="list-style-type: none"> <li>• Long term financing (capital and operating) should be planned and committed to from First Phase onwards</li> <li>• Smart Bike systems, whose aim is to promote cycling, should employ a pricing incentive which allows the first half hour of use for free and then charging a fee for additional use beyond 30 minutes</li> </ul>	✓	<ul style="list-style-type: none"> <li>• Funding sources pending</li> <li>• PBS in Hamilton would likely follow that pricing model, with a deposit of value</li> </ul>
<b>Pilot Testing, System Launch</b>	<ul style="list-style-type: none"> <li>• A full Smart Bike system should roll out with at least 50% of its fleet following a small-scale pilot used to test the technology</li> <li>• System launches are best done in the spring or summer, and paired with a large event such as a “bike to work” or “commuter challenge” week</li> </ul>	✓	<ul style="list-style-type: none"> <li>• N/A</li> <li>• Launch planned for spring, and should be paired with Smart Commute Hamilton initiatives</li> </ul>

	<b>Suggested Best Practice</b>	<b>Hamilton Proposal</b>	<b>Action</b>
<b>Marketing</b>	<ul style="list-style-type: none"> <li>• A “local champion,” for example a mayor or celebrity, can be very helpful in publicizing a PBS and ensuring its success</li> <li>• Continuous, on-going marketing maintains the popularity of a PBS beyond its initial “fad” appeal</li> <li>• PBS marketing should be paired with general cycling marketing, and encouraging purchase of personal bikes</li> </ul>	 ✓  ✓	<ul style="list-style-type: none"> <li>• A prominent local community member should be included in development of marketing materials</li> <li>• Marketing campaign will continue after launch of PBS</li> <li>• Municipal staff, Smart Commute Hamilton and other members of Bike Share committee should be included in development and implementation of marketing materials</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Throughout implementation, monitoring a new PBS is essential, so operator can tweak station locations, concentration of bicycles, and other relevant system processes which might improve efficiency and performance</li> <li>• Consistent and reliable monitoring also helps to make the case that a PBS should stay in</li> </ul>	 ✓  ✓	<ul style="list-style-type: none"> <li>• Phased implementation of Hamilton PBS places emphasis upon monitoring and adjustment, especially as system develops and expands</li> <li>• “Reporting points” will be established once PBS</li> </ul>

operation, or requires additional funds

launches, so as to closely follow successes and challenges

### ***Remaining and important best practices requiring action:***

- Sufficient resources for capital and operating costs not yet secured
  - Business strategy must be developed
- Research must establish a resource commitment to improving cycling conditions in Hamilton
- Exact technology and system design still uncertain
- As important stakeholders, public transit riders and bicycle retailers/rental business require more extensive consultation
- Public transit operators and bicycle manufacturers, suppliers and industry associations should be recruited as partners
- System design should try to include multiple payment and registration options (on-line, phone, kiosk or cash)
  - Design should also consider integration with “Presto” transit pass
- PBS launch should coincide with other cycling safety programs, as PBS operator has some responsibility to keep users safe
- Initial PBS launch should include, at minimum, one half of full fleet
- A local champion should be acquired, so as to better market a PBS in Hamilton

## **Feasibility Assessment**

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### **Strengths and Weaknesses**

This section presents various strengths and weaknesses in the proposed Hamilton PBS, based on previous information included in this report. Strengths are characteristics that improve the system’s potential for success. Weaknesses are areas, which left unaddressed, would decrease the chances for success of a PBS in Hamilton. The Library Model is of primary concern to this section, but most identified characteristics hold in general (i.e. for a system like Boulder’s or Buffalo’s). Important characteristics follow, as do select recommendations to address weaknesses.

#### ***Strengths:***

##### *Planning Time Frame:*

Best practice indicates the importance of extended and phased planning. This Report represents one part of a planning process that began in summer of 2009, and will continue through 2010 and likely into 2011.

##### *Phased Implementation:*

This report recommends and describes a phased implementation model, as per best practice research.

#### *Multiple Hub Locations:*

All successful PBS feature multiple check-in and check-out locations. All proposals included in this report describe a PBS that would employ numerous hubs. Significantly, this strength becomes a weakness if bicycles cannot be borrowed or returned at every hub.

#### *Bike Share Meeting:*

Initial Bike Share meeting helped to identify a group of stakeholders. This strength is relatively insignificant until the formation of a formal Bike Share Committee or Task Force, which includes all important stakeholders.

