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Rochester Area Bike Sharing Program Study

Final Report

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Rochester Area Bike Sharing Program Study

Final Report

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Abstract

Bike share is a relatively inexpensive and quick-to-implement transportation option that can deliver a variety of mobility, economic, health, safety, and quality of life benefits. When combined with other modes of transportation and other investments in cycling, bike share can provide a fundamental shift in the way people move about and make decisions on transportation. To this end, the Genesee Transportation Council commissioned this study to explore the feasibility of implementing a bike share system throughout Rochester and the surrounding area.

After a set of goals and objectives were established by local stakeholders, the consultant team undertook a comprehensive analysis of population and employment trends; evaluation of existing plans and regulations; review of existing conditions; and a comprehensive stakeholder and public engagement process. Based on this analysis, the implementation of a bike share program in and around Center City Rochester was found to be feasible. The larger region between its outlying villages and small cities, and excluding the City of Rochester and several inner ring suburbs, is rural in nature, which is not conducive to bike share implementation. There are, however, areas in which small satellite bike share systems may be feasible. Within the Rochester Transportation Management Area (TMA), these areas include (but are not limited to) the Villages of Brockport, East Rochester, Pittsford, and Fairport, the RIT Campus, activity centers in the Towns of Greece and Brighton, and the City of Canandaigua. The Central Rochester system was divided into four deployment phases beginning with the downtown core and expanding into adjacent neighborhoods, each with 25 stations and 250 bicycles. System phasing was broken into manageable sizes that would be small enough to allow the system to be implemented quickly but large enough to foster ridership and grow support for the system.

To implement such a system, a financial analysis showed that \$2.5 to \$5 million over 5 years is needed for capital and \$3.3 million of operational funding, netting out projected system revenues. Such funding can be sourced through a combination of public, private and philanthropic sources. Finally, the report details implementation considerations, including potential system ownership and governance structures, technology considerations between smart dock and smart bike systems, and strategies for increasing access to the system for lower income communities.

Keywords

Bike Share, Bike Share Systems, Feasibility, Analysis, Business Plan, Funding, Implementation, Rochester New York, Transportation, Sustainability, Equity.

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Acronyms and Abbreviations

402	State and Community Traffic Safety Program
ATI	Associated Transit Improvement
BYW	National Scenic Byways Program
CAFR	Comprehensive Annual Financial Report
CDC	Centers for Disease Control and Prevention
CMAQ	Congestion Mitigation and Air Quality Improvement Program
FHWA	Federal Highway Administration
FLH	Federal Lands Highway Program
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Geographic Positioning System
GTC	Genesee Transportation Council
HHS	Department of Health and Human Services
HR	Human Resources
HSIP	Highway Safety Improvement Program
IRS	Internal Revenue Service
MAP 21	Moving Ahead for Progress in the 21st Century Act
MCC	Monroe Community College
MPO	Metropolitan Planning Organization
NEPA	National Environmental Protection Act
NHPP/NHS	National Highway Performance Program (National Highway System)
NYC	New York City
PIN	Personal Identification Number
PLAN	Statewide or Metropolitan Planning
RFID	Radio Frequency Identification
RGRTA	Rochester-Genesee Regional Transportation Authority
RIT	Rochester Institute of Technology
RTP	Recreational Trails Program
RTS	Rochester Transit Service
SLC	Salt Lake City
SRF	SRF Associates
SRTS	Safe Routes to School Program
STP	Surface Transportation Program

SUNY	State University of New York
TAP	Transportation Alternatives Program
TCSP	Transportation, Community, and System Preservation Program
TDG	Toole Design Group
TMA	Transportation Management Area
TOD	Transit Oriented Development
U of R	University of Rochester
USDOT	United States Department of Transportation

Summary

Bike share is a relatively inexpensive and quick-to-implement transportation option that can deliver a variety of mobility, economic, health, safety, and quality of life benefits. When combined with other modes of transportation and other investments in cycling, bike share can provide a fundamental shift in the way people move about and make decisions on transportation.

To this end, the Genesee Transportation Council (GTC) commissioned this study to explore the feasibility of implementing a bike share system throughout Rochester and the surrounding area. GTC, local and regional stakeholders, with feedback from the public, developed a preliminary set of system goals and objectives for the system.

S.1 Goals and Objectives

The team has defined two types of goals for the system: policy goals and financial goals. The policy goals are the reasons why the system will exist, also known as the fundamental drivers. The policy goals should match the desires of the community. The financial goals must support the policy goals for the program.

S.1.1 Policy Goals

Create a public-private program with the following components:

- **Mobility:** Offer additional transportation options for residents of, students and employees in, and visitors to Rochester.
- **Equity:** Increase equitable and affordable access to public transportation.
- **Economic:** Increase the attractiveness of Rochester as a place to live, work, visit, and do business.
- **Bicycling:** Increase the amount of bicycling in Rochester and improve air quality and safety of cycling as a result.

S.1.2 Financial Goals

Create a public-private program that is financially viable and can meet the policy goals by:

- Seeking a public-private partnership to **maximize private sector** funding for a bike share system that will meet the stated policy goals.
- **Utilizing a combination of user revenues**, sponsorship, other revenues, and, if necessary, some local public assistance to fund ongoing operations.

- Ensuring that the **policy goal of equity has its own source of funding** to maximize success and impact.
- Creating and maintaining a contract structure whereby the program owner and operator (if applicable) are **both financially incentivized** for a financially sustainable program.
- Planning for and ensuring **sustainable capital and operational funding** for program growth and ongoing equipment replacement.
- **Seeking grant funding** or other large, one-time funding sources for capital investment.
- Clearly communicating **program performance and effectiveness** to stakeholders and the public.

S.2 Feasibility Recommendation

Implementation of a bike share program in and around Center City Rochester has been found to be feasible on the basis of these guiding principles and through a comprehensive analysis of population and employment trends; evaluation of existing plans and regulations; review of existing conditions; and a comprehensive stakeholder and public engagement process. The larger region between its outlying villages and small cities, and excluding the City of Rochester and several inner ring suburbs, is rural in nature, which is not conducive to bike share implementation. There are, however, areas in which small satellite bike share systems may be feasible. Within the Rochester Transportation Management Area (TMA), these areas include (but are not limited to) the Villages of Brockport, East Rochester, Pittsford, and Fairport, the Rochester Institute of Technology (RIT) campus, activity centers in the Towns of Greece and Brighton, and the City of Canandaigua.

The biggest opportunities for bike share in the City of Rochester are:

- High population density throughout significant portions of the City.
- Young demographics in the potential initial launch areas.
- Diverse income levels and significant minority populations with an opportunity to make bike share accessible to these populations and improve access to jobs and services.
- Strong stakeholder support and potential sponsorship opportunities.
- University and college populations and supportive administrations.
- Downtown revitalization, including a new transit center.
- Significant access to transit throughout the City.
- Strong community groups for partnerships.

The biggest challenges for bike share in the City of Rochester are:

- Lack of a complete network of bicycle infrastructure in the City.
- Few sources and destinations for visitors in the core of the Center City.
- Small, but growing, bicycle culture.
- Poor neighborhood connectivity in some areas.
- Some streets are not bicycle-friendly.

S.3 System Service Area and Phasing

A quantitative demand analysis was performed based on an assessment of mapped data representing residential population and employment density, key attractions, equity, bicycling, transit and public input. From these inputs, the project team identified areas of the region most likely to support bike share to develop a proposed phasing plan, shown on Figure S-1 and Figure S-2.

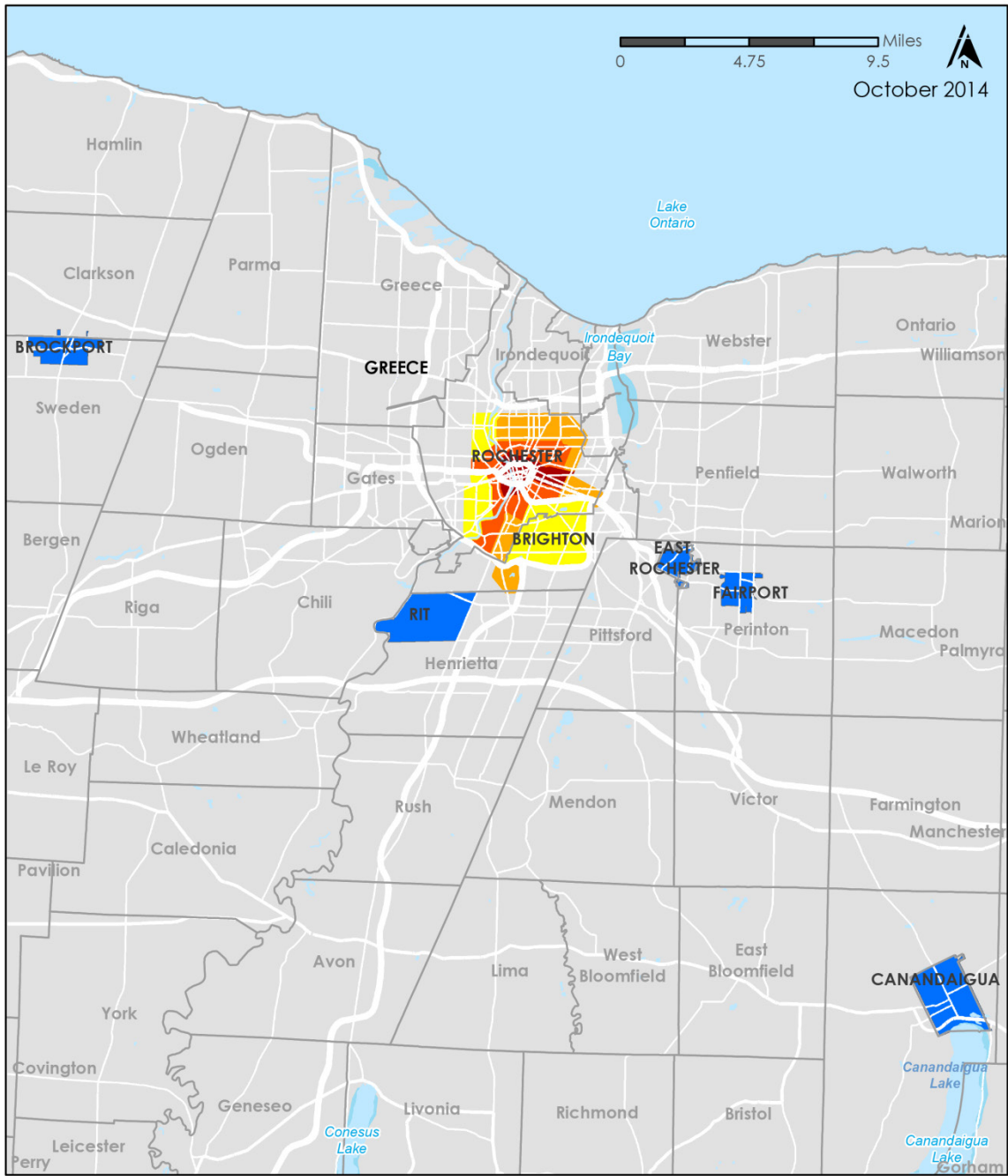
As shown on Figure S-2, it is expected that the core area of the City of Rochester (Central Rochester) and parts of the adjoining Town of Brighton will support a significant bike share network. A number of smaller communities in the region may also be candidates for smaller satellite bike share systems in the future. These areas could include but not be limited to Brockport, Canandaigua, East Rochester, Fairport and Greece, as well as the RIT campus, as shown in Figure S-1.

Bike share is expected to have the most success in Central Rochester, so the consultant recommended that the Central Rochester system launch first. However, if and when the satellite communities have the interest and funding to launch, there is nothing to preclude them from launching in parallel with the Central Rochester system.

The Central Rochester system is shown on Figure S-2, and was divided into four deployment phases beginning with the downtown core and expanding into adjacent neighborhoods. System phasing was broken into manageable sizes that would be small enough to allow the system to be implemented quickly but large enough to foster ridership and grow support for the system.

The size of each phase (i.e., the number of stations, docks and bicycles in each) was developed based on typical station densities and station sizes observed in peer cities and are summarized in Table S-1. Station densities will be higher in the downtown core and become less dense as the system expands into other areas of the city.

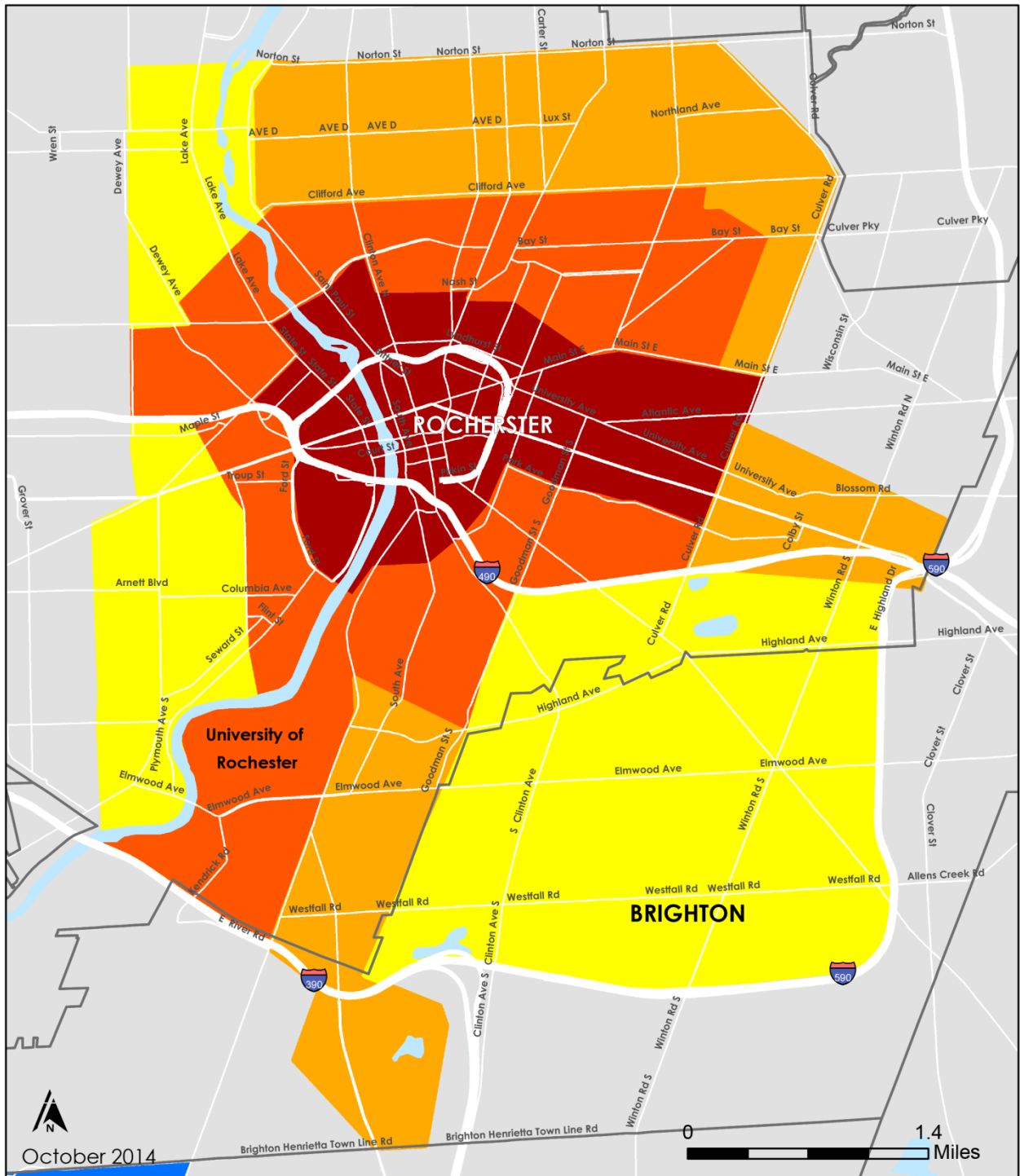
Figure S-1. Potential Satellite Service Areas



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY
Proposed Phasing**

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Potential Satellite Systems

Figure S-2. Proposed Phasing (City of Rochester)



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY
Proposed Phasing**

- Phase 1
- Phase 2
- Phase 3
- Phase 4

Table S-1. Proposed Phasing Area and Station Density for a Central Rochester Bike Share System

	Area (sq. miles)	Stations	Station Density (Stations / sq. mi.)	Docks	Bicycles
Phase 1	3.2	25	7.8	425	250
Phase 2	5.8	25	4.3	425	250
Phase 3	5.4	25	4.6	425	250
Phase 4	8.3	25	3.0	425	250
TOTAL	22.7	100	4.3	1,700	1,000

S.3 Governance and Structure

A key decision in establishing a bike share system is to create a governance structure for the program, and decide who will own and who will operate the system. The project team evaluated three potential business model options that could be appropriate for the Rochester area: regional agency-owned and privately operated system, city-owned and privately-operated system and nonprofit owned and/or managed system. Advantages and disadvantages of each were evaluated, but no single model was chosen. However, it is recommended that based on this study, one organization take responsibility for holding the extensive conversations required to identify the correct model and set it on its way to implementation.

S.4 Financial Analysis

The financial analysis for this study includes a five-year evaluation of expected program costs and revenues starting from six months before system launch, a typical timeline for equipment manufacture and installation. It includes numerous inputs. Where these variables were unknown, information was gathered from membership, ridership and financial data for the comparable systems chosen for this study.

Equipment costs from existing smart dock and smart bike systems were used, in addition to system startup and station installation costs to estimate capital funding required to start the bike share system. In addition, operating costs were estimated using per-docking point estimates from comparable bike share systems. Finally, revenue and ridership were estimated using membership and ridership metrics from comparable systems as shown in Table S-2.

Table S-2. Suggested Fee Schedule for Rochester Bike Share

Access Fee		Usage Fees	
		0-30 min.	Additional Half Hours
Annual	\$85	\$0.00	\$4.00
24-hour	\$8		

Other pricing structures should be considered, e.g., a monthly fee instead of annual membership (a model similar to cell phone plans) and/or a “per ride” trip fee similar to how transit is priced. Nevertheless, for this analysis, the traditional pricing structure has been assumed as there is significant data to support related membership and ridership assumptions using this structure.

Using the inputs above including equipment costs, system startup and station installation costs, and membership and ridership rates from comparable systems, a pro-forma was prepared to forecast membership, ridership, capital and installation costs, annual operating costs and system revenues for the Rochester Area Bike Share system. The pro-forma is shown in Table S-3.

Table S-3. Forecast Membership, Ridership, and Financial Performance for Phases 1-4 of the Rochester Area Bike Share Program

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Stations	25	25	44	88	100	100
Bikes	250	250	438	875	1,000	1,000
Docks	425	425	744	1,488	1,700	1,700
Membership and Ridership						
Annual Members	662	809	1,690	3,717	4,304	
Casual Members	10,778	11,975	22,753	45,505	47,900	
Annual Member Rides	17,146	33,636	57,745	127,040	179,076	414,643
Casual Member Rides	22,633	25,148	47,780	95,561	100,590	291,711
Total Rides	39,778	58,783	105,526	222,601	279,666	706,354
Trips per Bike per Day	0.58	0.64	0.66	0.70	0.77	0.69
Operations						
Bike Share Operating Costs	\$392,337	\$538,810	\$971,204	\$2,000,681	\$2,355,088	\$6,258,120
Revenues						
Bike Share Revenue	\$205,270	\$235,784	\$460,431	\$950,743	\$1,038,579	\$2,890,809
User Fee Recovery	52%	44%	47%	48%	44%	46%
Operations Fundraising Need						
Total Operating Fundraising Need	\$(187,067)	\$(303,025)	\$(510,773)	\$(1,049,938)	\$(1,316,508)	\$(3,367,311)
Per Bike Per Year	\$(748)	\$(1,212)	\$(1,167)	\$(1,200)	\$(1,317)	\$(1,197)

A summary of the five-year funding need for implementation of the four phase bike share system in the Rochester area is shown in Appendix B, and includes:

- **Capital and installation costs:** \$2.5 million for smart bike or \$5.0 million for smart dock over the five years, which includes capital, installation, system startup, and pre-launch administrative costs for the non-profit.
- **Operating costs:** \$540,000 per year on the Phase 1 system and \$2.4 million per year on the full Phases 1-4 system to operate. This includes operating costs and system upkeep.
- **Revenue:** \$215,000 per year for the Phase 1 system, and \$930,000 per year for the full Phases 1-4 system earned in membership sales and trip fees, for a total of \$2.6 million during the first five years of operation.
- **Fundraising need:**
 - Capital: for smart bike, \$890,000 in year 1, \$690,000 in year 3 and \$1.4 million in year 4 if the proposed roll-out schedule is to be maintained. For smart dock, \$1.4 million in year 1, \$1.2 million in year 3 and \$2.5 million in year 4.
 - Operations: netting out the system revenue, \$3.3 million over five years for the expanding system. For the Phase 1 system only, \$1.4 million over five years with approximately \$300,000 per year, or \$1,200 per bike per year.

S.5 Implementation Considerations

S.5.1 Smart Dock versus Smart Bike

An analysis comparing the advantages and disadvantages of these two technologies was undertaken for the study. No specific choice is recommended. However, it is strongly recommended that in the procurement process, the system owner should create an open set of technical requirements to allow for responses from both smart bike and smart dock vendors.

S.5.2 Social and Geographic Equity

During the stakeholder and public process, it was emphasized that a bike share system in Rochester should be designed to serve a large cross-section of the population outside the Center City core. The proposed phasing shown in Figure 47 reflects this goal.

To achieve the goal of equity for Rochester, some existing strategies used in other cities should be used, and some new ones implemented, including:

- Locating stations in lower income and minority communities: the recommended system map includes weighting of census tracts with high proportions of low-income and non-English speaking populations. The proposed phasing plan includes approximately 70 percent of Phase 1 stations in these areas and approximately 50 percent of Phase 1-4 stations in these areas.
- Providing subsidized discounted memberships for qualified people.

- Increasing access to those without credit cards.
- Dedicating a budget for marketing and outreach, as well as identifying local champions and community organizations as partners in this program.
- Creating a jobs program associated with the bike share system.

S.6 Implementation Timeline

Table S-4 shows a potential implementation timeline for a bike share system for Rochester with a total timeline to launch of Phase 1 of approximately 18 months.