#### *Partners:*

Positive working relationship has been developed with Hamilton Public Library. Maintaining this relationship is essential, for collaboration with HPL should lower start up and operating costs. Moreover, depending on model chosen, partner organization might be required to provide in-kind labour support. This report recommends developing other partnerships, essential to PBS implementation.

#### *Library Management System:*

If a workable solution is available after RFP, the existing library infrastructure provides a robust electronic system, allowing administrators to monitor and track PBS use. Integration with library software makes PBS more physically secure as well.

#### *Market:*

Best practice research suggests that many successful PBS include a large post-secondary user base, as well as other high-employment institutions like hospitals. Including a hub at McMaster University and downtown at Jackson Square should increase PBS success.

### ***Weaknesses:***

#### *Funding:*

Overwhelmingly, best practice research supports the conclusion that a long-term operating budget is very important to PBS success. Thus far, Hamilton PBS has secured no funding.

- As funding is pursued, emphasis should remain on sustained and consistent funding sources. At the scale proposed here, it is unlikely that a PBS could generate revenue, and in early stages charging membership or usage fees is not recommended.

#### *Maintenance:*

Formal arrangements must be made with community partners who are willing to handle maintenance. The business model should include funding for maintenance costs. Transportation of bicycles requiring maintenance must be planned, as well as protocol around reporting damage.

- Either formalize relationship with community partner(s) like MACycle (who have expressed positive interest in Hamilton PBS) or ensure sufficient funding and capacity for “in-house” maintenance demands. Vitally important that budget includes liberal estimates for coordinator’s maintenance duties, or cost of contracted maintenance.

#### *Market:*

Best practice research highlights the importance of placing hubs near high-employment institutions, like the Jackson Square/HPL Main Branch area in downtown Hamilton. However, that area is economically

depressed, does not experience significant foot traffic at night, and generally features less community inclusive architecture and design. For those reasons, hubs located downtown could present unique challenges.

- Implementation must remain sensitive to different challenges at Downtown location: Buffalo coordinator suggested housing bicycles indoors overnight. Planning should incorporate community as much as possible so as to generate ownership and respect of project.

*Registration:*

Users should have access to numerous registration options. Library model requires users to physically visit library for initial registration, and to sign waiver.

- This report recommends an on-line registration option, on the library website, for the Library Model. Other models should offer multiple registration options.

*Sign in/out procedure:*

Thus far, this Report has no physical solution that provides a fully automated, 24/7 rental process that allows users to take any bike from any location to any location. If realized, those elements would significantly contribute to project success. At present, rental procedure requires personnel and the user must visit the library at check-in and check-out.

- RFD should prioritize fully accessible, automated system, which is not limited to business hours. Depending on degree of automation, budget should include significant costs associated with manual rental procedure.

*Redistribution:*

As PBS rolls out, certain kiosks might be more popular than others, resulting in unequal concentrations of bicycles.

- Budget should include time required for redistribution, and costs associated with transporting bicycles. Given scale of Library model, these costs should be minor. (In other community systems, redistribution was unnecessary or done by "pedal power.")

*Lack of formal Bike Share Committee/Task Force:*

Though initial Bike Share Meeting was positive, it is more important to develop a formal committee or Task Force to oversee project development, and implementation.

- Smart Commute Hamilton should develop a formal Bike Share Committee. BSC should include representatives from all relevant stakeholder groups, as identified earlier.

## Opportunities and Threats

This section considers opportunities and threats relevant to a PBS in Hamilton. Opportunities and threats are analogous to strengths and weaknesses, but describe external factors that could influence the success of a PBS.

### ***Opportunities:***

*Future population growth and associated population density:*

According to data presented in the “Profile of the City of Hamilton,” population is expected to grow, and with it, population density. Significant to this project is the successful urban renewal happening on James Street North.

- Phased PBS implementation should track population growth, especially density, and respond accordingly. Further research should determine places of economic growth, for example James Street North and similar communities experiencing urban renewal.

*Transit/Cycling integration:*

Currently, HSR offers bicycle racks on its entire fleet. GO Transit is similarly accommodating of cyclists. A PBS complements and strengthens existing public transit, by allowing users to extend trips or use transit in situations where transit was previously considered impractical. Survey results indicate that PBS users would appreciate hub locations

- If possible, this report recommends placing a PBS hub at the GO Station. Moreover, Bike Share Committee should develop stronger partnerships with transit providers.