Table S-4. Potential Implementation Timeline

Critical Path Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Decision on governance structure and funding plan	█	█	█															
Identify funds for system installation, equipment and operations	█	█	█	█	█	█	█	█										
Develop procurement documents	█	█	█	█	█													
Issue Request for Proposals for equipment and/or operations				█	█	█	█	█										
Award and sign contract for equipment and/or operations								█	█	█	█							
Site planning and community outreach											█	█	█	█				
System manufacture, preparation for operations, installation and launch												█	█	█	█	█	█	█

Part A: Feasibility Study

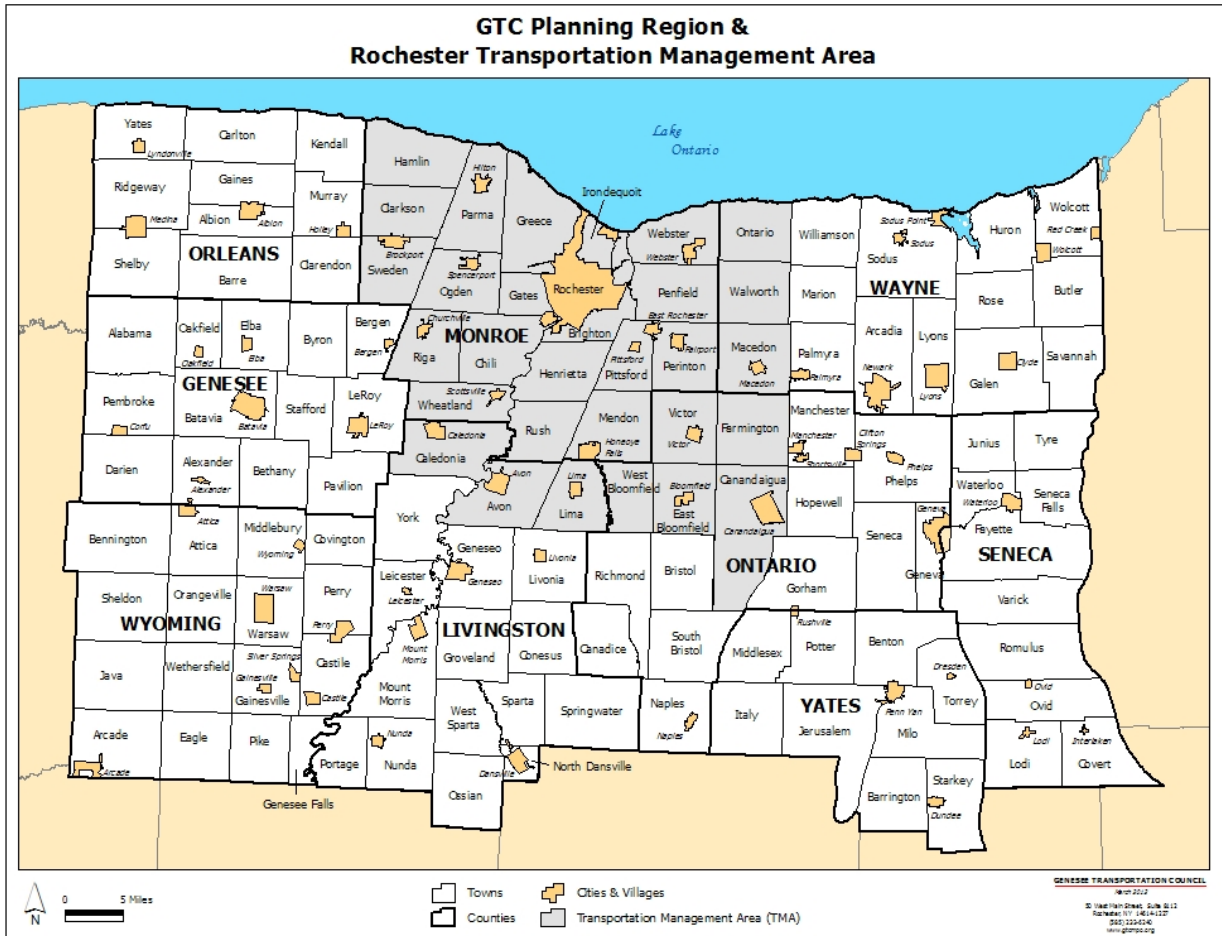
1 Introduction

The Genesee Transportation Council (GTC) engaged Toole Design Group (TDG) and SRF Associates (SRF) to investigate and determine the feasibility of a bike share system in the Rochester, NY, area. The consultant team was tasked with developing an operational model and business plan to implement an effective and sustainable system to serve the area. Such a system could integrate with the transit network, improve mobility options for residents and visitors, create future opportunities to link bike share with local colleges and universities and outlying municipalities, and attract potential employers, future residents, and visitors to the region.

Bike share is new for Rochester. However, in Upstate New York, Buffalo started a bike share system with 70 bicycles in 2013, using Social Bicycles' technology. The University of Rochester, Rochester Institute of Technology, and State University of New York at Brockport all have bike libraries, which are similar to but not the same as, bike share systems. These systems were started and operated by students, with various levels of technical sophistication. In the summer of 2014, the cities of Albany, Schenectady, Troy, and Saratoga Springs had a 25-bicycle bike share demonstration for one week each. During these demonstrations, more than 250 people tried bike share bicycles, and significant data were gathered on potential use of a bike share system in these communities. More and more small-to-midsize cities around the U.S. are starting bike share systems. Although numerous examples of successful systems exist in these communities, it should be recognized that bike share is not a one-size-fits-all solution creating the need for this study.

The nine-county Genesee-Finger Lakes Region, which is also the planning area of the GTC, is shown in Figure 1. This figure also shows the Rochester TMA and the City of Rochester, which are the focus of this study, as they also represent the areas with the highest economic activity, population density and trip-making in the region.

Figure 1. Rochester Study Area



1.1 Report Organization

This feasibility study follows the framework outlined in Figure 2. It includes phases for information gathering, goal setting, community and environmental analysis, evaluation of feasibility, program development, and implementation considerations. The completion of each phase resulted in the following sections for Part A:

- Section 1 introduces the purpose of the study and provides background on bike share efforts in the Rochester area.
- Section 2 introduces bike share and Section 3 describes the economic, transportation, health, environmental, and safety benefits and risks of bike share.
- Section 4 outlines the system goals identified by the project partners. These goals are important as they set the parameters for how the program will be set up and what will constitute success.
- Section 5 describes the experiences of cities similar to Rochester, identifying how their programs were established, their business models, equity programs and how they overcame certain challenges in those communities.
- Section 6 includes a community analysis for the Rochester area. It evaluates existing conditions for the region, and focuses on the City, evaluating the suitability for bike share in relation to the identified goals.
- Section 7 summarizes the extensive public and stakeholder outreach efforts undertaken as part of this project.
- Section 8 provides a bike share suitability heat map for the Rochester area. Overall feasibility of a potential bike share system in the Rochester area is also assessed in this chapter.
- Section 9 provides a recommended system size and phasing plan, as well as a financial analysis, which includes a business pro-forma that compares costs and revenues based on experience in other cities. It uses the analysis in Section 8 to offer a recommendation on the most appropriate program and the roles of the regional partners under this model.

Part B of this report covers the Business Plan, including sources of possible public and private funding sources for capital operations, technology assessments, and equity programs.

Figure 2. Feasibility Study Process



2 What is Bike Share?

Bike share is an innovative transportation program, whereby system subscribers have access to a network of public bicycles located around the community. Bike share systems are typically accessed through low-cost subscriptions ranging from a few dollars for one day to annual memberships that generally cost less than a bicycle tune-up (\$50-100).

Bike share is ideal for short distance, point-to-point trips, providing subscribers free access to bicycles to use and return for brief trips at any self-serve bicycle station within the system's service area. It can also be used for recreational trips, which offers public health benefits to a community. Most systems allow subscribers to make as many short trips as often as they like without additional charge provided they check the bicycle back in within 30-60 minutes. Operators generally begin to charge gradually increasing fees after the initial free period to discourage users from holding onto the bicycles when they are not being used, ensuring that bicycles are readily available for other system subscribers. In cities across the U.S., bike share systems have proven very popular and successful by giving residents and visitors a fast, affordable, easy to use transportation option that can make getting around town quick, fun, and healthy.

Some key characteristics of bike share are:

- It is oriented for short-term, point-to-point use.
- Most rides are typically around 15-20 minutes and 1-3 miles.
- The bicycle can be returned to any self-serve bike share station or designated area in the system.
- Generally, the bicycles have adjustable seats and one size fits most people.
- The rental transaction is fully automated and there is no need for on-site staff.
- Many bike share systems have wireless equipment and do not require hardwired connections.

A number of different bike share technologies are available. Most of the systems in the United States utilize “station-based” technology that include a computerized terminal where transactions and information are processed to release and lock the bikes at a series of connected docks. The components of station-based bike share systems and include:¹

- **Station:** the collective grouping of the following elements:
 - **Kiosk:** the electronic terminal where all rental transactions are made.
 - **Informational Panel:** a display that can be used to provide maps, information about the system, and space for advertising.

¹ United States Department of Transportation. 2012. Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration.

- **Dock:** the mechanism that holds the bicycles. Each dock has a mechanized locking system that locks and releases the bicycles.
- **Platform:** the structure that holds the kiosk, information panel, and docks. Some systems utilize wireless technology and solar power so that intrusion into the surface is not necessary, whereas others require an A/C connection for electricity. Most systems are modular allowing various sizes and arrangements.
- **Bicycle:** the bicycles are specifically designed for short trips and constructed of customized components to limit their appeal to theft and vandalism.
 - **RFID Card:** Radio Frequency Identification (RFID) technology, usually in the form of a card or fob, allows users to check out a bicycle directly from the dock and speeds up transactions. This also provides an added layer of security and accountability to each transaction.

To release and use a bicycle, a bike share user can either swipe their membership key or credit card. After the user is done, they just need to return the bicycle to the same or any other station within the system's service area. The check-in and check-out transactions take a few seconds each. Therefore, bike share is ideal for short distance point-to-point trips.

An emerging technology in bike share is the use of "smart-bikes" rather than "smart docks." These systems take the features of the station-based systems, and move them onto the bicycles. A typical example includes a transaction terminal, a locking mechanism, and a GPS unit on the bicycle itself. This allows more flexibility as to where bicycles can be locked but doesn't necessarily provide the reliability of knowing where bicycles are that is provided by the station-based systems. A user locates the specific bicycle through a mobile application or on a website. To counter this potential for bikes to be "everywhere," smart-bike vendors are setting up de-facto stations using regular bike racks to replicate the visibility of bike share stations in the community. In general, smart-bike systems are about 25–50 percent less expensive per bicycle than station-based systems but are largely untested in large-scale municipal systems. A smart bike system launched in Phoenix in November 2014 and other programs are scheduled to launch in Tampa, Florida and Hamilton, Ontario (Canada) in 2015.

Most operators in the United States limit users to those over 16 or 18 years of age (depending on the city). This restriction is primarily a result of the size of the bicycles being suited to adults, and in some areas, the requirement for persons under this age to wear a helmet.

Although helmets are not required for adults in any of the currently operating bike share systems, operators such as Boston Hubway and Capital Bikeshare encourage the use of helmets through discount programs, helmet giveaways (often funded by public health and medical partners), locating nearby helmet retailers on the system maps, and through safety messaging. Currently, the Boston Hubway system is testing prototypes for helmet vending machines.

Many systems (for example, Charlotte, NC; Chattanooga, TN; and San Antonio, TX) offer independent locks so that users can lock the bicycle while it's still in their possession (e.g., to run an errand at a location without a station). However, the time the bicycle is locked is still counted to the user and could result in usage fees being imposed.

As a transportation investment, bike share is relatively inexpensive. A 30 station and 300 bicycle system such as those in Chattanooga or Columbus, Ohio, costs in the order of \$1.5 million to for capital and installation costs. This amount is less than two transit buses or one quarter of the cost of constructing a mile of new four lane urban highway.²

They are also relatively quick to implement. Systems typically launch within two years of concept, although some cities have experienced delays from grant funding disbursement, equipment production, force majeure, and other factors. Some stations use wireless and solar technologies, while others have found significant success and costs savings in using A/C powered stations. After site preparation, both types of stations take less than two hours to install.

² One mile of new four lane urban highway costs \$8 - \$10 million based on information from the American Road & Transportation Builders Association, accessed online at <http://www.artba.org/faqs/#20> on December 12, 2013.

3 Benefits of Bike Share

Bike share is a relatively inexpensive and quick-to-implement transportation option that can deliver a variety of mobility, economic, health, safety, and quality of life benefits. When combined with other modes of transportation and other investments in cycling, bike share can provide a fundamental shift in the way people move about and make decisions on transportation. The benefits of bike share to a community include mobility, economic, health, environmental, and safety. For Rochester, bike share could be a means to:

- Introduce new riders to the benefits of bicycling.
- Improve physical and mental health and reduce health care costs.
- Promote the city to potential employers, residents, and visitors.
- Provide an economic uplift to local businesses.
- Expand and enhance existing transit services.
- Reduce dependence on automobile transportation.
- Reduce greenhouse gas emissions.
- Reduce household transportation expenditure.
- Catalyze investment and interest in bicycling.

These benefits are described in more detail in the following sections.

3.1 Mobility, Transportation, and Community Building Benefits

Bike share creates additional mobility in a community by adding transportation options. Bike share trips tend to be short – between one to two miles in length and about 20 minutes in duration. As a result, they provide an option for trips too far to walk and trips too short to wait for transit and provide a first-mile / last-mile solution to access public transit. Many bike share users combine membership in a bike share program with transit, car-share, walking, and other transportation options to reduce their dependency on automobile travel. In some places, this strategy has resulted in a fundamental shift in trip-making and household vehicle ownership. As well, cities have found that bike share contributes positively to increasing people’s perception and enjoyment of the city and increased social interaction through the physical presence of the stations and through social networking.

The following is a summary of the mobility, transportation, and community building benefits of bike share. It:

- Encourages active transportation by lowering barriers to entry.
- Provides the impetus for further investment in bicycling facilities.

- Contributes positively to people’s attitude toward the City.
- Acts as a conversation starter and increases social interaction.
- Augments a community’s existing transit system.
- Relieves already over-capacity transit services.
- Activates existing bike facilities with new riders.

3.1.1 Transit Benefits

A bike share system complements existing transit services by offering a first- and last-mile option that extends the reach of existing fixed-route services, connects transit lines that do not cross, and adds capacity to already congested transit routes. The following examples describe how bike share has augmented transit in other cities:

- In New York City, two-thirds of Citi Bike users link their bike share trips with transit and the busiest stations are clustered near transit hubs.³ An example of bike share’s role in extending transit can be seen on the Lower East Side. These stations provide a first- and last-mile connection for an area currently under-served by mass transit. Daily usage patterns at these stations follow an outward flow of bicycles from the neighborhood in the morning and a reverse of this pattern in the afternoon.⁴
- Several cities including New York City and Vancouver, Canada have identified bike share as a means to alleviate over-capacity transit routes by providing an option for bicycling to less crowded stops or to replace certain transit trips altogether.^{5,6}
- In Washington D.C., over half (54 percent) of respondents to Capital Bikeshare’s member survey stated that at least one of their bike share trips in the previous month had started or ended at a Metrorail station and about a quarter (23 percent) of respondents used bike share to access the bus in the previous month.⁷

³ New York City Department of Transportation Press Release (December 12, 2013). After First 200 Days of Citi Bike, NYC DOT Releases New Data Showing that Significant Number of New Yorkers are Biking, Complementing Transit System.

⁴ For example, view the E 10th Street & Avenue a bike share station in New York: <http://bikes.oobrien.com/newyork/>.

⁵ New York City. 2009. Bike Share Opportunities in New York City. http://www.nyc.gov/html/dcp/pdf/transportation/bike_share_complete.pdf

⁶ Johnston, S. July 2013. Presentation to Vancouver City Council: City of Vancouver Public Bike Share System. <http://vancouver.ca/files/cov/public-bike-share-staff-presentation-to-council-07232013.pdf>

⁷ LDA Consulting. 2013. 2013 Capital Bikeshare Member Survey Report. <http://capitalbikeshare.com/assets/pdf/CABI-2013SurveyReport.pdf>

Recognizing that transit agencies are important partners in bike share programs, the Federal Transit Administration (FTA) has funded several different systems including in Boston and Chattanooga. To be eligible for FTA funding, stations must be within a 3-mile radius of transit and funds can be used toward bike share docks, equipment, and other capital costs as the cost of the bicycles and operating costs are not eligible.⁸

3.1.2 Active Transportation Benefits

Cities across the United States are looking for effective ways to encourage active transportation and promote the benefits of walking and bicycling. Bike share has proven one of the most effective ways of quickly and affordably introducing new riders to bicycling and using the momentum around bike share to drive further investment in active transportation.

Bike share's ability to reduce some of the common barriers to entry, e.g., allowing new users to try bicycling without needing to own or store a bicycle, as well, the design of the bicycles and the visibility of the stations has a significant impact in attracting new riders. In Minneapolis, for example, 33 percent of new members surveyed in 2010 by Nice Ride Minnesota had ridden less than once per month before joining.⁹

In addition, bike share is often coupled with an increase in bicycle infrastructure. Although the exact correlation between bike share and investment in bikeways has not been studied, it is reasonable to expect that utilization of bike share as part of an increase in overall bicycling increases the desire for a more comfortable riding environment and may prompt increased investment in the bicycling network as a result of public demand.

⁸ Federal Transit Administration's Frequently Asked Questions and Answers Concerning Bike Sharing Relative to the United States Department of Transportation. http://www.fta.dot.gov/documents/Informal_Q_and_As_Final_6-14-12.pdf

⁹ Two-thirds of members also said they had increased their amount of bicycling since joining Nice Ride. Percentages were reported in the Nice Ride Minnesota 2010 Annual Report.

3.1.3 Community Building Benefits

As well as providing an additional transportation and mobility option for residents and visitors, cities implementing bike share systems have found a number of positive community-building benefits including:

- People’s perception of the city can be shifted by the presence of bike share. Of Nice Ride Minnesota users surveyed in 2011, 95 percent agreed or strongly agreed that bike share had made the Twin Cities a more enjoyable place to live.¹⁰
- Two-thirds of Capital Bikeshare survey participants reported that they like to bicycle because it is “fun.” Eighty-five percent reported that bicycling is an easier and faster way to get around.¹¹
- After the installation of bike share kiosks in New York City, it was observed that the kiosks created a social space where people meet and gather as well as act as a conversation starter.¹²
- Social network communities are a large part of the way that bike share systems communicate to users and how users interact with each other. For example, Boston’s Hubway has 6,000 followers and very active interaction among users.

3.1.4 Mobility Risks

Although 20 to 40 percent of bike share trips replace single occupancy vehicle trips,^{3,13,14} the remainder of trips are entirely new trips, augment public transit trips, or may actually replace public transit or walking trips. A full, holistic analysis of the impact of bike share on public transit and active transportation has not been undertaken. However, some bike share trips may detract from other public transit or active transportation trips.

3.1.5 Overall Mobility Impacts for Rochester

Overall, in Rochester, bike share could be a positive addition to the existing transportation options and help connect neighborhoods that are not currently well-connected.

¹⁰ Nice Ride Minnesota Annual Report. 2011. https://www.niceridemn.org/_asset/9n2z8n/

¹¹ LDA Consulting .2012. Capital Bikeshare 2011 Member Survey Report. <http://capitalbikeshare.com/assets/pdf/Capital%20Bikeshare-SurveyReport-Final.pdf>

¹² Nelson, David M. and David Leyzerovsky. The Social Life of CitiBike Stations. Project for Public Spaces. <http://www.pps.org/blog/the-social-life-of-citibike/>.

¹³ National League of Cities. 2011. Integrating Bike Share Programs into a Sustainable Transportation System.

¹⁴ Nice Ride Minnesota. 2011 Presentation about Nice Ride Minnesota.

3.2 Economic Benefits

Bike shares offer a number of economic benefits that bike share offers at a community, business, and individual level. These benefits include making the community attractive for employers, individual transportation savings, money spent by bike share users at local businesses, and bike share memberships provided as part of employee benefits packages.

The following is a summary of the economic benefits of bike share:

- At the **community** level, bike share is recognized as a means for attracting or retaining workforce talent and in providing visitors with a unique way to experience the city.
- For **businesses**, bike share riders spend more money at local businesses, and offer potential benefits for employees.
- For **individuals**, bike share reduces the costs of transportation and health care.

3.2.1 Community Benefits

A bike share system can help a community attract and retain residents. Many communities see bike share as part of a (re)vitalization effort for their downtown or other areas. In addition, it provides a new and different way for tourists to see a city, helping attract more tourists and their spending power to communities. The amount of national and international press coverage generated by a bike share system would serve to emphasize the city to visitors, businesses, and employers. For example, the launch of Charlotte B-Cycle in North Carolina received exposure in 18 newspapers including *The New York Times*.¹⁵ A bike share system also creates a small number of local jobs operating and maintaining the system.

3.2.2 Business Benefits

Local businesses and employers benefit in many ways from bike share. Some of the business benefits of bike share are:

- **Increased sales:** in other cities, businesses located near bike share stations have seen an economic uplift. A recent study of the Nice Ride Minnesota bike share system in Minneapolis / St. Paul found that bike share users spent an additional \$150,000 at local businesses over the course of one bike share season compared to the prior year before bike share was

¹⁵ From the Sponsor's Perspective. 2013. www.bikeshare.com.

implemented.¹⁶ Increased sales in the bike retail sector can also be expected. Although there is limited data available in the United States, in Paris, city-wide bicycle sales increased 39 percent following the launch of Velib.¹⁷ The sale of bike-related products and accessories could also increase as a result of bike share.

- **Corporate membership:** most bike share programs offer corporate membership packages where annual memberships are purchased in bulk by the organization at a discounted rate. Some systems, such as Hubway in the Boston area, offer packages where employers choose how much of the membership cost they contribute and whether they cover usage fees or not.¹⁸ Corporate membership could be offered as part of a company's travel demand management program, as a way to decrease the inventory of fleet vehicles or vehicle maintenance costs, or as an employee benefit.
- **Sponsorship and promotions:** most bike share programs offer sponsorship or advertising opportunities on the stations and bicycles. These opportunities can range from one large system sponsor to many smaller station-based sponsors. In some communities, sponsors become involved in bike share promotions, such as discounted goods or services for bike share members.

3.2.3 Individual Benefits

The economic benefits to individuals and households come in the form of reduced household expenditure on transportation and health care, which combined make up over 22 percent of annual average household expenditure in the United States.¹⁹ Compared to the cost of operating an automobile, bike share membership is relatively inexpensive with most programs costing between \$50 and \$100 per year. In comparison, the median cost of annual car ownership is approximately \$9,100.²⁰ Eighty-seven percent of annual members in Washington D.C. said they saved money on weekly travel costs by using Capital Bikeshare.⁷ On average, this resulted in an \$800 per year saving on personal transportation costs for these users.

¹⁶ Schoner, J.E., Harrison, A. and Wang, X. 2012. Sharing to Grow: Economic Activity Associated with Nice Ride Bike Share Stations. Humphrey School of Public Affairs, University of Minnesota.

¹⁷ Bike Europe (2007). Strong Shifts in 2007 French Market. <http://www.bike-eu.com/Home/General/2008/4/Strong-Shifts-in-2007-French-Market-BIK002778W/>.