*Cycling Master Plan:*

Updated in 2010, the City of Hamilton Cycling Master Plan (CMP) is an impressive document that outlines and guides the development of cycling infrastructure in Hamilton. The Plan describes a long-term implementation plan for a continuous, extensive bicycle lane system in the City. It generally supports various initiatives that promote active transit. Significantly, the CMP is supported by a dedicated implementation budget. The Plan demonstrates a serious commitment to cycling as a viable mode of transportation, and provides comprehensive and accessible cycling infrastructure. Bike Share supports two of three core policies of the plan, which are to “build awareness and promote the benefits of walking and cycling,” and to “continue to improve and expand on the existing network of pedestrian and cycling infrastructure.”

- Hamilton PBS implementation should be mindful and supportive of CMP. Important to track infrastructure development in the City, and amend PBS if necessary. Funds should not be diverted from CMP to PBS.

*Provincial/Municipal legislative support:*

Previous sections, “Project Relationship to Provincial Policy Initiatives” and “Project Relationship to Hamilton Goals and Initiatives,” describe the extensive provincial and municipal support for a PBS in Hamilton.

- Existing policy climate, described here as supportive and positive, should be leveraged to gain political and financial support for PBS in Hamilton. In seeking funding or grants, attention should be paid to opportunities made available by supportive legislation.

*Public interest:*

Though the results of interest-survey were statistically biased, the response was overwhelmingly positive. About 84% of respondents were interested in using a PBS in Hamilton, were it available. Refer to “Online Survey of Public Opinion,” in this Report, for a more thorough account of public-interest. Appendix B contains full survey results. The survey also identified problem areas, relevant demographic information, and presented a rough idealization of PBS operation in Hamilton.

- Planning, marketing, phasing and implementation should incorporate survey results, and respond to stated desires of user-base.

*General success of PBS in North America:*

Since this particular Report began, a number of successful PBS have been implemented in North America. Though on a larger scale, the high-tech PBS in Minneapolis suggests the potential for advanced and automated PBS in relatively Northern cities that are not major tourist destinations. In general, the number of PBS is increasing exponentially.

- In marketing PBS in Hamilton and developing funding applications, draw on the National, Continental, and International success of PBS.

*Concentration of Social Services Downtown*

Depending on model chosen, a high concentration of social services downtown could support PBS implementation, and provide unique opportunities for community partnerships.

- PBS design should consider ways to partner with Hamilton social service providers, and include that demographic in PBS implementation and operation.

***Threats:***

*Existing cycling, transit and automobile use:*

Similar to most large Canadian cities, active transit and public transit use in Hamilton pales in comparison to automobile use. Refer to “Profile of the City of Hamilton” for exact figures. In downtown Hamilton, “motor vehicle” is the primary mode of transportation for 88.85% of residents. However, Table 2 (Long-Term Modal Share Projections) presents encouraging data: cycling is projected to increase to 15% of modal share in Hamilton, over the next 15-25 years.

- PBS in Hamilton should work closely with active transit initiatives to support and promote cycling as a mode of transportation. A relationship with SCH is especially important in this regard.

*Legal Issues:*

In the Hamilton case, a PBS presents a number of complicated legal issues. The following list describes important elements of a risk management strategy for PBS operators, though it is by no means comprehensive:

- Considerable liability insurance to protect operator from potential risks;
- Require users to sign waiver/liability release form;
- Attach “helmet required for all riders” signage to every bicycle;
- Provide demonstrations or training seminars, which users can participate in, so that PBS operator does not appear negligent
- Implement comprehensive anti-theft and general loss prevention measures; and
- Secure professional insurance and legal counsel.

*Underdeveloped downtown core:*

Though Hamilton downtown is presently experiencing urban renewal in certain areas, in general it is economically depressed. In certain downtown areas, architecture and urban design do not encourage community development; other PBS operators identify those urban characteristics as threats to success.

- PBS design and implementation must remain sensitive to the unique challenges presented by potential downtown hub locations. Planners should track successful urban renewal projects in downtown and implement accordingly.

*Barriers to cycling:*

Public interest survey identified a number of significant barriers to cycling in Hamilton. Appendix C contains a complete summary of survey results. The largest “barrier” to cycling in Hamilton reported was insufficient on-road cycling facilities (79.5%) followed by feeling uncomfortable riding on the roads and the winter (both 61.1%) and concern about bicycle theft and security (42.6%). As a PBS would not operate over the winter, weather concerns are irrelevant.

- PBS design must support current implementation of the Cycling Master Plan. A PBS in Hamilton will experience much greater success if it accompanies cycling infrastructure development. Concerns about theft and security should be addressed with a robust, safe hub design.