¹⁸ Hubway Corporate / University Accounts, <http://www.thehubway.com/corporate>.

¹⁹ U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2010.

²⁰ For comparison, the median annual cost of car ownership is approximately \$9,100 based on information from www.consumerreports.org.

3.2.4 Economic Risks

Some economic risks are related to a bike share system, such as:

- Most bike share systems are not economically self-sustaining, i.e., operating costs are greater than system membership and usage fees. Therefore, the responsible organization (public agency, non-profit, or private company) must ensure that the requisite funding is available to support capital purchases, expansion, and ongoing operations. If membership and ridership are not significant, then the cost of operations needs to be recouped through a higher burden on other funding sources.
- Although few systems have failed in the United States, should a system not garner membership and ridership, it could act negatively on the city's image.
- Many communities fear that bike share will threaten the local bike rental and bike shop businesses. Some actions have been employed to reduce this risk including developing a price structure to deter long-term rental of the bike share bicycles and identifying bicycle rental and retail locations on the station maps.

3.2.5 Overall Economic Impact on Rochester

Overall, all communities that have implemented a bike share system have faced the economic risks of bike share, and have overcome them (i.e., no system has shut down due to financial non-compliance). The most impactful potential net benefits to the Rochester area are:

- Augmenting the image of Rochester as a forward-thinking, bicycle-friendly city to attract and retain students, residents, and visitors.
- Increased likelihood that bike share users will patronize businesses located near a bike share station.
- Opportunity for employers and businesses to sponsor, advertise and provide bike share as an employee benefit.
- Individual savings on transportation.

3.3 Health Benefits

The health benefits of cycling are well known in helping to address preventable diseases such as obesity, heart disease, and diabetes. As such, bike share can have a positive impact on both physical and mental health.

3.3.1 Physical Health Benefits

Bike share is a means for people to incorporate active transportation into their daily lives and lower medical and health care costs. Bicycling for 30 minutes a day, e.g. using bike share to go to and from work each day, can reduce the risk of heart disease by 82 percent²¹ and reduce the risk of diabetes by up to 58 percent.²²

A study of the Bicing bike share system in Barcelona, Spain published in the *British Medical Journal* in 2011 compared the benefits of increased physical activity to the additional risks introduced from increased inhalation of air pollutants and increased exposure to traffic crashes. The study found that over 10 deaths were avoided each year due to increased physical activity, offsetting any smaller increases in expected deaths from air pollutant inhalation and traffic crash exposure.²³

The health benefits of bike share are recognized by the health care industry. The federal government, through the Center for Disease Control (CDC), has funded several different systems including in Boston and Nashville. The private sector is also represented with many bike share systems in the United States supported by health care providers such as Blue Cross Blue Shield (Nice Ride Minnesota) and Kaiser Permanente (Denver B-Cycle) through partnerships and sponsorships.²⁴

3.3.2 Mental Health Benefits

Bike share can also have a positive impact on mental health. Users in other cities have expressed that bike share has positively contributed to an improved outlook, increased recreation, and improved sociability.

3.3.3 Health Risks

Safety is a large concern for bike share users. This risk is described more in Section 3.5.

²¹ British Medical Association (1992). *Cycling Towards Health and Safety*. Oxford University Press.

²² Lindström, J. et al. 2002. The Finnish Diabetes Prevention Study: Lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care*, vol. 26 no. 12 3230-3236.
<http://care.diabetesjournals.org/content/26/12/3230.full>

²³ Rojas-Rueda, D. et. al. 2011. The Health Risks and Benefits of Cycling in Urban Environments Compared with Car Use: Health Impact Assessment Study. *British Medical Journal* 2011; 343:d4521.
<http://www.bmj.com/content/343/bmj.d4521> Statistics reported are based on the sensitivity analysis that assumes 10% of Bicing trips replace car trips.

²⁴ Denver B-cycle 2010 Annual Report

3.3.4 Health Impact for Rochester

Overall, bike share can have a positive health impact on Monroe County and Rochester. Considering that in Monroe County approximately 63 percent of the adult population is obese or overweight,²⁵ bike share can be a useful tool in addressing obesity. Additionally, businesses in the health care industry may be interested in sponsoring part of a bike share system and providing free or discounted memberships as a wellness strategy.

3.4 Environmental Benefits

Bike share can have an impact on reducing greenhouse gas emissions by replacing trips taken previously by automobile. These impacts can be multiplied when bike share is used in combination with transit and other modes to reduce dependence on automobile use, change travel patterns, and increase environmental consciousness.

3.4.1 Air Quality Benefits

In communities where bike share is an active transportation option, surveys have shown that approximately 20-40 percent of annual member bike share trips replace what would have been an automobile trip.^{13,14} A survey of Capital Bikeshare members in Washington D.C. in 2011 showed that bike share trips had replaced approximately 4.4 million vehicle miles,¹¹ representing a four percent decrease in the city's annual driving mileage.²⁶

In its first season of operation, Denver B-cycle users took over 100,000 trips and rode more than 200,000 miles. A survey of members showed that over 40 percent of trips replaced a vehicle trip, resulting in almost a 16,000-gallon savings in gasoline consumption and avoiding over 300,000 pounds of greenhouse gas emissions.¹³

²⁵ New York State Health Department; Obesity Statistics for Monroe County, <https://www.health.ny.gov/statistics/prevention/obesity/county/monroe.htm>.

²⁶ Federal Highway Administration, Highway Statistics 2011: Urbanized Areas – 2010 Miles and Daily Vehicle – Miles Traveled. <http://www.fhwa.dot.gov/policyinformation/statistics/2011/hm71.cfm>

3.4.2 Increase Environmental Consciousness

Bike share helps to increase environmental consciousness for both individuals and communities as a whole. For individuals, most bike share systems offer member logins where people can track the amount of greenhouse gas emissions avoided through their bike share trips. Employers can use these statistics to help track the organization's greenhouse gas emission reductions. The data tracked through a bike share system can also be used to foster contests among employees for distance ridden. Such contests are already frequently used with pedometers at workplaces.

Bike share is also a high-profile endeavor for a community that garners significant press attention. In 2011, at the launch of Hubway, then Boston Mayor Thomas Menino famously commented, "The car is no longer king." This quote was memorialized on a Hubway bicycle. The press attention allows politicians to publicly support a popular and convenient transportation system that has a positive environmental benefit. There have been many images of celebrities on bike share bicycles, including Rafael Nadal on Toronto Bixi, Leonardo DeCaprio on Citi Bike, and many images and mentions of Citi Bike on late-night television, including Bruce Willis on The Late Show with David Letterman and Paul McCartney on Saturday Night Live. Such high-profile attention brings attention to the bike share system as well as increases overall environmental awareness.

3.4.3 Environmental Risks

A major part of bike share operations is balancing the system – that is, moving bicycles around from full stations to empty stations to ensure the availability of bicycles and empty docking points. Typically, this operation is undertaken by vans. Because of the relatively high cost and low availability of non-GHG options, there are few operations that utilize electric or other environmentally friendly vehicles. There have been no studies on the emissions of such vehicles, or other aspects of operations, on the overall environmental impact of a bike share system. However, this negative impact should be noted.

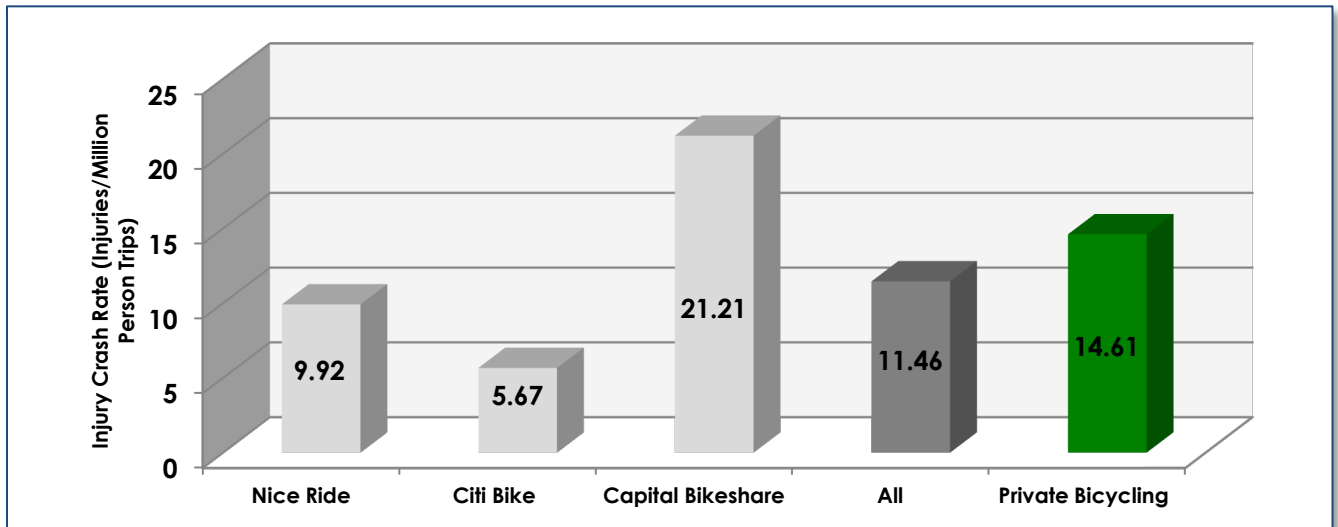
3.4.4 Overall Environmental Impact for Rochester

Overall, a bike share system could provide a positive environmental impact for Rochester by serving as a catalyst for increased bicycling in the region. Furthermore, the bike share program will have a positive effect on the environment by increasing public transit accessibility and usage, lowering single occupancy vehicle trips, and increasing environmental awareness.

3.5 Safety Benefits

The safety of bicycling in a community is a significant concern to bike share users. Although still relatively new, bike share has an extremely impressive safety record. To date, no system in the United States has recorded a fatality and the rates of injury crashes are typically lower than private bicycling, as shown on Figure 3.²⁷

Figure 3. Comparison of Injury Rates for Bike Share and Private Bicycling²⁸



The safety benefits of bike share include:

- Introducing more riders to a community for a “safety in numbers” effect.
- Exposure of riders to road rules and safety hints through messaging at bike share stations and websites.
- Introducing safer bicycles in good repair that feature permanent lighting systems.

²⁷ Only Capital Bikeshare has a higher injury crash rate than private bicycling. It is uncertain why the injury crash rate is higher in Capital Bikeshare than in other systems and higher than the private bicycling rate.

²⁸ Injury rates for private bicycling obtained from: Beck, L. et al. 2007.. “Motor Vehicle Crash Injury Rates by Mode of Travel, United States,” American Journal of Epidemiology.

3.5.1 Safety in Numbers

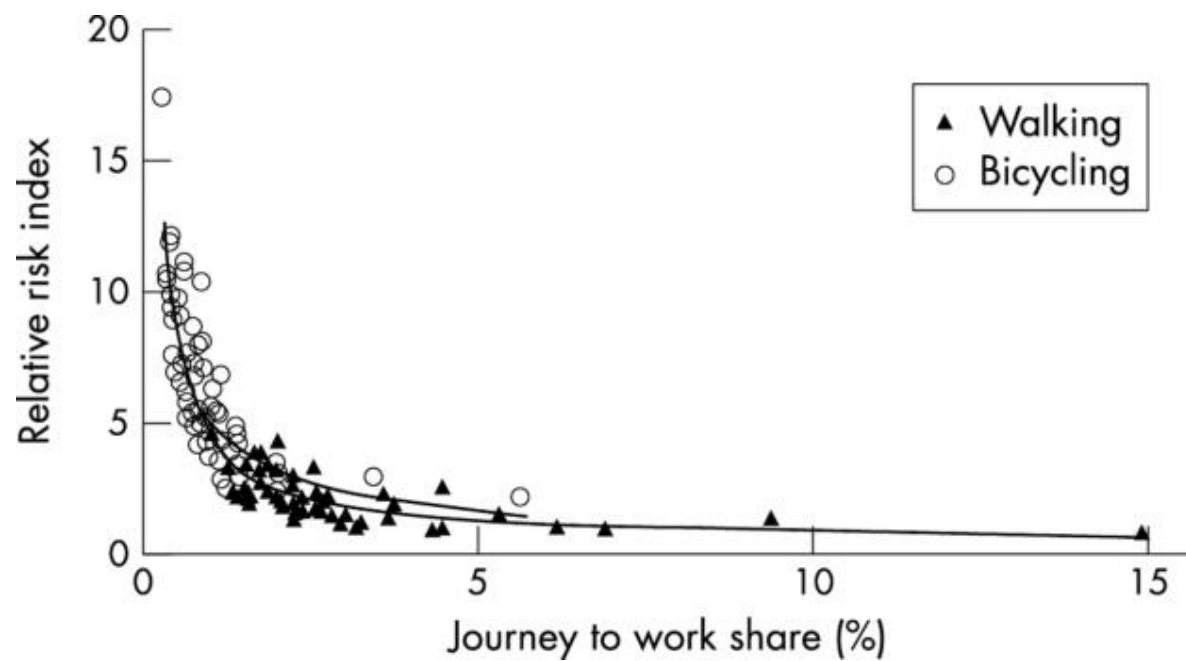
Millions of bike share trips were taken in almost 30 U.S. cities in 2013 significantly increasing the number of bicycling trips in these cities. For example, in New York, there were an additional 40,000 bicycle trips per day due to Citi Bike and bike share trips made up approximately 29 percent of the 113,000 daily bicycle trips made within the bike share service area. Bike share has been effective in attracting new and previously infrequent bicyclists. A survey of Hubway members in Boston found that 12 percent bicycled less than once per year prior to joining Hubway and a further 16 percent bicycled less than once per month prior to joining.²⁹

Along with the high visibility of stations, the high volume of riders results in greater awareness of bicyclists by drivers. In fact, the “safety in numbers effect” is well established. A study published in *Injury Prevention* in 2003 showed that the “likelihood of a person walking or bicycling being struck by a motorist varies inversely with the amount of walking and bicycling”.³⁰ Figure 4 shows how the injury rate (referred to as “relative risk index”) reduces exponentially with the number of bicyclists using the road system (in this case using journey to work mode share as a proxy for the overall amount of bicycling).

²⁹ Freedman, Nicole. 2013. Presentation titled *The Hubway Influence on New Riders* given by Nicole Freedman <http://baystateroads.eot.state.ma.us/movingtogether/docs/Freedman-Moving%20Together%202013.ppt.pdf>

³⁰ Jacobsen, P.L. 2003. “Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling.” *Injury Prevention* 9:205-209.

Figure 4. Walking and Bicycling Risk in 68 California Cities in 2000³⁰



3.5.2 Road Rules and Safety Hints

Bike share provides a unique opportunity to communicate with cyclists about road rules and regulations and safety hints. Some example messages include:

- Don't ride on sidewalks.
- Ride with the flow of traffic.
- Watch out for car doors.
- Wear your helmet.
- Watch out for right-turning vehicles.
- Ride predictably and in control.

Means of communicating safety messages are numerous, including:

- Website.
- Social media.
- At kiosk during registration.
- On the bicycle handlebars and stem.
- On the map panels.
- High-profile events or press articles.
- Host safe cycling seminars and present safe cycling tips at community events.

Such communication leads to better educated and safer riders who typically take fewer risks than the traditional, private bicyclist.

3.5.3 Safe Bicycles

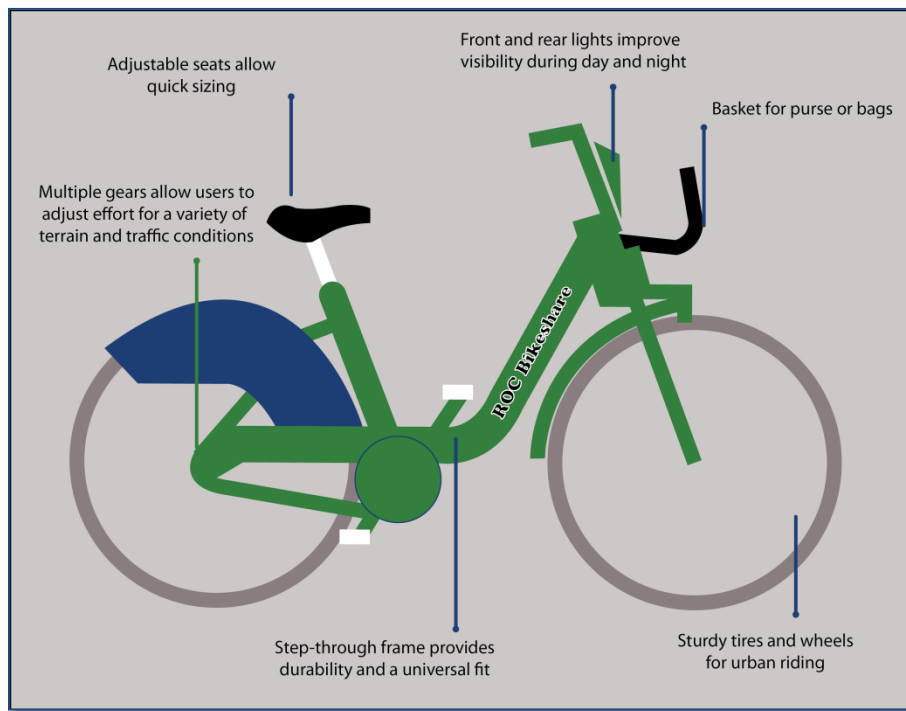
The strong safety record of bike share is also impacted by the introduction of bicycles with many safety features. These safety features are shown on Figure 5 and include:³¹

- Built-in safety features such as front and rear lights, brakes, and reflectors.
- An upright position of the rider.
- A heavy bicycle (typically 40-45 lbs.) with wide handlebars where riders generally keep slow speeds and do not weave in and out of traffic.

In addition, the operator undertakes regular maintenance of the bicycle fleet to ensure its safety.

³¹ Atlanta Bicycle Coalition (2013). Atlanta – Decatur Bike Share Feasibility Study.
http://issuu.com/atlantabike/docs/atl-dec_bikeshare_book_lowres#

Figure 5. Safety Features of a Bike Share Bicycle



3.5.4 Safety Risks

Many communities have had strong concerns about safety prior to implementation, including:

- Lack of bicycle infrastructure for safe bicycling.
- Introducing inexperienced riders to the streets.
- Low helmet usage rate among bike share users (a study of bike share trips in Boston and Washington, D.C. showed that less than 20 percent of bike share riders wore a helmet).³²
- Pedestrian concerns of riders breaking rules such as riding on the sidewalk or against traffic (particularly for the elderly pedestrian population).

³² Fischer, C.M. et al. 2012. "Prevalence of Bicycle Helmet Use by Users of Public Bikeshare Programs." *Annals of Emergency Medicine*, 60,(2): 228-231.

3.5.5 Overall Safety Impact on Rochester

Although the safety risks are real and should be considered and mitigated for a system in Rochester, none of these fears have proven to be a large factor once a system is up and running in a city. Bike shares have strong safety record in the communities after introduction. However, it is advisable that the agency responsible for the program procure adequate liability insurance and consult its legal team. Furthermore, it is recommended that the responsible agency reach out to peer cities and their attorneys to get guidance on possible language to include in waivers as well as on the bicycles, maps and signage throughout the program. The region should also make a commitment to expanding its bicycling infrastructure to support the proposed bike share system.

3.6 Summary of Benefits and Risks

Bike share provides a multitude of mobility, transportation, community-building, economic, health, environmental and safety benefits. However, there are also risks associated with launching a bike share program. Some of the major benefits that bike share could bring to the Rochester area include:

- Providing an additional transportation option that by itself or combined with other options presents an opportunity to reduce dependence on automobile transportation.
- Expanding and enhancing existing transit services providing a first- and last-mile option and an opportunity to relieve already over-capacity transit services.
- Introducing new riders to the benefits of bicycling and spurring new impetus for further investment in bicycling facilities.
- Building on the City's reputation as a forward-thinking, bicycle-friendly community and using bike share to promote the city to potential employers, residents, and visitors.
- Providing an economic uplift to local businesses.
- Reducing household transportation expenditure.
- Improving physical and mental health and reduce health care costs.
- Reducing greenhouse gas emissions and increase environmental consciousness.
- Introducing more riders on safely designed and well maintained bicycles to positively contribute to the safety in numbers effect.
- Introducing new opportunities to promote safety messaging to all road users.

The major risks include:

- Providing sufficient funding to support capital, expansion, and ongoing operations. Most bike share systems are not economically self-sustaining from membership and usage fees alone.
- Creating a competitor that may threaten the local bicycle rental and retail markets.
- Detracting from other public transit or active transportation trips.
- Causing greenhouse gas emissions through rebalancing that could offset the benefits of the system.

4 System Goals and Objectives

An important component in determining the feasibility of a bike share program is to understand its role in the community, decide what benefits are considered most valuable, and determine what will be considered a successful program. To this end, the project team has developed a preliminary set of system goals and objectives based on meetings with key regional stakeholders and initial feedback from the public.

The team has defined two types of goals for the system: policy goals and financial goals. The policy goals are the reasons why the system will exist – the fundamental drivers. The policy goals should match the desires of the community. However, the primary need of any program is to maintain financial viability. This does not mean that revenues generated by the program must cover the full cost of operating the program – in fact few systems do. Nevertheless, the program needs to maintain financial viability to continue to operate.

The financial goals will need to support the policy goals for the program. Some policy goals will complement financial viability and others will compete with this interest. For example, promoting high membership and ridership and considering market value pricing structures will encourage financial viability, whereas maintaining a high functioning program with high operating standards will add cost to the program and reduce financial viability. The ultimate funding plan should identify funding targets that the program must meet either by reducing operating costs or generating more revenue.

Table 1 presents the final policy and financial goals. In addition, performance measures were developed to measure the impact of the system relative to the system goals. Effective performance measures must be detailed enough to give meaningful indicators about system performance, yet be simple enough to collect and report on a regular basis. The measurements proposed for Rochester can be developed using three different input sources: automatically generated system data, a proposed annual user survey, and figures that the program administrative and marketing staff can track internally over time. If any of the proposed performance measurements fall under the responsibility of an outside vendor, the vendor should be contractually required to track these measurements. Although many of these figures can be tracked in real-time, the full set of performance measures should generally be reported on an annual basis by the managing agency. Performance measures are also shown in Table 1.

Table 1. Goals, Objectives, and Performance Measures for a Potential Rochester Bike Share Program

Policy Goal	Objectives	Performance Measures
<p>Mobility: Offer additional transportation options for residents of, students and employees in, and visitors to Rochester</p>	<ul style="list-style-type: none"> • Increase the reach of other transportation modes by using bicycle trips as the first mile / last mile solution and to increase overall use of public transportation. • Connect key origins and destinations in and around Downtown Rochester with one another and nearby neighborhoods, including: downtown offices, government buildings (offices, library, post office), cultural venues (e.g., Eastman School, The Little, theaters, museums), eateries, retail, stadiums, High Falls, neighborhood business districts, Genesee River Trail, the Public Market, University of Rochester, Monroe Community College, etc. • Create a program that has the potential of expanding regionally with one integrated system for the region. • Increase the accessibility of neighborhoods that are not currently served with efficient transit options, as well as connections between neighborhoods that currently do not have efficient transit connections. 	<ul style="list-style-type: none"> • Percentage of bike share stations within 1/4 mile of a public transit stop / station . • Number of trips origins and destinations at stations with direct proximity to transit stations and bus stops, as well as trips between stations that are >1/4 mile from the closest transit stop. • Percentage of rides coupled with public transit as reported through survey. • Percentage of stations in different jurisdictions.
<p>Equity: Increase equitable and affordable access to public transportation</p>	<ul style="list-style-type: none"> • Provide a jobs program associated with the bike share system to offer employment to those with lower incomes. • Create a program with stations located to serve the largest cross-section of the community. • Create partnerships with low-income service providers to increase accessibility of the bike share system. • Create a pricing and payment structure that lowers barrier to entry and makes the system accessible to people of all income classes. • Ensure that bike share is cost competitive and financially accessible to users of all economic strata and is an affordable alternative to other modes of transportation. 	<ul style="list-style-type: none"> • Average cost per trip per user. • Average annual travel savings among bike share users. • Bike share trips originating or ending in low-income census tracts. • Number of stations in low-income census tracts. • Demographic user profiles through registration and user surveys for age, race, gender and income. • Memberships and ridership for low income individuals through partnerships with community organizations. • Number of responses from outreach campaigns focused on station locations in low-income census tracts. • Number of people employed through jobs program.

Table 1 continued

Policy Goal	Objectives	Performance Measures
<p>Economic: Increase the attractiveness of Rochester as a place to live, work, visit and do business</p>	<ul style="list-style-type: none"> • Provide an alternative means of transportation for visitors to Rochester, including conference attendees, families of students and tourists to the area. • Provide a program that is customer-service focused and well-maintained to standards that will attract and maintain program sponsors, and be a visual and economic asset to the local community. • Create co-promotions with employers to offer discounted bike share membership as part of a group membership. • Create a program that will both attract visitors and retain residents in and around Downtown Rochester and its surrounding neighborhoods. • Create a program that will attract national attention to Rochester as a city that is technology-oriented, fun, attractive, safe and comfortable to both live and visit. 	<ul style="list-style-type: none"> • Population and employment within a quarter mile of a bike share station. • Number of employer / corporate partnership memberships. • Percentage of rides coupled with public transit as reported through survey. • Number of active corporate memberships. • Proportion of surveyed bike share users who are visiting the city for leisure or business. • Number of casual users. • Usage reports of stations located near the convention center, including casual and member usage. • Number of media reports about Rochester bike share
<p>Bicycling: Increase the amount of bicycling in Rochester and improve air quality and safety of cycling as a result.</p>	<ul style="list-style-type: none"> • Provide alternatives to single occupancy vehicle trips including bicycling to foster an active lifestyle and environmental sustainability. • Increase the presence of and visibility of bicyclists to improve overall bicycle safety. • Increase the mode share for bicycle-related trips in Rochester, whether for transportation or recreation. 	<ul style="list-style-type: none"> • Number of annual memberships. • Number of visitor memberships. • Number of rides per annual member. • Annual member rides from each station. • Casual member rides from each station. • Bicycle and transit mode share through planning study. • Bicycle trip counts at specific locations near bike share stations • Percentage of bike share trips that avoided single occupancy vehicle trips. • Number of reported bike share crashes per 1,000 bike share trips. • Total calories burned per year. • Greenhouse gas emissions avoided.

Table 1 continued

Policy Goal	Objectives	Performance Measures
<p>Financial: Create a public-private program that is financially viable and can meet the Policy Goals.</p>	<ul style="list-style-type: none"> • Seek a public-private partnership to maximize private sector funding for a bike share system that will meet the stated Policy Goals. • Utilize a combination of user revenues, sponsorship, other revenues, and, if necessary, some local public assistance to fund ongoing operations. • Ensure that the Policy Goal of Equity has its own source of funding to maximize success and impact. • Create and maintain a contract structure whereby the program owner and operator (if applicable) are both financially incentivized for a financially sustainable program. • Plan for and ensure sustainable capital and operational funding for program growth and ongoing equipment replacement. • Seek grant funding or other large, one-time funding sources for capital investment. • Clearly communicate program performance and effectiveness to stakeholders and the public. 	<ul style="list-style-type: none"> • Sponsorship funding acquired. • Grant and other type of funding acquired. • Total system revenue (broken down by annual membership, casual membership, and usage fees for each). • System revenue per bike and for each station per year. • Funding acquired to achieve Equity goal. • Membership, ridership and equity performance measures included in operator contract. • Farebox recovery. • Annual reporting of the state of bike share that details to the members and public the progress on all bike share performance measures.

5 Comparable Cities

Most of the major North American bike share systems launched after 2010. Several programs, in cities of comparable size to Rochester, have come on line more recently and provide a considerable data set for this feasibility study. Four peer systems were selected from among active systems based on their similarities in population size, climate, regional nature, proximity to a large university population and/or equity programs. The selected programs also highlight several different ownership and operational models. Characteristics of the following peer systems are summarized in Table 2 and discussed in this section. Given the varying age of the systems discussed and varying types of data available, not all can provide the same level of detail, but comparative measures are provided whenever possible. The systems are:

- **Chattanooga Bicycle Transit System – Chattanooga, TN** - small/mid-sized city with bus-only transit network and a strong car culture that has launched a bike share system focused on connecting to transit. The system is owned by the City and operated privately.
- **GreenBikes – Salt Lake City, UT** – a system created by the Downtown Business Improvement District that then spawned the operating nonprofit. Salt Lake City has bus-only transit, similar to Rochester, and the system has a very diverse mix of public and private funding.
- **Hubway – Boston, MA region** – a regional system that has made the strongest efforts toward equity.
- **Nice Ride Minnesota – Minneapolis / St. Paul, MN** – a nonprofit run system in the Midwest in a city with a large university presence, similar to Rochester. This system has expanded regionally both to St. Paul, and to the small town of Bemidji with a different technology

Table 2. Performance of Existing Programs in Comparable Cities

	Nice Ride Minnesota (started June 2010)	Hubway (started July 2011)	Chattanooga Bike Transit System (started July 2012)	Salt Lake City Green Bikes (started April 2013)
Population	380,000	625,000	171,000	189,000
System Characteristics	168 stations 1,296 bikes 2,867 docks	136 stations 1,000 bikes 2,300 docks	31 stations 300 bikes 547 docks	12 stations 65 bikes 165 docks
Service Area	34.3 sq. mi.	21.9 sq. mi.	2.0 sq. mi.	2.0 sq. mi.
System Ratios	4.3 stations / sq. mi. 7.7 bikes / station 2.2 docks / bike	3.7 stations / sq. mi. 7.4 bikes / station 2.3 docks / bike	15.5 stations / sq. mi. 9.7 bikes / station 1.8 docks / bike	5.4 bikes / station 2.8 docks / bike
Membership Cost	\$65 annual \$6 24-hour	\$85 annual \$20 monthly \$12 3-day \$6 24-hour	\$75 annual \$6 24-hour	\$75 annual \$15 weekly \$5 24-hour
Trip Fees	First 30 minutes free Graduated scale for additional half hours	First 30 minutes free Graduated scale for additional half hours; different for annual and casual users	First 60 minutes free \$5.00 / additional half hour	First 30 minutes free \$2.00 / second half hour \$5.00 / additional half hour
Operating Practices	April – November 24 hours a day	March – November 24 hours a day	Year-round 24 hours a day	Year-round 24 hours a day

5.1 Chattanooga Bicycle Transit System

The Chattanooga Bicycle Transit System (www.bikechattanooga.com) received \$2 million of federal funding, is owned by the City of Chattanooga, and is operated by Alta Bicycle Share, a private bike share operator. It was implemented in July 2012 with 30 stations and 300 bicycles and serves a population of over 170,000 people. This system has a partnership with the University of Tennessee, Chattanooga.

System Characteristics

Equipment:	Public Bike System Company (Bixi)
Equipment Type:	Solar/Wired modular
Equipment Ownership:	Jurisdiction-owned
Operator:	Alta Bicycle Share, Inc.
Operations:	Year-round (365 days)

System Size³³

Bikes:	300
Stations:	33
Docks:	535
Service Area (Square Miles): ³⁴	5.2
Station Density: ³⁵	6.3

Demographics

System Population: ³⁶	171,279 (2012)
Metro Area Population:	528,143 (2012)
Estimated Annual Tourists:	8,000,000
Average System Population Density:	1,223 people / square mile

Membership and Ridership³⁷

Casual Subscriptions:	8,578
Annual Members:	696
Casual Subscriber Rides:	15,816
Annual Member Rides:	16,184
Total Rides:	32,000

³³ As of March 2014

³⁴ Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

³⁵ Stations per square mile in service area

³⁶ 2011 US Census Estimates. State & County QuickFacts.

³⁷ Alta Bicycle Share, “Bike Chattanooga – First Year of Operations”, July 2013

Rides per annual membership:	23.3
Rides per casual subscription:	1.8
Population per bike:	571
% population with annual membership:	0.4%
Casual subscriptions per station:	277
Tourists per casual subscription:	933

Capital Funding Sources³⁸

Initial System

- 300 Bikes, 31 Stations
- \$1.3 million from the Federal Congestion Mitigation and Air Quality (CMAQ) funding for capital purchases.

Revenue Model

First year subsidized by startup public funding. Following first year, sponsorship and usage fees to cover operating costs. A breakdown of revenue is shown in Figure 6.

Membership Fees

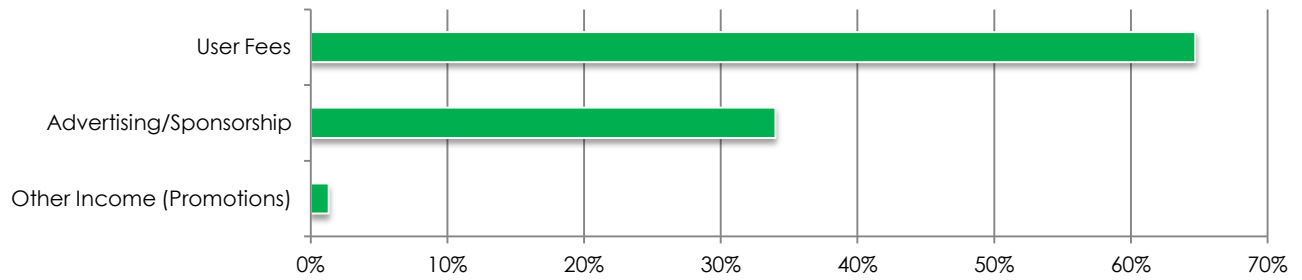
Annual:
7 days
24 Hours

Usage Fees

\$75 for first 60 minutes – no usage fee (all membership plans)
\$20
\$6
Additional 30 minute increments: \$5 (max \$100/day)
Corporate & Community Partner: varies

³⁸ Philip Pugliese. Transportation Consultant. Chattanooga.

Figure 6. Breakdown of Revenue³⁹



Operating Costs⁴⁰

Operating expense per dock per month: \$82.24

Operating expense per ride: \$16.50

Fare box recovery:⁴¹ 26%

5.2 GREENBike SLC

GREENbike in Salt Lake City, UT, is a relatively new bike share system that opened in April 2013. It is primarily located downtown with 65 bikes at 12 stations (www.greenbikeslc.org). The operating model is unique in that GREENbike, SLC Bike Share is a 501(c)3 nonprofit organization that is a public / private partnership between Salt Lake City, the Salt Lake Chamber of Commerce, and the Salt Lake City Downtown Alliance. The system is operated by the Downtown Alliance. Local public funding and significant sponsorship was used to launch and operate the system.

System Characteristics

Equipment:	B-cycle
Equipment Type:	Solar/modular
Equipment Ownership:	Non-profit
Operator:	Downtown Alliance
Operations:	24 hours, 7 days / week
	Closed for winter

³⁹ Alta Bicycle Share, “Bike Chattanooga – First Year of Operations,” July 2013

⁴⁰ Ibid

⁴¹ Fare box revenue is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

System Size⁴²

Bikes:	65
Stations:	12
Docks:	165
Service Area (Square miles)	2
Days in operation (2013):	251
Station Density (Stations/Square miles):	5.5

Demographics⁴³

City Population:	189,000 (2012)
Metro Area Population (approximately):	1,100,000 (2012)
Estimated Annual Tourists:	7,000,000
Average System Population Density:	1,678 people / square mile

Membership and Ridership⁴⁴

Casual Subscriptions:	9,689
Annual Members:	308
Casual Subscriber Rides:	Not available
Annual Member Rides:	Not available
Total Rides:	25,968
Population per bike:	2,910
Percent population with annual membership:	0.15%
Casual subscriptions per station:	500
Tourists per casual subscription:	1,167

⁴² www.greenbikeslc.org and <http://bikes.oobrien.com/saltlakecity/>.

⁴³ United States Census Bureau (2012). July 2014.

⁴⁴ Utah Policy, <http://utahpolicy.com/index.php/features/featured-articles/2344-live-work-play-bike> and Deseret News, <http://www.deseretnews.com/article/865593172/Salt-Lakes-GREENbike-program-using-winter-downtime-to-prep-for-2014.html?pg=all>.

Funding Sources⁴⁵

Initial System

- 65 Bikes, 12 Stations

Capital

Title sponsors – Select Health

Operations

Basket sponsor – Rio Tinto

Station sponsors - various

Membership card and helmet sponsors

Business Model

The impetus for a bike share system was driven from the Mayor’s Office. However, the City did not have the funds to launch the system and so asked the Downtown Alliance if they would take on responsibility for developing a business model and seeking funds for the system. The Downtown Alliance secured a title sponsor and other sponsors sufficient to launch and maintain operations for a 12 station system in 2013.

Membership and Usage Fees

Annual:	\$75	First 30 minutes free
Annual Discounted:	\$56	Additional 30 minute increments:
Weekly:	\$15- Annual and Casual: \$2 (1 hr); \$5 (additional half hours) (max \$75/day)	
24 Hours:	\$5	

5.3 Hubway

Hubway launched in 2011 in the City of Boston, growing as a regional system now serving the communities of Boston, Cambridge, Somerville, and Brookline by 2012 (www.thehubway.com). It has garnered multiple sources of funding, including FTA and Centers for Disease Control and Prevention, many sponsorships, from title to station, and piloted a helmet vending machine solution.

⁴⁵ Utah Policy, <http://utahpolicy.com/index.php/features/featured-articles/2344-live-work-play-bike..>

System Characteristics

Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Jurisdictional
Operator:	Alta Bicycle Share
Operations:	Seasonally March to
November	(Cambridge year round pilot starting 2014)

System Size

Bikes (Total EOY ⁴⁶ Average ⁴⁷):	1,000 700
Stations:	80
Docks:	1,400
Service Area: ⁴⁸	21.9 square miles
Station Density:	3.7 stations / square mile

Demographics

System Population: ⁴⁹	878,786 (2012)
Metro Area Population: ⁵⁰	4,590,000 (2008)
Estimated Annual Tourists: ⁵¹	22,500,000
Average System Population Density: ⁵²	14,027 people / square mile

⁴⁶ About Hubway, History, 2014. <https://www.thehubway.com/about>

⁴⁷ With Cambridge, Somerville, and Brookline adding new stations and bicycles to the Hubway system starting in August 2012, 700 bicycles was the average fleet size available over the course of the year. Data from City of Boston.

⁴⁸ Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

⁴⁹ The system population is calculated as the sum of the populations in Boston, Cambridge, Somerville, and Brookline. Population sources: United States Census Bureau (Google Search). 2012.

⁵⁰ Wikipedia: The Free Encyclopedia. Wikimedia Foundation, Inc. January, 2014.

⁵¹ Greater Boston Convention and Visitors Bureau. Statistics & Reports. 2012. Jan. 2014 www.bostonusa.com/partner/press/statistics/.

⁵² The average system population density is calculated as the average of the population densities in Boston, Cambridge, Somerville, and Brookline. Population Density Sources: Wikipedia: The Free Encyclopedia. Wikimedia Foundation, Inc. January, 2014.

Membership and Ridership⁵³

Casual Subscriptions:	61,181
Annual Members:	6,133
Casual Subscriber Rides:	159,671
<u>Annual Member Rides:</u>	<u>349,690</u>
Total Rides:	509,361
Rides per annual membership:	57
Rides per casual subscription:	2.6
Population per bike:	1,255
Percent population with annual membership:	0.7%
Casual subscriptions per station:	765
Tourists per casual subscription:	3,368

Business Model

Jurisdictions fund capital and operations through different combinations of public funding, membership and usage fees, advertising and sponsorship, with profit sharing for each jurisdiction.

Funding Sources⁵⁴

Initial System (610 Bikes, 60 Stations)

Grants	\$4.5 million	Sponsorship	\$1.5 million
FTA	\$3 million	Title – New Balance	\$600,000 over 3 years
CDC	\$450,000	Station sponsorships– over 30	\$50,000 each, paid over 3 years
CMAQ	\$250,000		

⁵³ Obtained from City of Boston. April, 2013.

⁵⁴ City of Boston Press Release: Mayor Menino Signs First-Ever Bike Share Contract Launching Hubway in Boston, 2011. <http://www.cityofboston.gov/news/default.aspx?id=5075>

Membership and Usage Fees

Annual:	\$85	First 30 minutes free
Annual Corporate:	\$50	Additional 30 minute increments:
Annual Discounted:	\$5	- Annual: \$1.50 (1 hr); \$3(1.5hrs); \$6 (per 30min) (max \$75/day)
Monthly:	\$20	- Casual: \$2 (1 hr); \$4 (1.5 hrs); \$8 (per 30 min) (max \$100/day)
72 Hours:	\$12	
24 Hours:	\$6	

Operating Costs⁵⁵

Operating expense per dock per month:	\$121.75
Operating expense per ride:	\$2.87
Farebox recovery: ⁵⁶	88.3%

Equity Strategy⁵⁷

\$5 subsidized annual memberships through Boston Public Health Commission. 600 sold through end of year 2012. Prescribe-A-Bike program allows physicians to give subsidized memberships as a health solution.

5.4 Nice Ride Minnesota

Minneapolis Nice Ride launched in June 2010 in the City of Minneapolis and quickly expanded into Saint Paul, MN the following year (www.niceridemn.org). To date, there have been no reported thefts and two crashes.

⁵⁵ Contract between City of Boston and Alta Bicycle Share, April 2011, using Annual Cost Cap for Operating Costs.

⁵⁶ Fare box recovery is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

⁵⁷ Hubway Subsidized Membership Flyer <<http://www.thehubway.com/assets/pdf/flyers/pbhc-subsidized-membership-flyer.pdf>> and Inclusivity is a big hurdle for bike share programs, May 7, 2013 <<http://axisphilly.org/article/the-big-hurdle-for-bike-share-programs-inclusivity/>>

System Characteristics

Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Non-profit owned
Operator:	Nice Ride MN
Operations:	Seasonally April through October

System Size

Bikes ⁵⁸	1328
Stations:	146
Docks:	2,656
Service Area ⁵⁹	34 square miles
Station Density:	4.3 stations / square miles

Demographics

System Population: ⁶⁰	683,650 (2012)
Metro Area Population: ⁶¹	3,422,264 (2010)
Estimated Annual Tourists: ⁶²	17,900,000
Average System Population Density: ⁶³	6,252 people / square miles

⁵⁸ Nice Ride Annual Report, 2012. Per dock per month cost calculated over 12 months, although system is not operational November through April.

⁵⁹ Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

⁶⁰ The System population is calculated as the sum of the populations in Minneapolis and St. Paul. Population sources: United States Census Bureau (Google Search). 2012. January 2014.

⁶¹ Wikipedia: The Free Encyclopedia. Wikimedia Foundation, Inc. January, 2014.

⁶² Meet Minneapolis, http://www.minneapolis.org/sites/default/files/u7/pdfs/MediaKit_Meet.pdf.

⁶³ The average system population density is calculated as the average of the population densities in Minneapolis and St. Paul. Population Density Sources: Wikipedia: The Free Encyclopedia. Wikimedia Foundation, Inc. January, 2014.

5.4.1 Membership and Ridership⁶⁴

Casual Subscriptions:	54,451
Annual Members:	3,500
Casual Subscriber Rides:	103,850
<u>Annual Member Rides:</u>	<u>170,197</u>
Total Rides:	274,047
Rides per annual membership:	48.6
Rides per casual subscription:	1.9
Population per bike:	515
Percent pop. with annual membership:	0.51%
Casual subscriptions per station:	373
Tourists per casual subscription:	329

Capital Funding Sources⁶⁵

Initial System (700 Bikes, 65 stations)

Sponsorship	\$1,250,000
Grants	\$1,750,000
Other	\$141,000
Total Capital	\$3.14 million

Expansion Funds (through 2013)

Public Funding	\$5,063,000
<u>Presenting Sponsorship</u>	<u>\$2,675,000</u>
Total Capital	\$7,738,000

Membership and Usage Fees

Annual:	\$65	First 30 minutes free
Annual Student:	\$55	Additional 30 minute increments:
24 Hours:	\$6- \$1.50 (1 hr); \$4.5 (1.5hrs); \$6 (per additional 30min)	(max \$65/day)

⁶⁴ Nice Ride Annual Report, 2012

⁶⁵ Nice Ride Annual Report, 2012

Revenue Model

Nonprofit owned and managed with revenues generated from fundraising, sponsorship, membership, and usage fees.

Operating Costs

Operating expense per dock per month:	\$30.77
Operating expense per ride:	\$3.58
Fare box recovery: ⁶⁶	62%

Equity Strategy

Target sponsored 600 free memberships for low-income residents. In addition, Nice Ride hired a staff person to sell discounted \$20 memberships. The outreach resulted in a few partnerships and events but almost no subscriptions.⁶⁷

⁶⁶ Fare box recovery is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

⁶⁷ Bringing Bike Share to a Low-Income Community: Lessons Learned Through Community Engagement, Minneapolis, Minnesota, 2011, http://www.cdc.gov/pcd/issues/2013/12_0274.htm.

6 Existing Conditions and Community Analysis

Understanding the conditions and context into which a bike share program would be introduced is an important component of assessing the feasibility of a bike share program. This section evaluates the physical, demographic, and transportation environments of the study area and identifies opportunities and challenges for a bike share program at the end of each section.

The area under consideration is shown in Figure 1 and includes the broader Genesee-Finger Lakes Region, which includes all of Monroe County plus the adjacent developed areas of Livingston, Ontario, and Wayne Counties. This area is also the planning area of the Genesee Transportation Council, with more focused analysis on the Rochester TMA and the City of Rochester.