*Public awareness:*

40.5% of survey respondents said they were familiar with the idea of a bike lending service. Consider the acknowledged biases in the survey, we should conclude that a large majority of the targeted area is unfamiliar with the idea of a PBS.

- PBS implementation should not proceed until a comprehensive marketing schedule, and material, is developed. Marketing should familiarize potential users with basics of PBS in Hamilton, and emphasize the utility of the system.

*Escarpment:*

Approximately 39.5% of respondents identified “physical barriers” as an impediment to cycling in Hamilton. This is a substantial number, but presently irrelevant. A PBS in Hamilton should not expand to the mountain until it is developed and successful in its initial phases.

- Should initial phases of PBS in Hamilton prove successful, special attention should be paid to escarpment. This report suggests PBS operator should collaborate with HSR.

## **Conclusion**

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This Report examined a potential market for a PBS in Hamilton and considered various existing PBS models so as to comment on appropriate PBS models for the City of Hamilton. Drawing upon a widely distributed public-interest survey, this Report reviewed and considered the feasibility of the 2009 “Smart Commute Hamilton-McMaster Bike Share Proposal.”

That proposal presented an innovative solution to bike sharing in the Hamilton context. This report recommends continuing research and design on the Library model; a workable solution could establish Hamilton as an innovator in active transit in Canada and establish best practice for its unique Library Model PBS. This report further recommends that Hamilton consider a 4<sup>th</sup> generation bike share model, if capital funding is secured, as the analysis shows that there is a market and supportive infrastructure for such a system.

It is imperative that further research and design be accompanied by the following recommendations:

*RFI/RFP:*

The City, or Smart Commute Hamilton, should release an RFI or RFP to relevant bike share operators or consultants, and technological firms capable of integrating a PBS into the existing HPL system or using standard 4<sup>th</sup> generation database systems and kiosks. For further information consult “Proposed Hamilton Pilot Project,” in this Report.

*Funding:*

All PBS operators emphasize the vital importance of securing a long-term operating budget. Before a final PBS design is chosen, and before PBS implementation, long term funding should be secured.

*Bike Share Committee/Task Force:*

In the very immediate future, research and design should be accompanied by the formal creation of a Bike Share Committee or Task Force. As important community stakeholders, this task force would guide research and provide valuable input.

*Marketing:*

A comprehensive marketing and promotion schedule (and the necessary materials) should be developed before PBS implementation. Promotion should familiarize potential users with PBS basics and should emphasize the benefits and utility of PBS use.

Incorporating these recommendations into further research and design should maximize the potential success of a PBS in Hamilton. After addressing those central recommendations and those identified in the “Feasibility Report” section, a comprehensive Implementation Plan should be developed.

Appendix AA further elaborates on these recommendations, integrating input from the public bike share workshop hosted in August of 2010.

## Appendix AA – Bike Share in Hamilton, Justification and Recommendations Regarding 4th Generation Models

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On August 31<sup>st</sup>, 2010, Smart Commute Hamilton hosted a workshop and demonstration on 4<sup>th</sup> generation bike share systems, represented by *Bcycle* based in Denver, Colorado, and *Bixi* based in Montreal, Quebec. Each company presented their basic business and operational models to a large group of stakeholders from the Hamilton community. In addition, each company brought working examples of their bicycles and kiosks which were set up in the City Hall forecourt for a public demonstration.

Feedback from this workshop showed a clear preference to working with *Bixi*'s parent company, *Public Bike System Company*. PBSC offers the equipment, bicycles, and operating system to other municipalities around the world for a cost with ongoing support from the central office and access to their planning expertise. By comparison, *Bcycle* has limited experience with setting up their system in another municipality.

The decision by Public Works and Smart Commute Hamilton to pursue a 4<sup>th</sup> generation bike share system is based on several key considerations.

- 4<sup>th</sup> gen systems such as *Bixi* have proven successful in several different cities around the world, providing nearly instant returns and operational surpluses
- 4<sup>th</sup> gen systems minimize the risks of theft and vandalism which are prevalent in previous generations, by including GPS monitoring of all bicycles and requiring credit card access to the system
- Public Bike System Company is prepared, as part of the cost of purchasing and installing a system, to work with the City of Hamilton in identifying the best layout of stations, and ultimately to hand over full operation of the system after a certain period
- 4<sup>th</sup> gen systems represent the most modern, sleek and convenient type of bike share available and has the best chance of being successful amongst the general public in Hamilton