6.1 Geography, Climate, and Land Use

The Genesee-Finger Lakes region is located in the western-central region of New York State. The Rochester TMA is a sub-area within the region and stretches south from the shores of Lake Ontario. It includes Monroe County and portions of Livingston and Ontario Counties. Bordering the western edge are Orleans and Genesee Counties, while the eastern boundary extends into Wayne County. The City of Rochester is located near the shores of Lake Ontario in the center of the region. The City includes the confluence of the Erie Canal and Genesee River near its southern-most border. The Genesee River bisects Rochester, and the Genesee River Greenway provides bicycle riders with an accessible route through the cultural and physical heart of the City, notwithstanding that, gaps remain.

Agriculture and agri-business is ingrained throughout the region's history. Currently, half of the land within the Genesee-Finger Lakes Region is dedicated to farmland.⁶⁸ Town centers are connected by state and county roads. The largest cities outside of Rochester are Canandaigua and Geneva, southeast of Rochester. There are several canal-side villages such as Fairport, Pittsford, Spencerport, and Brockport that make up the region's prominent waterfront communities. Meanwhile, inner ring (e.g., Irondequoit, Brighton) and outer ring (e.g., Penfield, Greece, Henrietta) suburbs make up areas closer to the City of Rochester. The outlying cities, towns, and villages are widely spread, and bicycling between them on a daily basis is not possible for most riders, due to the distance involved. The TMA is characterized largely

⁶⁸ Long Range Transportation Plan for the Genesee-Finger Lakes Region.
[http://www.gtempo.org/Docs/LRTP/2035/Chapter%203%20\(The%20Region\).pdf](http://www.gtempo.org/Docs/LRTP/2035/Chapter%203%20(The%20Region).pdf)

by level terrain; however, variations in elevation can be found south and east of the City of Rochester, throughout parts of Perinton, Macedon, and Walworth.

The City of Rochester, in Monroe County, is almost entirely flat with streets laid out in mostly grid-like patterns within the local neighborhoods. Many primary roadways, such as Main Street, Lake Avenue, East Avenue, Clinton Avenue, Monroe Avenue, and Mount Hope Avenue/West Henrietta Road all lead into the center of the City in a “hub-and-spoke” or radial street system. This hub-and-spoke pattern leads to an opportunity for bike share to provide connections to neighborhoods that are not connected by transit. The City itself is 36 square miles with a dense Center City. There are several attractions on the outskirts of the City, including the University of Rochester and its Medical Center, which is approximately 2 miles south of Center City and extends south. Rochester Institute of Technology (RIT) sits approximately 7 miles south of Center City.

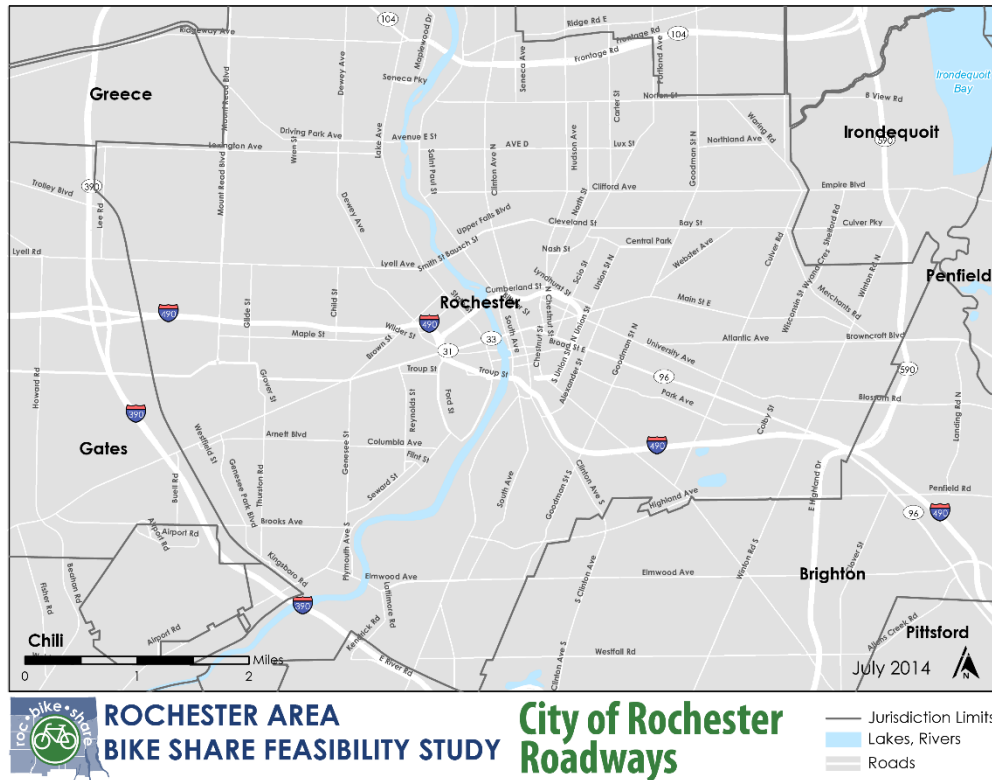
Having been a thriving industrial city in the early 20th century, major arterial and collector streets were typically built with at least two lanes of traffic in both directions. Currently, many of these streets are not friendly from a bicyclist’s and pedestrian’s point of view given heavy traffic volumes, a lack of bicycle infrastructure (bike lanes, sharrows, etc.), and the number of travel lanes. Also typical of mid-20th century cities was the construction of highway bypasses and expressway loops designed to facilitate the movement of automobiles throughout the region. The City’s Inner Loop – built over 50 years ago – is an example of how highways cut through and disconnected established neighborhoods. Beginning later in 2014, there are plans to “fill in” and reconstruct a two-thirds of a mile stretch of the highway in order to begin stitching these communities back together, while providing friendlier, more human-scaled environments for pedestrians and bicyclists.

The Rochester area has a humid continental climate characterized by warm summers and cold winters. Average daytime temperatures range from the mid-teens in the coldest of winters to the mid-80s during most summers. Winters are generally snowy, with average yearly snowfalls totaling approximately 100 inches.

6.2 Demographics and Employment

Bike share demand is influenced by a number of important variables, including density of population, employment, and the mix of land uses. Some cities and towns in the Genesee-Finger Lakes Region, as well as the City of Rochester, have numerous neighborhoods where the mix of population and employment is ideally suited for a potential bike share system (Figure 7).

Figure 7. City of Rochester Roadways

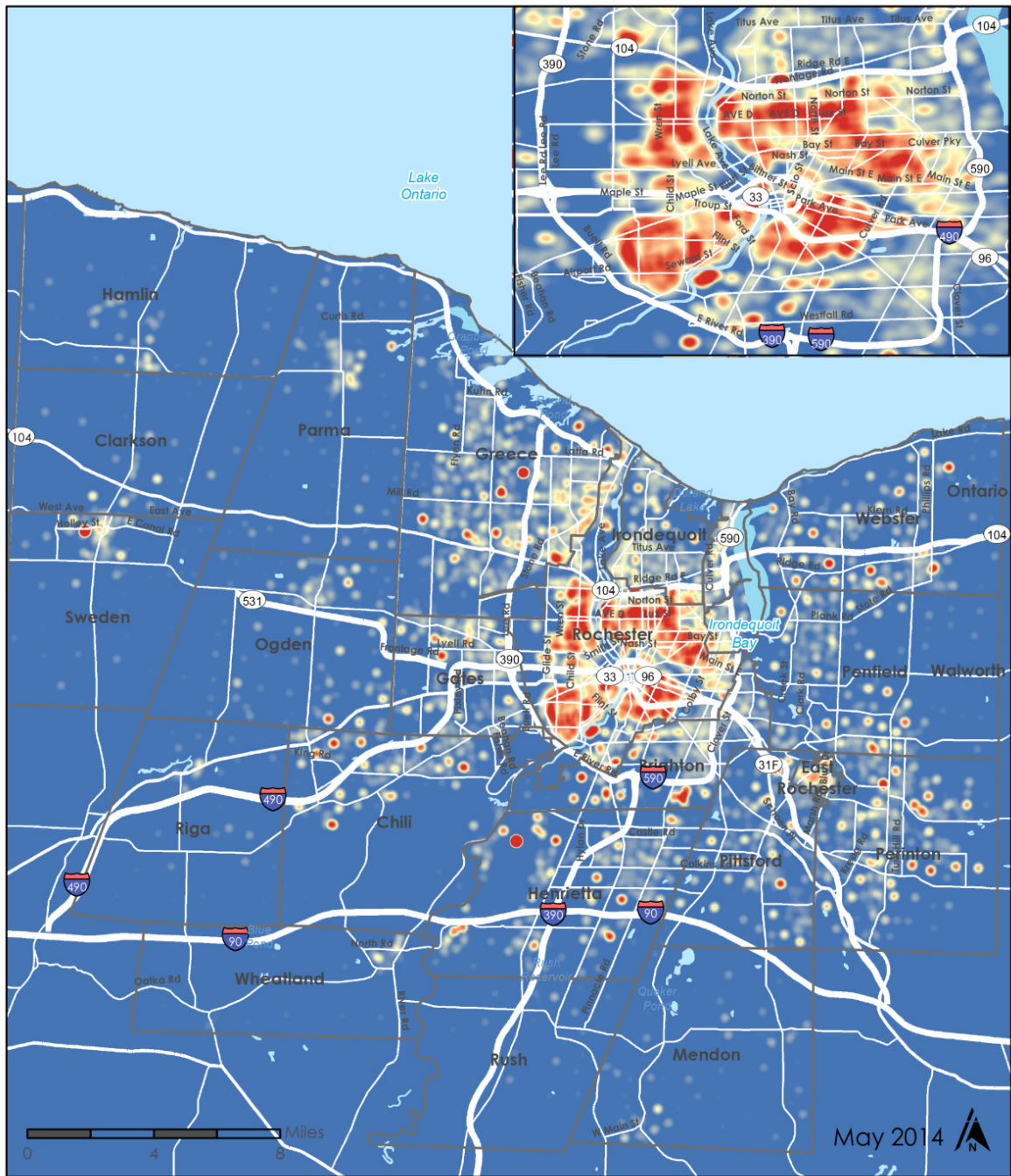


6.2.1 Population Density

Monroe County, comprising the bulk of the Rochester TMA, is approximately 657 square miles and is home to nearly 750,000 people according to the 2013 U.S. Census. This represents a population density of approximately 1,132 persons per square mile. Over the previous four years, the population has increased by 0.7 percent between 2010 and 2013 and by 1.9 percent between 2000 and 2013. Some cities and towns in the region with high population density are: Brockport, East Rochester, Webster, Greece, Pittsford and Fairport. Between these population centers, much of the county is rural with relatively low population densities. Figure 8 below shows the areas of highest population density in the region. It is evident from the map that the City of Rochester is the area of the TMA with the most significant density.

The City of Rochester, the third largest city in New York State, has a population of over 210,000 people. With a land area of approximately 36 square miles, Rochester has a population density of approximately 5,885 persons per square mile (Figure 8). This density ranks in the middle of the comparable cities, as shown in Table 3.

Figure 8. Study Area Population Density



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**
Population Density

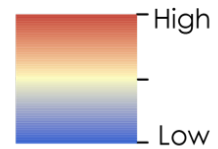


Table 3. Comparative Population Density

	Area (Sq. Mi.)	Population	Density (People / Sq. Mi.)
Chattanooga	137	170,000	1,251
Salt Lake City	110	190,000	1,666
Rochester	36	210,000	5,885
Minneapolis	55	400,000	7,287
Boston	48	650,000	13,340

Although the City’s population has been declining (-4.2 percent between 2000 and 2010), this trend has slowed more recently with population estimates between 2010 and 2012 showing only a -0.1 percent decrease. The inset in Figure 8 shows very little residential population in the core of downtown Rochester - currently, there are approximately 5,000 people living in downtown, with more residential units being developed over the next several years.⁶⁹ Some of the recent or upcoming developments that are increasing mixed land use, which is ideal for bike share, include:

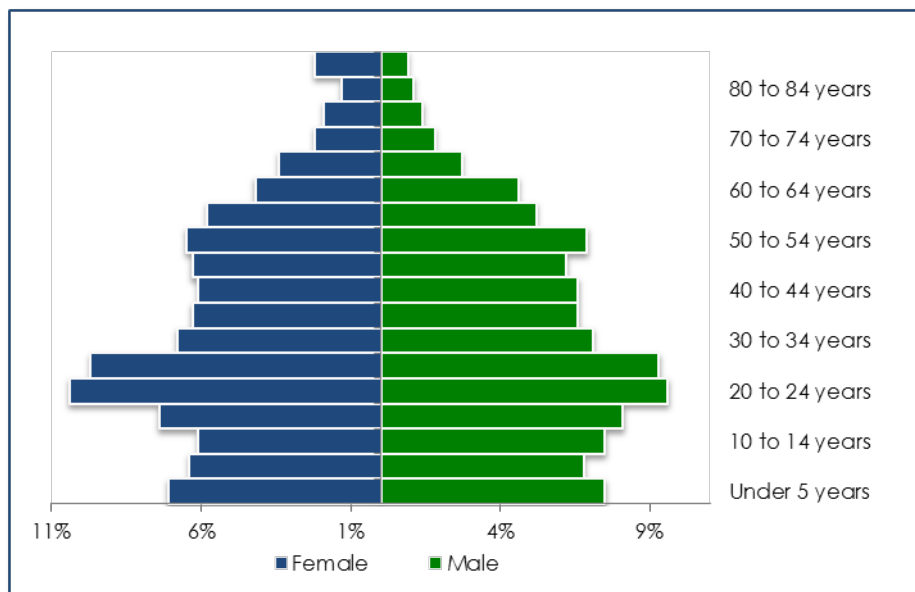
- Redevelopment of legacy sites such as The Mills at High Falls and the Voter’s Block Community are examples of efforts to provide improved housing options for people living near Downtown Rochester. The Voter’s Block Community is located along West Main Street between the neighborhoods of Mayors Heights and Susan B. Anthony. This development provides mixed-income housing and the 1872 Café, which takes its name from the year Susan B. Anthony and 15 other women voted illegally on the same site.
- Within the Inner Loop, the redevelopment of the Midtown Plaza into the Tower at Midtown aims to adaptively reuse the lower floors for office and retail space, and apartment units on the upper floors. Entertainment programming is expected to be a part of the project, to contribute to a live-work-play destination.⁷⁰
- Elsewhere within the Loop is the future development of Hart’s Local Grocers, the City’s first grocery store in over a decade to augment the burgeoning residential development.
- College Town, located at the intersection of Mt. Hope and Elmwood Avenues, is being developed by the University of Rochester (U of R) as a large, mixed-use project consisting of residences, retail, entertainment, and eateries.
- Kodak’s former building stock is being repurposed. For example, Monroe Community College will be renovating the existing Kodak building on State Street and Morrie Silver Way to be used as the school’s downtown campus. This regional destination will serve a density of what could be early adopters of a bike share system.

⁶⁹ Comprehensive Annual Financial Report. Rochester, NY. 2013, www.cityofrochester.gov.

⁷⁰ The Tower at Midtown. www.thetoweratmidtown.com.

The revitalization of these sites, and ultimately the surrounding neighborhoods, can help to draw potential users of a bike share system by offering sources and destinations where people live, work, play and take transit. Despite this current lack of population density in Downtown, there is significant residential population in many parts of the City, stretching to several directions out to the City limits. Key neighborhoods include Neighborhood of the Arts (NOTA), East Avenue, Park Avenue, South Wedge, Brooks Landing, Corn Hill (southwest of Center City), Susan B. Anthony (west of Center City) and the area between East / Park Avenue and University of Rochester. The northeast, northwest and southwest sectors of the City show significant population density for large portions of the area, as shown in the inset of Figure 8.

Figure 9. Study Area Age and Sex Distribution



6.2.2 Demographics

The region (represented by Monroe County) has a median age of 38 years, while the City’s population is younger with a median age of 31 years.⁷¹ A population and age distribution chart for the City of Rochester is shown on Figure 9. The City’s population, with approximately 39 percent being between the ages of 20 and 44 is conducive to early adoption of bike share based on experience in other cities.

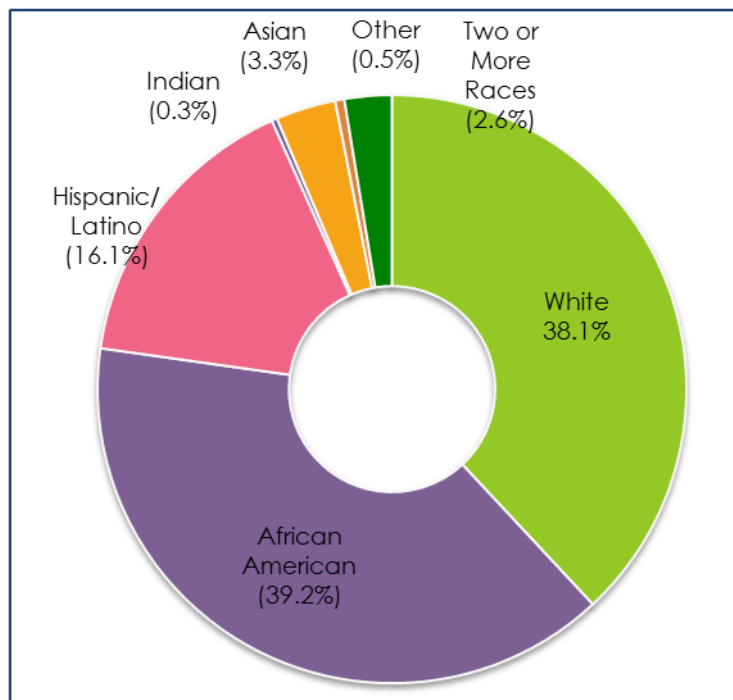
⁷¹ U.S. Census Bureau. 5-Year ACS Estimates.

The median household income within Monroe County is \$52,700 and within the City limits is approximately \$30,700. The more affluent populations are concentrated in Pittsford, Perinton, Penfield, Webster, and part of Greece. The less affluent areas tend to be within the Rochester city limits.

Experience has shown that younger, more affluent populations are more likely to be early adopters of bike share. For example, 63 percent of members of Capital Bikeshare in Washington D.C. were under the age of 35 (compared to only 17 percent of the regional employee population being within this age range).⁷² The younger demographics of the City, as referenced above, are an advantage for bike share in Rochester.

The demographic composition of Monroe County consists of over 72 percent White, 14 percent Black/African American, 7 percent Hispanic/ Latino, and around 3 percent Asian. Within the City, the breakdown is illustrated in Figure 10.

Figure 10. Study Area and Demographic Composition



⁷² LDA Consulting (2013). 2013 Capital Bikeshare Member Survey Report. <http://capitalbikeshare.com/assets/pdf/CABI-2013SurveyReport.pdf>

Approximately 14.6 percent of people are below the poverty level in Monroe County and 31.6 percent in the City of Rochester.⁷³ Low income populations are concentrated within the Inner Loop and areas bounded by Mt. Read Boulevard, Portland Avenue, I-490, and Norton Street.

The lower income level and high minority community in the City of Rochester presents both a challenge and an opportunity for a bike share program. It is a challenge because other systems have shown that bike share is most popular among White middle-to-upper class populations. However, creating an equitable transportation system has been identified as a major goal for a bike share system in Rochester. Therefore, there is a significant opportunity to provide an additional mobility service to low-income residents who may have difficulty connecting to jobs and other services.

As noted earlier, there are also several academic institutions in the City of Rochester and the area, including the University of Rochester, RIT, Monroe Community College, Nazareth College, Roberts Wesleyan, and SUNY Brockport. The younger demographic in these institutions will help make for a successful bike share system. Many of these institutions have a history of working together, even though they are located in different jurisdictions.

6.2.3 Employment

The amount and density of employment has a strong influence on bike share system success. Bike share can create opportunities for commuting, as well as through-the-day trips such as off-site meetings, errands, lunch, breaks, and even recreational rides.

Monroe County and Rochester's diverse economy benefits from a range of business sectors including healthcare, institutions of higher learning, optics, communications, graphics technology, and medical instrumentation. Approximately 85 percent of the employment market is service-based. This economic well-being has translated to a comparatively low unemployment rate. According to the 2013 Monroe County Comprehensive Annual Financial Report (CAFR), the unemployment rate in the County was

⁷³ U.S. Census Bureau, 5-Year ACS Estimates.

7.3 percent in December 2013 and the City’s CAFR reported an unemployment rate of 7.0 percent (CAFR June 2013). These rates are both lower than the State of New York’s unemployment rate of 7.9 percent, and the United States’ current rate of 7.4 percent (as of December 2013). A list of the region’s top employers is included in Table 4.⁷⁴

These companies are not all located in Center City Rochester, but approximately 50,000 people are part of the weekday workforce within the Center City. Bike share offers opportunities for establishing additional transportation choices for employees and visitors and could be added as a health or transportation benefit for employees. Additionally, the varied employer base in the area could provide opportunities for sponsorship and corporate membership, as well as satellite systems on employer campuses.

Table 4. Study Area Top 10 Employers

Employer	Estimated Employees
University of Rochester	20,340
Wegmans Food Markets	13,976
Rochester General Health	7,600
Xerox Corp.	6,116
Unity Health System	5,472
Eastman Kodak Co.	5,129
Paychex Inc.	3,712
Lifetime Healthcare Cos. Inc.	3,584
Rochester Institute of Technology (RIT)	3,299
YMCA of Greater Rochester	2,732

The region’s top employer is the University of Rochester, with over 20,000 employees. It is also a significant figurehead in the region’s economy and community outlook. The University is looking to expand its operations, as discussed earlier, through the construction of College Town. While the project is still under construction, it is estimated 180 full-time jobs will be created.

⁷⁴ Greater Rochester, NY Region’s Top Private-Sector Employers, 2013. Greater Rochester Enterprise. <http://www.rochesterbiz.com/Portals/0/PortalFiles/Documents/PrivateSectorEmployers2013.pdf>

The top employers in Downtown Rochester with employment counts over 300 are (not in order):⁷⁵

- MCC Downtown Campus (includes employees and students).
- Eastman School of Music (includes employees and students).
- Kodak.
- City and County offices.
- ESL Federal Credit Union.
- Windstream.
- Excellus (Blue Cross Blue Shield).
- Xerox.
- CGI Communications.
- Riverside Convention Center.
- Public Library.

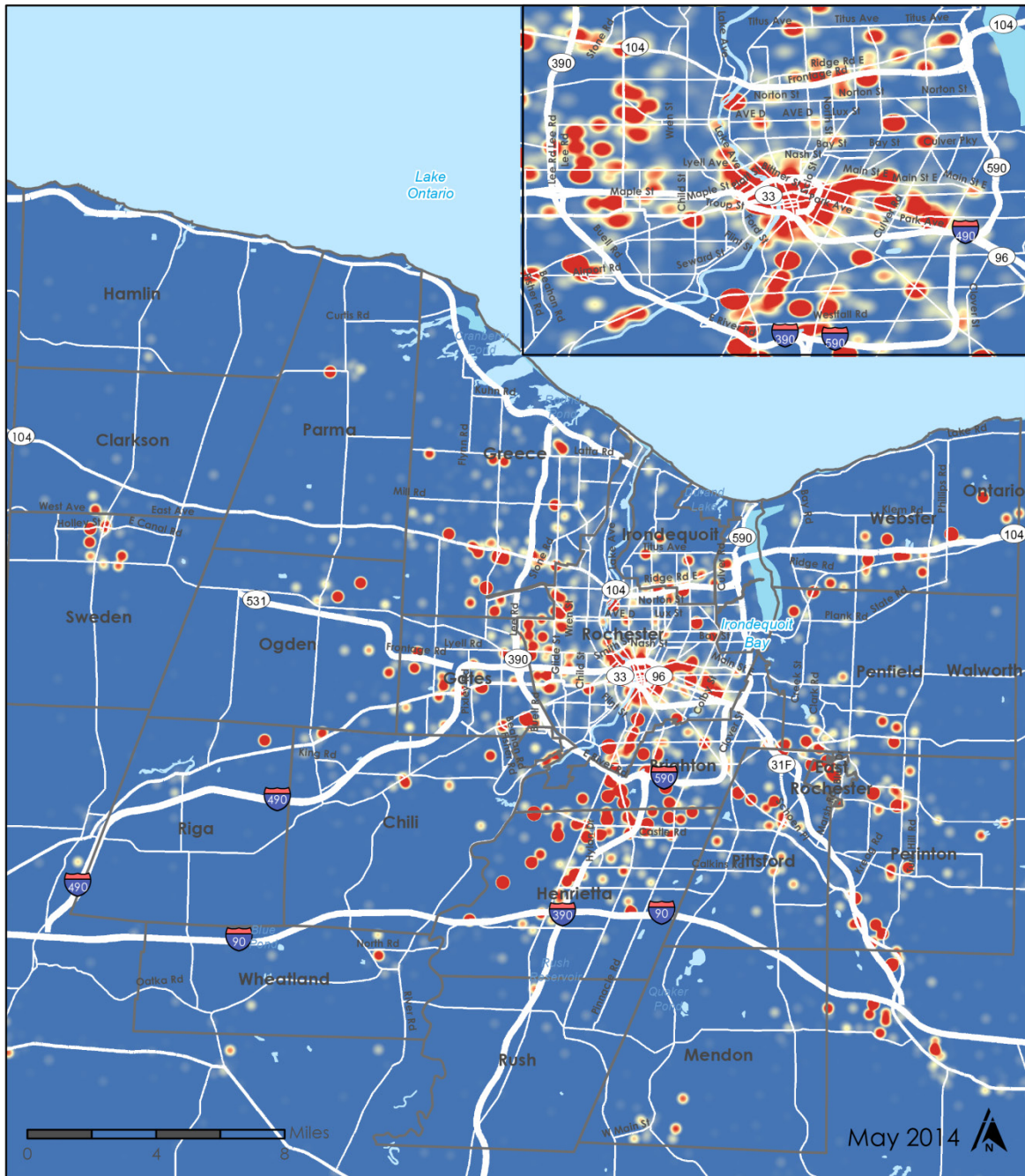
Other developments that might offer significant numbers of future employees include:

- Eastman Business Park: along with the City, is marketing vacant parcels for prospective businesses. Recently with help from the City, County, and Greater Rochester Enterprise, three employers have established within the Park, with the development increasing the amount of full-time jobs and bringing along a \$100 million investment to the community. To date, over 45 business are located within the Eastman Business Park, with more space available for future tenants.
- CityGate: a large-scale project under construction on a 45-acre campus of the former Monroe County Iola Complex located within the City. Over 550,000 square feet of construction will include a mixed-use destination and living complex, and is expected to create nearly 260 full-time positions.

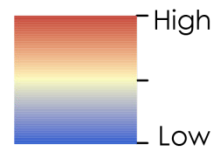
Figure 11 shows the employment density for the region and the City. There is significant density in Center City, stretching east along Main Street / East Avenue, and also south near University of Rochester. Pockets of employment density exist in several further out areas of the City, including the far west area of the City.

⁷⁵ Conversation with Rochester Downtown Development Corporation, October 2014.

Figure 11. Study Area Employment Density



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**
Employment Density



6.3 Transportation Mode Share

Within Monroe County, single-occupant vehicles make up the majority of commuter trips, at approximately 81 percent. The abundance of highways with relatively low commuting times (the average commute is approximately 19.5 minutes compared to 31.5 minutes statewide) and distributed employment centers contribute to the high use of single-occupant vehicles.

At the City level, single-occupant vehicles make up approximately 70.2 percent of total commuter trips with 10.7 percent (carpool), 7.6 percent (public transportation), 6.2 percent (walk), 1.2 percent (bike), 1.0 percent (taxicab or other means), and 3.0 percent (telecommuting) making up the remainder.⁷⁶ It should be noted that Rochester ranks 15th in the nation in terms of the percentage of people that walk to work.⁷⁷ Rochester ranks 16th in the percentage of bicycle commuters for cities with populations between 200,000 and 300,000 people.⁷⁸ According to the 2010 American Community Survey five-year estimates, Rochester ranked 50th in terms of transit ridership with cities having a population greater than 100,000.

According to the Rochester-Genesee Regional Transportation Authority (RGRTA), there are approximately 20,000 daily downtown transit riders. A new downtown transit center was completed and operational in November 2014. The Rochester Transit Service (RTS) Transit Center will provide an indoor space for riders to wait for RTS buses. With 30 bus bays and the potential to accommodate up to 100 buses per hour, the Transit Center is an opportunity to create a bike share hub and transportation equity node that could provide lower income and transit-dependent populations access to bike share at the end of their transit trip.

⁷⁶ As per USA Census Commuting Characteristics by Sex for the ACS 5-year Estimates, the total percentage adds up to 99.9%. The 0.1% deficit may be due to rounding calculations and/or margin of error estimates.

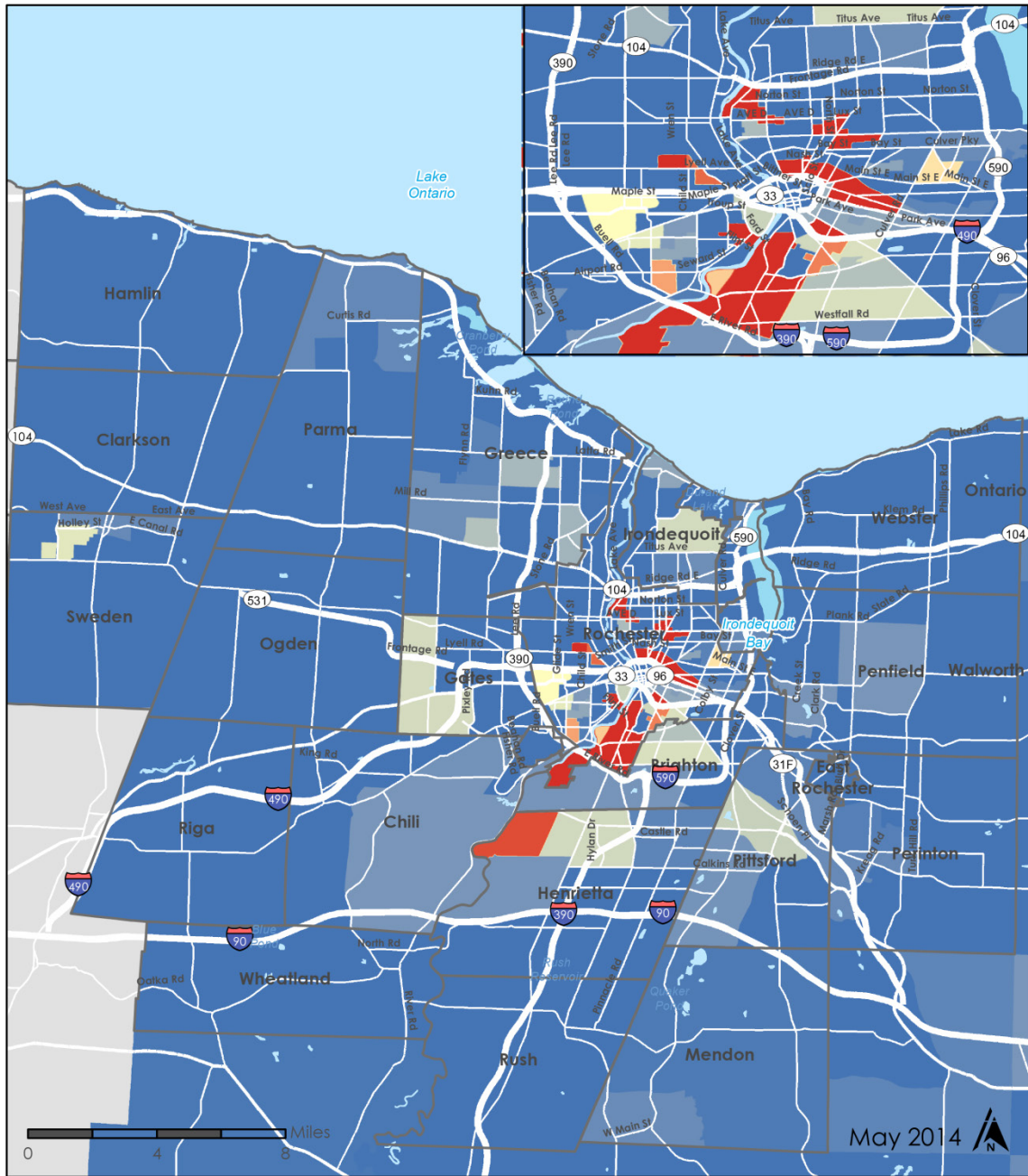
⁷⁷ Modes Less Traveled. U.S. Census Bureau. 2014

⁷⁸ The League of American Bicyclists. 2013. "Where We Ride: Analysis of bicycling in American Cities." Annual American Community Survey Data Report for 2012.

Figure 12 and Figure 13 show the study area's bicycle commute mode share and proximity to transit. The proximity to transit index depicted in Figure 13 was created by constructing half-mile buffers around existing bus routes and stops (a half mile is the distance a pedestrian is considered willing to walk to a transit stop). The areas shaded in red indicate areas of the jurisdiction closer to a transit stop or route.

A challenge shown on these maps is that the percentage of people using bikes and transit for commuting is highest outside of Center City, specifically to the south and east, around the East and Park Avenue neighborhoods, and University of Rochester. There is good access to transit throughout the City of Rochester, as shown in the inset of Figure 13. In Center City, Main Street is the main east-west transit corridor, with several north-south routes emerging from Main Street on both sides of the Genesee River. Broad Street also has a significant number of east-west routes. Some of the major routes outside of Center City are Main Street and Plymouth Avenue to the southwest, Lyell and Lake Avenues to the northwest, several routes in the inner northeast, bus service down Park Avenue to the east, and frequent service to the University of Rochester area. There is clearly a hub-and-spoke pattern to the transit system, yielding the opportunity for bike share to connect transit routes that are not currently connected. Outside of the City, toward the periphery of the transit service area, proximity to transit service is limited.

Figure 12. Study Area Bicycle Mode Share



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**

Bicycle Modeshare

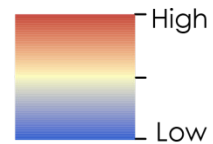
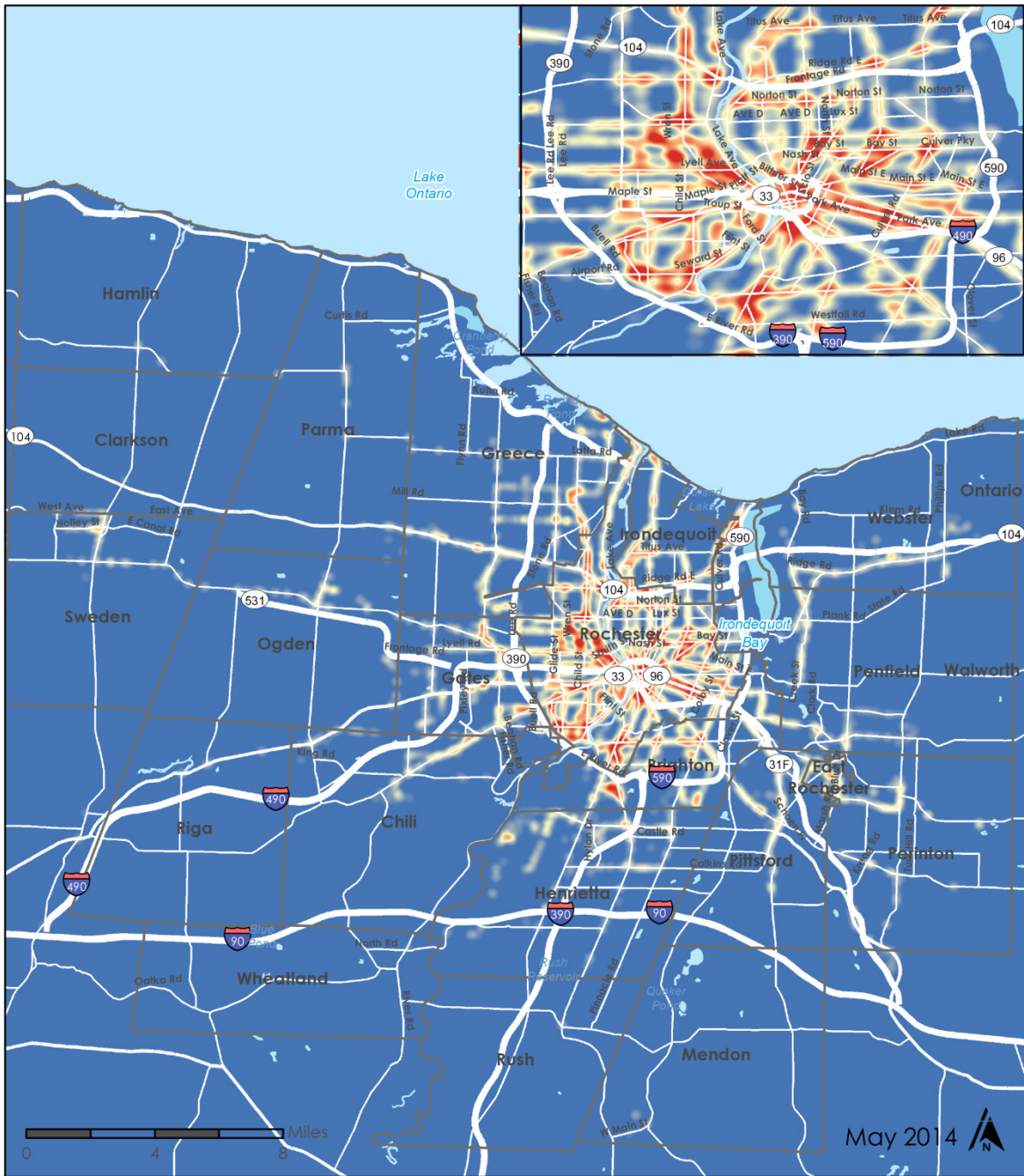
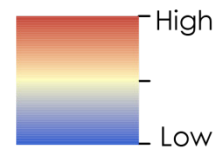


Figure 13. Study Area Proximity to Transit



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**

Proximity To Transit Index



6.4 Bicycle Infrastructure

Trails and trail systems are a growing and ever expanding characteristic of the immediate Rochester Area. Within the Rochester TMA, there are over 230 miles of multi-use trails. One of the most influential and attractive trails in New York State is the Erie Canalway Trail, of which 85 miles are located within the TMA. Extending from Buffalo to Albany (with some gaps), what was once a bustling transportation corridor for goods and supplies is now also a premier recreational destination. With the rise in popularity of bicycling, the Canal's trail network offers significant social and economic benefits to adjacent communities.

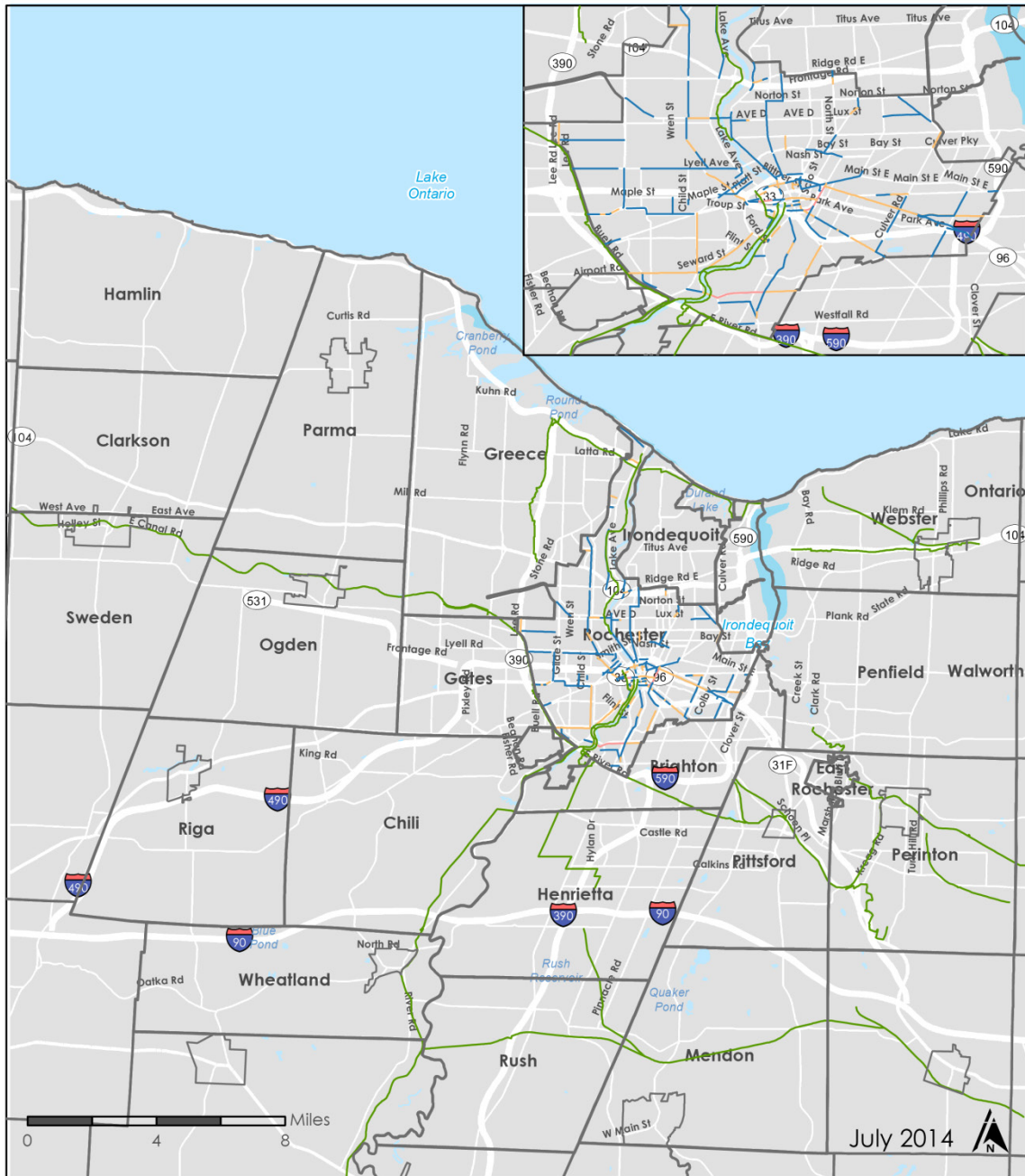
While the Canalway Trail acts as the prime east-west bicycle route, the Genesee Riverway Trail running along the Genesee River is a popular north-south connector. This trail extends from the southern edge of the TMA to Lake Ontario and is approximately 50 miles in length. Figure 14 shows bicycle facilities in the greater Rochester area.

At this point, the Rochester area's bicycle facility inventory is incomplete; however, it is growing each year. Early plans such as the Town of Penfield Bicycle Facilities Master Plan (2008) and the City of Rochester Bicycle Master Plan (2011) have helped spur more communities to complete their own active transportation plans with a particular focus on bicycle facilities. Brighton, Chili, and Greece are communities that have taken the initiative to assess and develop recommendations for completing the region's bicycle infrastructure.

In the City of Rochester, there is a continuously expanding bicycle infrastructure network. As of May 2014, there were 26.2 lane miles of bike lanes and 19.7 lane miles of marked shared use lanes (sharrows). Over the remainder of 2014, another 9.4 lane miles of bike lanes and 5.1 lane miles of sharrows are planned for installation. Future facilities are outlined in the City's Bicycle Master Plan, which was completed in January 2011. This plan serves as the framework and guidance for advancing the goals of making Rochester a bicycle friendly city.

In 2012, the City was awarded a Bronze level award by the League of American Bicyclists as a "Bicycle Friendly Community." In addition, Rochester's Complete Street policy, accommodating all users, including pedestrians, bicyclists, transit users and persons with disabilities, went into effect on December 1, 2011. Also since 2011, the El Camino Trail was completed offering a safe and attractive option for residents to travel between neighborhoods and key destinations. Rochester, and the surrounding area, is committed to advancing the goals of creating a healthy, viable, and socially coherent community.

Figure 14. Existing Bicycle Friendly Facilities



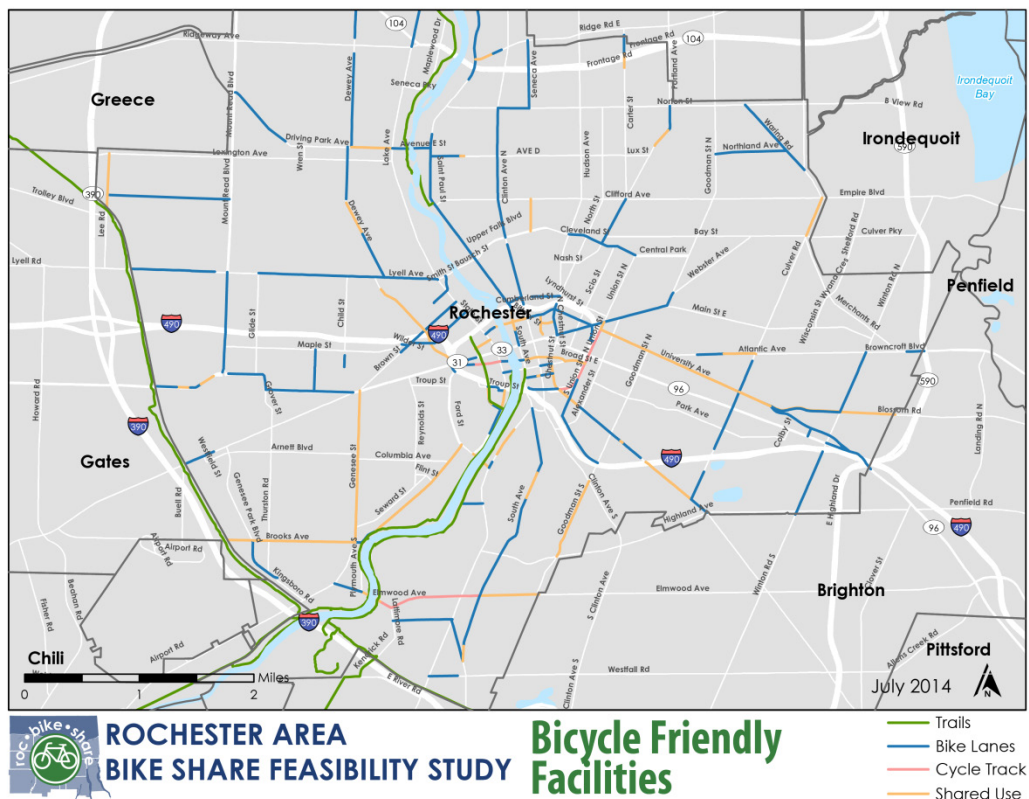
**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY
Bicycle Friendly Facilities**

- Trails
- Bike Lanes
- Cycle Track
- Shared Use

Organizations such as R Community Bikes, the Rochester Cycling Alliance (a member of the New York Bicycling Coalition), and Conkey Cruisers advocate and promote the social, environmental, and economic benefits of bicycling for people of all ages, ability, and skill levels. These organizations play a key role in assisting the region’s communities in developing active transportation plans, and can play an important role in helping the bike share system achieve its equity goals.

Rochester’s street network is generally a grid pattern within the neighborhoods with major routes extending from the downtown in a radial pattern. Roadways within the City that offer bicycle facilities include Monroe Avenue/Chestnut Street, South Avenue, University Avenue, and Exchange Boulevard, amongst others. A bike share system may be beneficial along these roadways because of trip generators such as The Memorial Art Gallery, Highland Hospital, Corn Hill Landing, and the Strong National Museum of Play, as well as local shops, offices, restaurants, and residences. Downtown Rochester includes a network of one-way streets. These streets can reduce the ability of riders to get to their destinations with ease and convenience. Local streets are generally more conducive to bicycling as they typically have lower traffic volumes, and are generally narrower than the collectors. Figure 15 shows bicycle facilities in the City of Rochester.

Figure 15. Existing Bicycle Friendly Facilities (City of Rochester)



Within the City, gaps in the bicycle facility network can be found along Main Street. Other primary east-west routes that lack dedicated bicycle facilities are Norton Street and Clifford Avenue. East Avenue, however, has time-restricted marked on-street parking lanes, but is used by bicyclists as a separated riding area when not being utilized by parked vehicles. There is also a notable gap in marked bicycle facilities to the northeast of the Center City.

The City has a strong and growing bicycling culture, supported by elected officials, agency staff, and the public. Bicycling encouragement events, such as Bike Month and Bike Week, are well supported. Organizations, such as Conkey Cruisers, R Community Bikes, and Cyclopedia, work to improve access to bicycling with all members of the community. These organizations reflect and help to meet the ongoing demand for affordable and dependable transportation that bicycles can represent while providing opportunities for exploration and healthful recreation. Bike shops are very limited (three as of the date of this writing) within the City with most being located in the suburbs.

The Rochester Bicycle Boulevards Plan is being updated concurrently to this study. Bicycle boulevards are low-stress, neighborhood greenways that encourage bicycle use on local low-volume, low-speed streets as an alternative to riding along busier collectors and arterials. This plan will make recommendations for implementing a bicycle boulevard network and will identify streets that provide links between key destinations.

The lack of a strong existing network of bicycle friendly facilities is not necessarily a deterrent to bike share. Almost every city that has implemented a system has built out their bicycle infrastructure in parallel to implementing a bike share system. However, providing a core network of low-stress bikeways that connect various neighborhoods will encourage success, as comfort and safety is a large factor in people's willingness to try bike share.

6.5 Tourism

Tourists can provide an important revenue stream for bike share systems, with approximately two-thirds of user-generated revenues contributed by casual users in most systems. These users are more inclined to pay a higher access fee and more often go beyond the free ride period and incur trip fees. Visit Rochester, Monroe County's tourism promotion agency, reported that over 1.5 million people visit the region per year. Locally, there are over 20,000 people employed in tourism-related industries. With over 140 annual festivals, Rochester and the surrounding region are popular destinations for residents and visitors. Local events include the Lilac Festival, Jazz Fest, Corn Hill Arts Festival, and Park Avenue Festival. Natural

attractions include the High Falls area in downtown, Highland Park, the Erie Canal, Charlotte and Durand Eastman Beaches, the area's more than 12,000 acres of parkland, and over 230 miles of multi-use trails. Historical and educational destinations include the George Eastman House; the Public Market; Memorial Art Gallery; Rochester Museum and Science Center; The Strong National Museum of Play; the Eastman, Geva and Little Theaters; and National Susan B. Anthony Museum & House. Figure 16 shows the location of these destinations, location of major retail centers, as well as the location of local and regional parks.

Rochester is also home to several professional sports teams, including The Rhinos men's soccer team, Red Wings baseball team, Amerks hockey team, Western New York Flash women's soccer team, and the Rattlers and Knight Hawks lacrosse teams. As well, Rochester has other destinations such as the Seneca Park Zoo, the Downtown Convention Center, and numerous hotel accommodations within walking distance of eateries, offices, and entertainment.

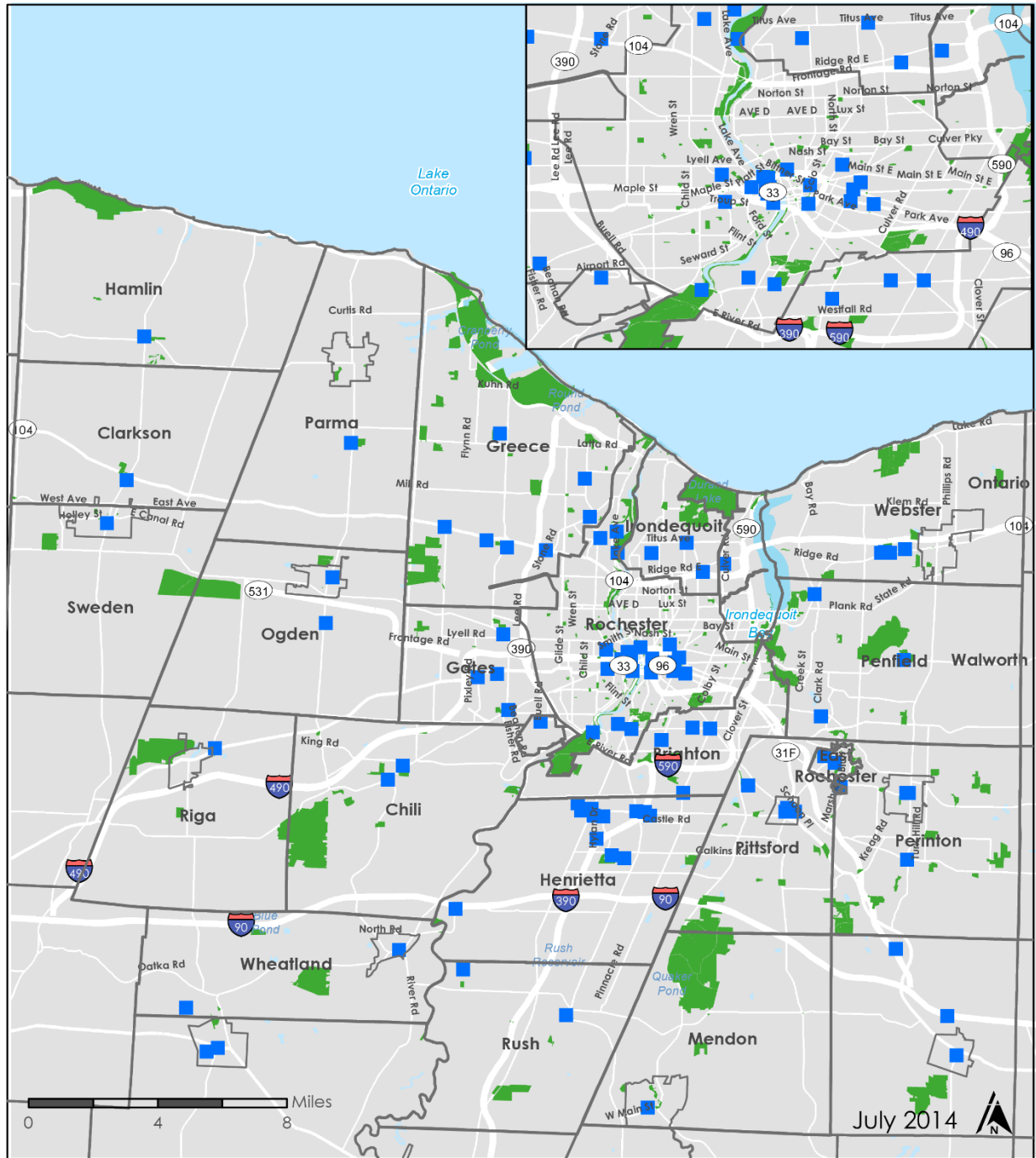
For tourists, visitors, and people unfamiliar with the area, finding one's way around is a challenge in Center City Rochester. Because the few downtown eating establishments can be difficult to find, many convention visitors limit their activities to convention-sponsored events and meals, otherwise staying within their convention hotel.

Specifically related to bike share, it will be important to market to tourists and visitors, as they provide important revenue to the system. However, marketing to this population can be challenging because each visitor must be educated anew when they arrive in Rochester. Further, marketing to tourists can be expensive, because digital media is not as effective for reaching short-term visitors. It is recommended that bike share work with Visit Rochester and local hotels to distribute marketing materials to visitors.

6.6 Summary

Overall, the employment, demographics, population density and other previously described metrics offer both challenges (Table 5) and opportunities (Table 6) in launching a bike share system in the City of Rochester and the surrounding region.

Figure 16. Study Area Attractions and Destinations



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**
Attractions and Destinations

- Attractions and Destinations
- Parks

Table 5. Challenges

City of Rochester	Region
Neighborhood connectivity is impacted in some areas by railroads, highways, as well as the Genesee River Gorge.	Areas of the region have hilly terrain and steep slopes.
Some of the City’s primary roadways are not bicycle friendly.	Most state and county roads connecting town centers are not bicycle friendly.
Several downtown roadways are wide and uninviting to bicyclists as they lack dedicated facilities and are heavy traffic volume streets.	Outside the Center City, activity centers can be very dispersed, so using bike share in these areas is unlikely.
One-way streets can reduce connectivity and convenience for bicyclists.	Much of the region is rural with low population density.
The highest bicycle commute mode share is outside of Center City.	The high level of single-occupant vehicle use presents a challenge to obtaining significant membership and ridership.
Many employment centers, visitor and other attractions are spread widely outside of Center City.	Older demographic in the region is not conducive to early adoption of bike share.
Center City Rochester is not tourist friendly, with most attractions and eating establishments outside of downtown.	There is a gap in the Genesee Riverway Trail in downtown Rochester.
Lower income in the City of Rochester is not conducive to early adoption of bike share.	
Incomplete network of bicycle-friendly infrastructure in the City.	

Table 6. Opportunities

City of Rochester	Region
Generally flat topography in the Center City and throughout the City of Rochester.	Several smaller outlying communities, including but not limited to Brockport, Webster, Greece, Brighton, Pittsford and Fairport, have high population and employment density which may be candidates for satellite bike share systems.
Strong population density throughout significant portions of the city, with population density higher than many existing successful bike share systems.	There are numerous destinations and entertainment attractions that may be prime locations for bike share deployment to take advantage of the significant tourist population that visits the Rochester area.
Grid-like street patterns within Rochester’s neighborhoods with a hub-and-spoke street pattern on the primary roadways that can facilitate connections between neighborhoods and destinations.	Strong trail and greenway network throughout the region.
The relatively young demographic within the City of Rochester fits the typical trend of bike share users.	The combination of multi-use trails and bike facilities nearby popular tourist destinations can expand the reach of the bike share network.
Neighborhood and parcel redevelopment offers new populations for a potential bike share system.	Regional partners who have a history of working together.
University of Rochester and area-wide universities, such as RIT, Monroe Community College (MCC), St. John Fisher College, and Nazareth College represent populations of potential early adopters for a bike share system.	
Low income and minority populations in the vicinity of downtown represent an opportunity to provide bike share for underserved populations, addressing an important goal of the program.	
Several strong community health and equity-focused bicycle groups such as R Community Bikes and Conkey Cruisers are potential partners to help fulfill the equity goal of the program.	
Several large employers downtown and within the nearby vicinity represent an opportunity for bike share system users, group memberships and prospective sponsors.	
Strong proximity to transit in large areas of the City, with opportunity for bike share to connect transit routes not currently connected.	
The on-street bicycle network is continuously expanding.	

7 Public and Stakeholder Engagement

To gauge public and stakeholder sentiment on the possible implementation of a bike share program, a series of public and stakeholder engagement meetings were conducted in April and May 2014. These meetings helped identify opportunities and challenges to implementing a bike share program in the Rochester area, in addition to helping define a set of goals and objectives for the program.

7.1 Stakeholder Engagement

Stakeholder outreach was conducted through several workshops with individuals and organizations that could play a role as supporters, sponsors, or participants of the bike share program. The project team gathered information from over 30 organizations during the course of the feasibility study. The bulk of stakeholder engagement was conducted through a series of workshops held on April 21-22 and May 19, 2014 in Rochester.

Given the number of stakeholders, workshops were conducted with stakeholders in smaller groups. The workshop groups included: transportation facility owners and operators, municipal permitting staff, food and beverage industry, large business and real estate developers, business associations, conceptual sponsors, tourism, and health and wellness promoters.

The following organizations were represented in stakeholder meetings:

- City of Rochester staff
- City Council
- University of Rochester
- Rochester Institute of Technology
- Monroe Community College
- SUNY Brockport
- Rochester Downtown Development Corporation
- Cyclopedia
- AARP
- Rochester Community Foundation
- Rochester Business Alliance
- Winn Development
- Excellus Blue Cross Blue Shield
- Monroe County Health Department
- University of Rochester Medical Center
- Reconnect Rochester
- City of Canandaigua
- MVP
- Wegmans
- Rhinos
- Staybridge Suites
- Visit Rochester
- Town of Brighton
- New York State Department of Transportation
- Monroe County Department of Transportation

Each meeting included an introduction on bike share in the United States and in the region and then turned to a group discussion where participants were asked to identify how bike share might be relevant to their organization. Participants were also asked to identify any challenges they saw to implementing a bike share program and, depending on the group, the appropriateness of potential sponsorship scenarios. The majority of organizations were supportive of a bike share system in the Rochester area. The following list summarizes opportunities for bike share in the Rochester area identified by stakeholders:

- Bike share would augment downtown revitalization, as it is in a transformative phase.
- Bike share can provide safe and affordable transportation for many neighborhoods that are not well connected to employment centers.
- There is an existing bike share / bike library culture at several local universities and colleges. Yet all of them see integration of a university system with a downtown system as very important, and see bike share as a significant addition to transportation options for students, both on-campus and between campus and downtown.
- Bike share can tie into the new transit center being constructed downtown.
- A Business Improvement District is being formed, and bike share can potentially be supported by this organization.
- There is a strong philanthropic network in the Rochester area that could potentially help with bike share funding.
- Several large businesses showed genuine interest in future partnerships via station locations and potential sponsorships.
- Bike share could be a key strategy in extending the reach of visitors, particularly conventioners who typically stay very close to the Convention Center.
- Many local groups that seek to advance health and social equity-focused programs offer potential partnership opportunities with bike share. There are no significant obstacles with regard to regulations for station permitting and sponsorship or advertising.

Although there was a strong supportive environment for all of the meetings, many stakeholders identified potential challenges for a bike share system in the Rochester area. The most-often cited potential challenges were:

- There is a need to continue to develop a network of good bicycle facilities, as well as a strong need for motorist education. Bicycling is a challenge in Rochester with its auto-dominated culture.
- RIT and University of Rochester (main campus) are removed from downtown, yet the student population is very important. The major challenge is to create a system that is compact and successful while addressing some of the key populations such as students, faculty, and staff of these institutions.
- Downtown Rochester is still emerging with significant development occurring. However, at the current time, there is the perception that there is a lack of sources and destinations for potential bike share trips in the core downtown area.

- Funding bike share for the universities and colleges could be difficult. It is not likely that student fees would be used for funding, and sponsorship on campuses may be an issue because of existing exclusive agreements with various companies, as well as restrictions on the look and feel of stations on campuses.
- Expanding outside the City of Rochester may be difficult, as most county and State roads outside the city are not bicycle friendly.
- Equity is an important goal of the system, yet sources of funding for a system that is not self-supporting is not yet identified.

7.2 Public Engagement

Public feedback was gathered using a number of public engagement tools including a community workshop, a project website, an online survey, a crowdsourcing map, and interviews with local stakeholders and agencies. The following section summarizes each phase of the public engagement process.

7.2.1 Community Workshop

A public meeting was held on May 19, 2014 at the Central Library of Rochester and Monroe County (Figure 17). The meeting was attended by 24 community members and a number of officials from the Genesee Transportation Council and other regional organizations involved in the Feasibility Study. The workshop included a short presentation outlining the scope of the project, an exploration of what bike share systems are and what they have represented for cities around the United States. A short summary of preliminary findings was also presented. Through this open house meeting, participants were asked to comment on what the potential goals and objectives for a bike share program in the Greater Rochester Area could look like. Furthermore, to gain an understanding of which areas within the region could potentially support a bike share station, participants were asked to suggest station locations in printed maps and through the use of the online crowdsourcing map.

Figure 17. Community Forum at Rochester Public Library

Source: Toole Design



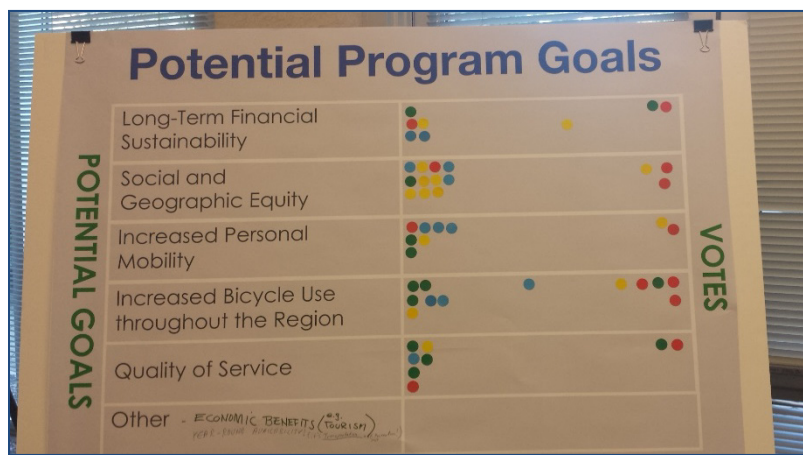
Open house attendees generally supported the concept of bike share and understood its potential benefits.

Public comment included:

- Concern about the preparedness of the existing bicycle network.
- The possibility of a regional system to include the Greater Rochester Area.
- Concerns about the potential financial sustainability of a system for the City and the possibility of having to bear costs for capital and operations of a bike share system.

Attendees were also asked to weigh in on the goals and objectives for a potential bike share system. To this end, there was overwhelming support for implementing a program that would help increase the number of bicyclists, while providing minority and low-income residents an affordable transportation option to connect to jobs and activity centers. Another goal that was popular based on public opinion was the increase of personal mobility for residents and tourists alike. Finally, there was a desire for a system that could experience financial sustainability in the long run (Figure 18).

Figure 18. Potential Goals Receiving Public Votes During the Public Meeting



7.3 Online Survey

To further engage Rochester area residents, an online survey was created and disseminated through various print and online channels. The survey was designed to understand bicycling practices of residents and gauge public sentiment toward bike share and its potential implementation. The survey was comprised of 30 questions grouped into four categories: i) current bicycle usage; ii) opinions about bike share; iii) potential goals and objectives; and iv) demographic and employment information. The survey was open from April 3 through June 13, 2014 and received a total of 67 responses. This section provides a summary of responses received and has been organized into these four categories. A full account of responses can be found in Appendix A. Note that there are some limitations to this survey and the results should not be considered a statistically valid sample. For example, many of the respondents are self-selecting individuals who either strongly support or oppose bike share and may be more inclined to complete the survey, rather than a randomly chosen sample.

7.3.1 Current Bicycle Usage

The majority of respondents (92 percent) reported having access to a working bicycle and bicycling at least a few times a week (58.2 percent) (Figure 19). Just under three quarters of respondents (71.6 percent) self-identified as seasonal bicyclists riding the most during the summer season (62 percent) for recreation (95.5 percent), socializing (67 percent) and utilitarian purposes such as work (54 percent) (Figure 20). However, a majority of respondents (68.5 percent) reported driving as their primary mode of transportation for daily travel. These numbers are comparable to those from jurisdictions in the early stages of bike share implementation.

Figure 19. Bicycle Ridership and Transportation Modes from Online Survey

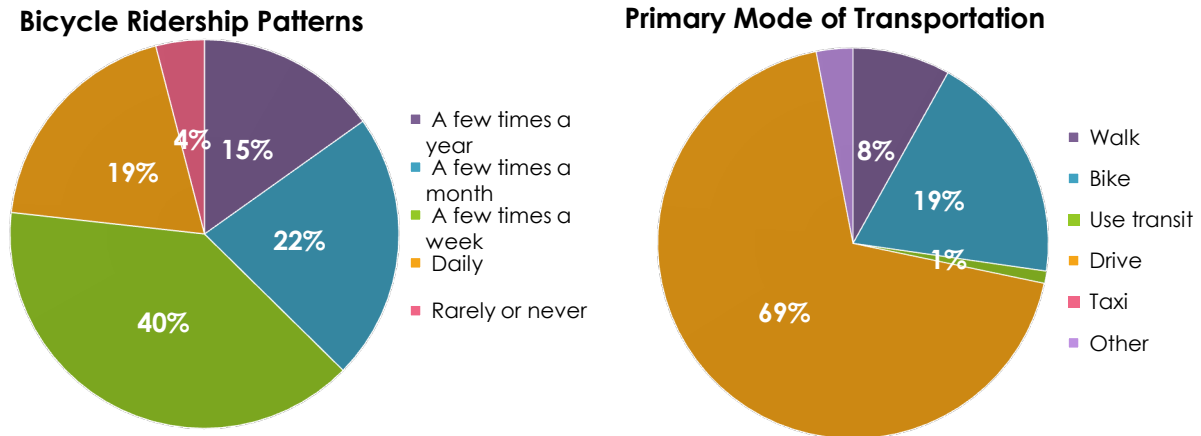
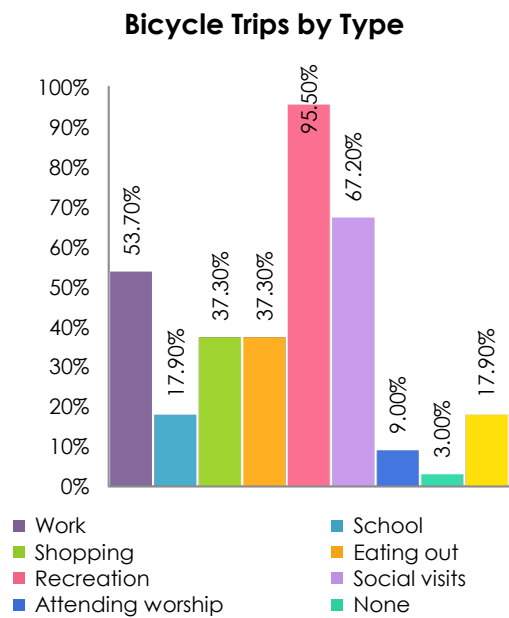


Figure 20. Bicycle Trip Types from Online Survey



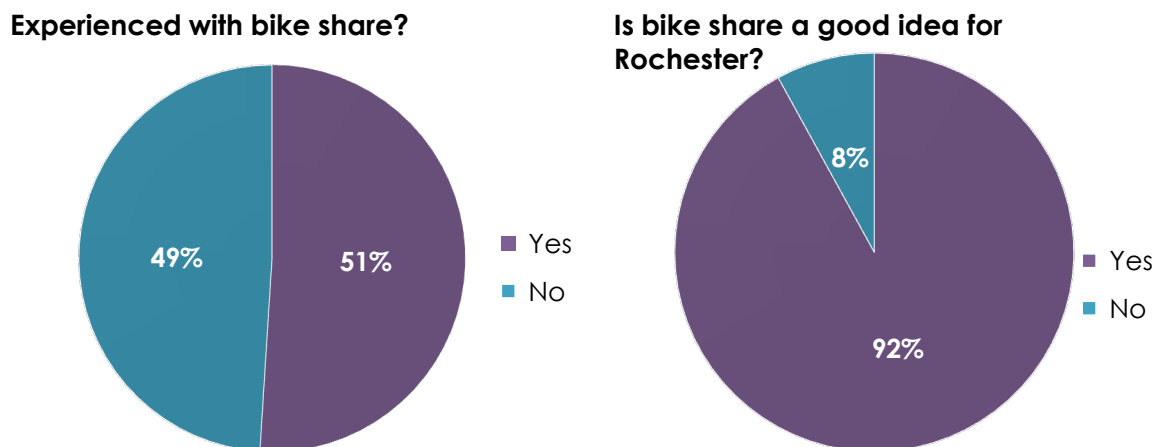
Unsurprisingly, the majority (91.8 percent) of respondents feel most comfortable riding in exclusive bicycle facilities such as bicycle lanes, cycle tracks (i.e., protected/separated bicycle facilities), or shared-use trails. It is important to note that 52.1 percent of respondents noted that the existing infrastructure near potential bike share stations would have an effect on how much they would use the bike share system. When asked to explain their decision, a large number of people agreed that riding on many roadways was very intimidating because of the high automobile speeds and volumes. Based on the responses received, it will be important for the City and the region to consider expanding its existing network of bicycle-friendly facilities to help promote bicycle use and increase the pool of potential bike share users.

7.3.2 Opinions on Bike Share and its Feasibility

On the topic of bike share implementation, the majority of survey respondents (91.7 percent) were in favor of implementing such a program. Most responses were positive and could be summarized in four main themes: i) promotion of a healthier/more active community; ii) increase in bicycle use; iii) increase in accessibility and connectivity between different communities; and iv) provision of additional sustainable transportation options. Furthermore, when asked if they had experienced a bike share system 50.7 percent of respondents answered positively, with many of them having experienced the New York, Washington and Minneapolis systems.

Residents who did not respond positively towards implementation of a bike share system showed hesitation about i) the potential program costs (too expensive) to the City; ii) not enough tourists/people riding bicycles; and iii) existing dangerous conditions for bicyclists (Figure 21).

Figure 21. Responses to Bike Share Questions from Online Survey



With regard to potential usage, 74 percent would use the bike share system to run errands, 67 percent would use it for shopping and dining; 48 percent of residents would use bike share for exercise and recreation and a combined 74 percent would use it for commuting purposes or connecting to existing transit. These positive reactions are congruent with responses and usage patterns from existing programs in U.S. cities where many bike share trips are linked or connect with transit use.⁷⁹ While most people (71.3 percent) agreed that regional expansion will be important to continue to promote increased bicycle use, 36 percent of respondents would use the bike share program at least once a week if it were available.

Finally, with regards to potential pricing, there was an indication that on average residents would be willing to spend \$87, \$22, and \$7.75 for annual, monthly, and daily memberships, respectively, for a potential bike share program. Respondents also had the option to provide recommendations on additional membership options with suggestions including seasonal (3 months), 3-day passes, hourly rentals, and a pay-per-ride option.

7.3.3 Goals and Objectives

Participants were asked to rank a list of possible program objectives, in addition to providing focus areas for the program. The top five highest ranked objectives included i) the expansion of the on-road bicycle facility network (453 points); ii) Integration of bike share and transit (433 points); iii) optimization of origins and destinations serving various neighborhoods (408 points); iv) social and geographic equity and access (393 points); and v) promotion of a culture of safety among bicycle users (360 points). Additional program objectives suggested by the general public included:

- Implementing a regional bike share system with a focus on connecting dense areas of the City with universities.
- Promoting Rochester as a livable, walkable, and bicycle-friendly city.
- Partnering with local businesses to sponsor stations at close-by locations.

7.3.4 Demographic and Employment Information

In the final six questions of the survey, participants were asked to provide some demographic information. According to answers received the majority of respondents self-described as white (82 percent) and male (56 percent). A large number of respondents self-described as being between the

⁷⁹ Federal Highway Administration. United States Department of Transportation. 2012. Bike Sharing in the United States: State of the Practice and Guide to Implementation.

ages of 21-30 years of age (42 percent), employed (82.9 percent), living in households with two or less people (67 percent), and with a combined annual household income of at least \$60,000 (62 percent).

It is important to note that many online surveys are self-selecting, i.e., that existing bicyclists and those supportive of bicycling may be more likely to complete the survey. Furthermore, results from the demographic portion of this survey suggest that additional outreach to a broader cross-section of residents will be needed to completely gauge public sentiment towards bike share implementation.

7.3.5 Online Crowdsourcing

A crowdsourcing map was launched on April 3, 2014 as a companion to the project website and online survey. The map allowed users to suggest locations for possible bike share stations and provide commentary on other people’s suggestions. It remained open for comment until June 13 and received over 182 unique station location suggestions. Table 7 provides a summary of the top 10 station locations based on the number of votes received. Figure 22 and Figure 23 provide a full account of the overall station location suggestions for the City of Rochester and the region.

Table 7. Top 10 Most Suggested Station Locations⁸⁰

Location	Likes/Votes
Neighborhood of the Arts (University Avenue & Goodman Street)	13
East Avenue (East Avenue & Mathews Street)	10
Corn Hill Landing	10
High Falls	9
Brooks Avenue & Genesee Street	9
Rochester Public Market	9
Wegman’s (East Avenue & Winton Road N)	8
South Wedge (South Avenue & Gregory Street)	8
Elmwood Avenue & Monroe Avenue	8
S. Clinton & Goodman	7

Following the public comment period, station suggestions were exported as a Geographic Information System (GIS) shape file and mapped. This feedback was later aggregated with demographic and infrastructure data to produce a demand analysis map (see Section 8).

⁸⁰ Includes stations or votes placed in close proximity to the stations.

Figure 22. Publicly Suggested Station Locations in Rochester

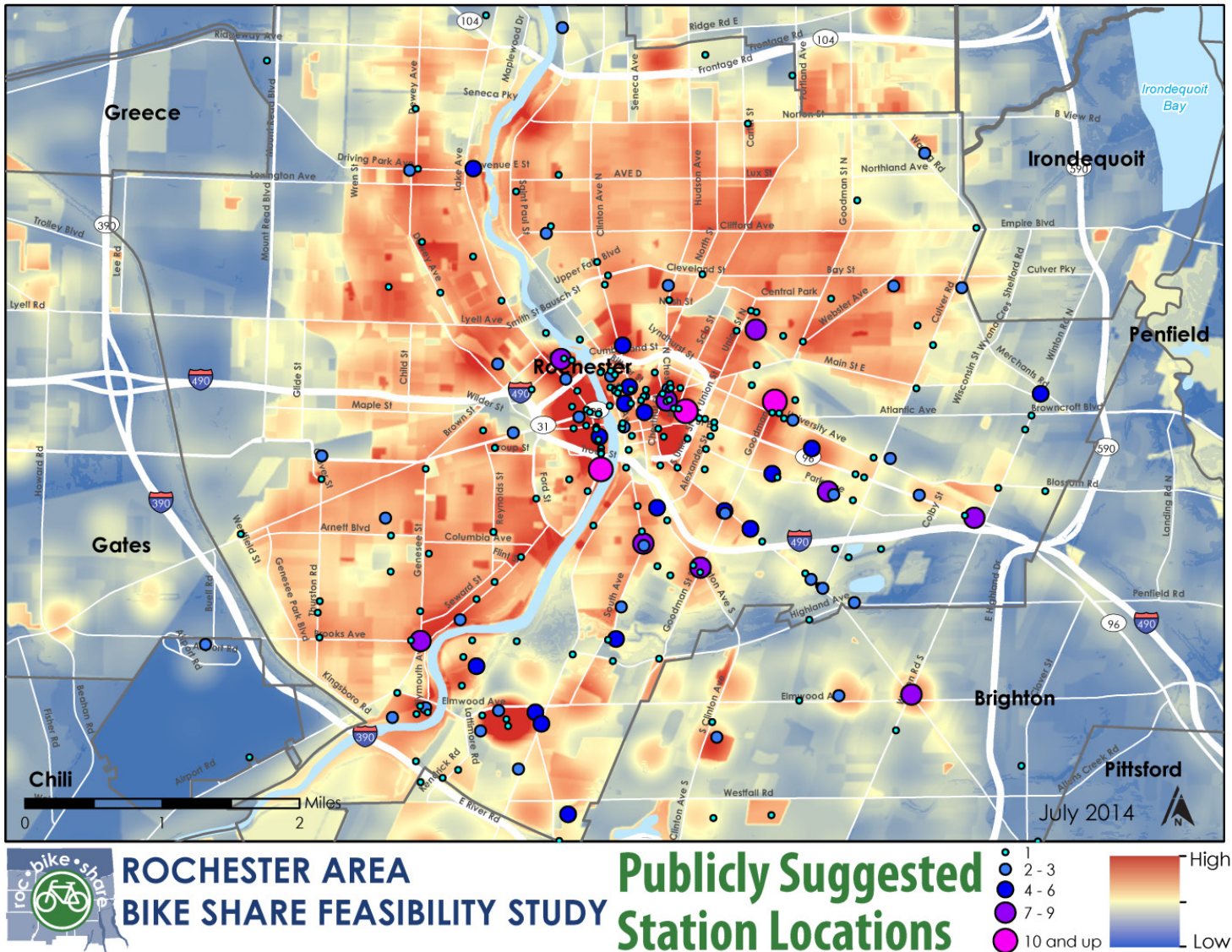
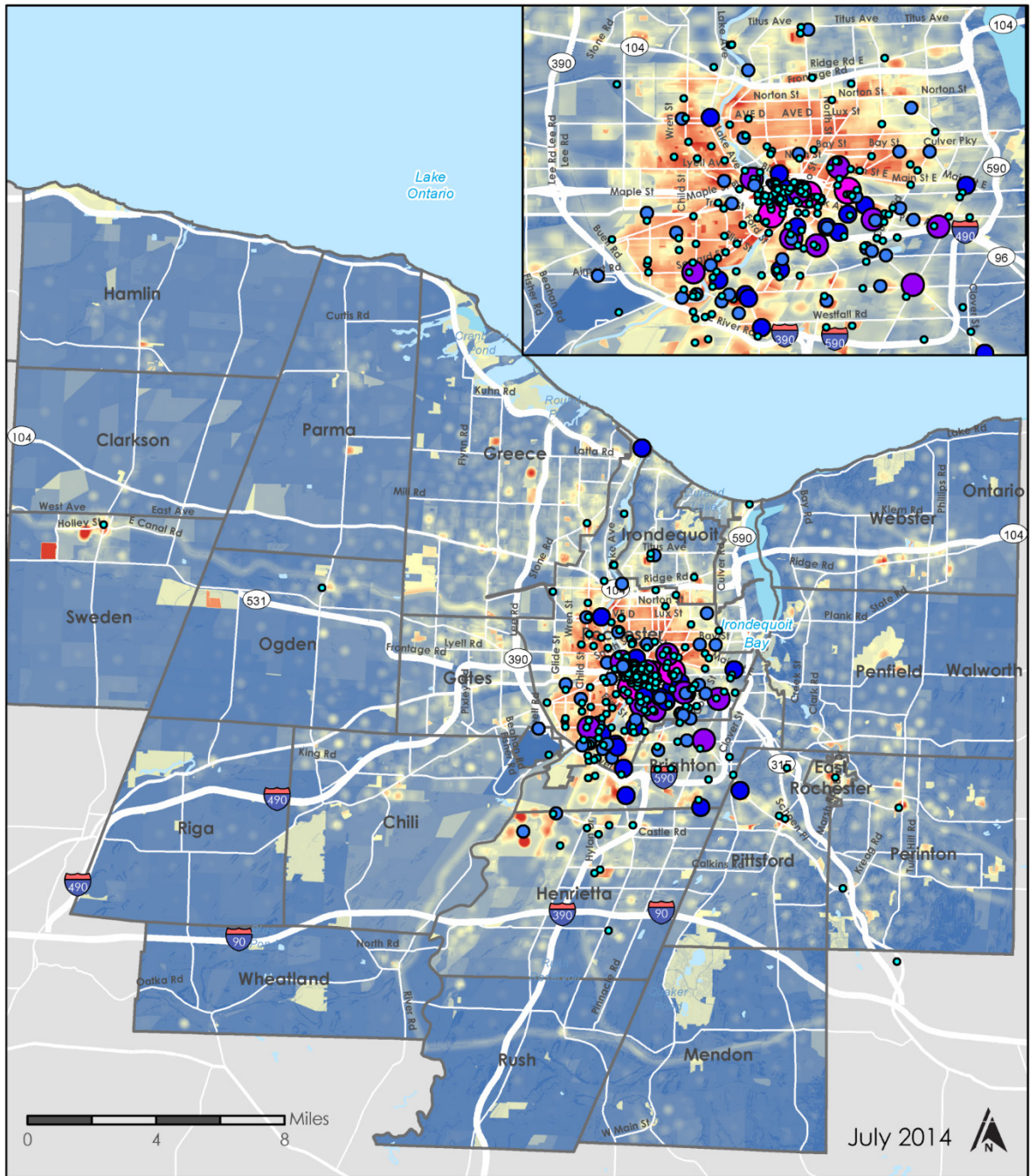
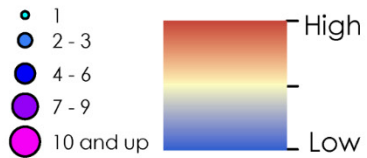


Figure 23. Publicly Suggested Station Locations in the Study Area



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**

Publicly Suggested Station Locations



8 Bike Share Suitability Analysis

Section 6 described many of the factors taken into account when analyzing bike share suitability. A quantitative demand analysis was performed based on an assessment of mapped data provided by GTC representing these factors. The demand analysis was used to identify the most suitable market areas for a bike sharing system with areas with high potential demand for bike share identified through a “heat mapping” exercise that allocated “points” to where people live, work, shop, play, and take transit. Launching a bike share program in the highest demand areas will increase the likelihood of program success.

Factors evaluated in the demand analysis include:

- **Residential population density:** high population densities provide a pool of potential bike share riders. Trips originating from home may include commuting, recreational, or personal business trips. Data utilized for this analysis is from the 2012 U.S. Census.
- **Employment density:** job density measurements indicate where most people are during the day. High employment density provides users making commuter trips, as well as short trips during the work day. Data utilized for this analysis is from the U.S. Census Bureau’s Longitudinal Employer-Household Dynamics Survey.
- **Key attractions:** beyond where people live and work, there are a host of other destinations that could generate large numbers of bike share trips such as colleges and universities, parks, retail centers, libraries, hospitals and airports. Key attractions were identified by GTC staff and provided in a GIS layer to the project team.
- **Bicycle commute mode share:** bicycle mode share within the study area was used to understand areas that may be more conducive to new bicycle and bike share trips. Data utilized for this analysis was derived from the 2006-2010 American Community Survey 5-Year Estimates.
- **Transit density:** bike share provides an opportunity for making first and last mile connections with transit. Bike share availability in close proximity to transit can extend its range. The location of transit stops and routes was provided by the GTC.
- **Proximity to bicycle infrastructure:** bicycle lanes, bike boulevards, cycle tracks, and shared-use paths provide supporting infrastructure for bike share users. The presence of bicycle-friendly infrastructure is correlated with higher rates of bicycling and likely to increase the attractiveness of using bike share, especially for novice or inexperienced bicyclists. The location of existing bicycle facilities was provided by the GTC.
- **Topography:** Terrain and slope can have a significant impact on the amount of bicycling. Bicycle ridership has been shown to be reduced by up to 15 percent with a 10 percent increase

in the degree of slope.⁸¹ Given bike share bicycles weigh 40-50 pounds each, which is significantly more than most private bicycles, a five percent slope was selected as the threshold for when this variable has an impact on bike share ridership. Topographic data was provided by GTC staff.

- **Public input:** as described in Section 7, during the project the team received input about specific locations where people in greater Rochester would most like to see bike share stations. This feedback came through comments received at the open house conducted on May 19, 2014, and through the interactive web map accessed via the project website, where station input was collected through June 16, 2014.
- **Equity:** a defined goal of the system is to create a bike share system accessible to all populations, especially with regard to minority and low income populations that might benefit most from a new affordable transit option. Locations with higher concentrations of these populations were identified from 2010 U.S. Census data.

As a combination of land uses tend to generate increased pedestrian activity, population, and employment densities have been used as proxies for explaining this interaction.

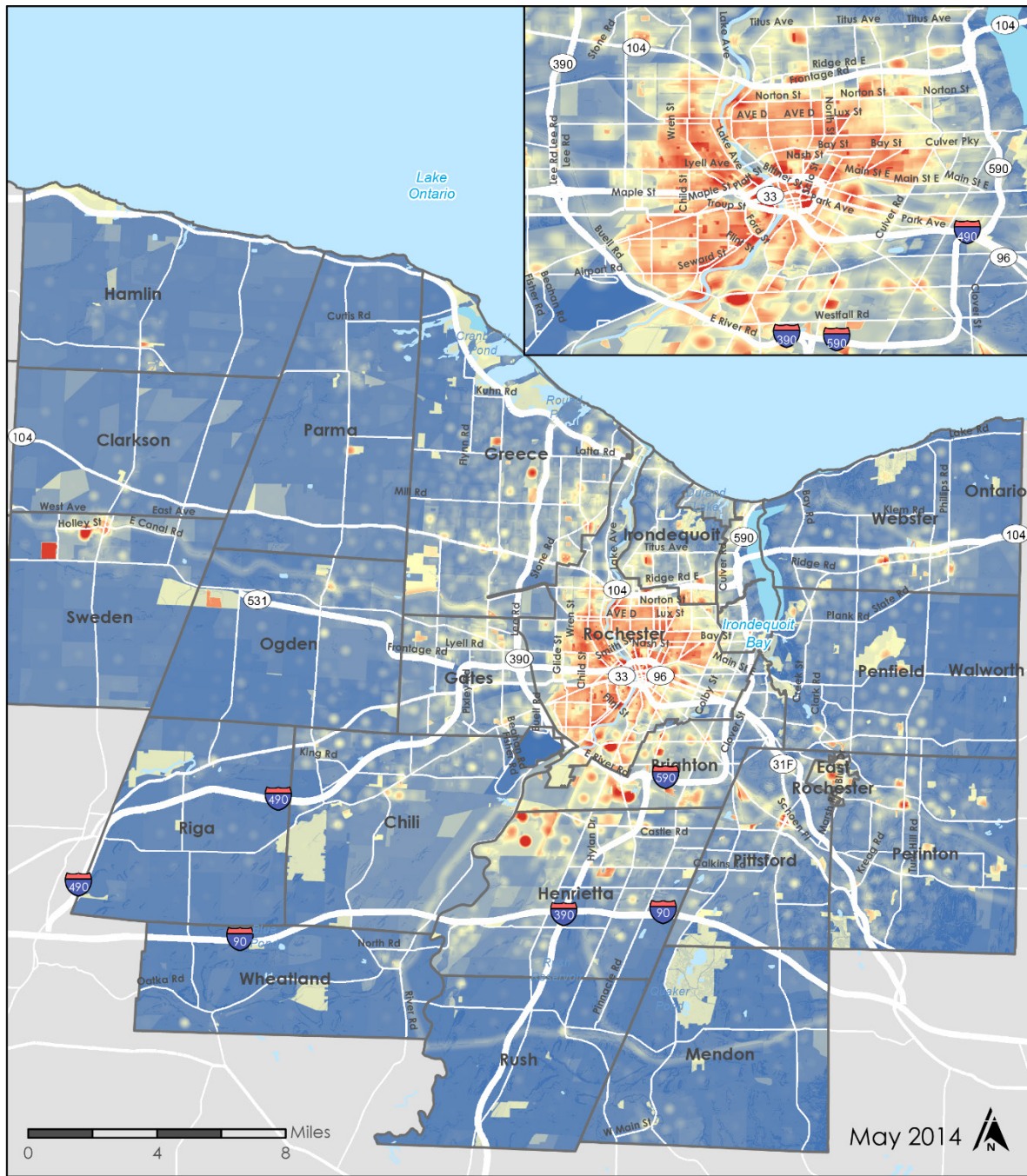
8.1 Demand Estimate Methodology

The bike share demand map (Figure 24) was created by aggregating the factors previously described. Each factor was weighted based on its perceived impact on bike share demand as judged by the project team's experience and public input. For those factors such as population density, employment density, bicycle mode share, and minority and low-income populations, the data was aggregated based on census tract boundaries. For point data, i.e., all other factors, buffers of 0.25 miles were created around each point to represent a realistic walking distance from these attractions / destinations to a bike share station. This process created area-based data sets and scores were assigned to each factor.

All factors were then combined into a single mapped display representing the cumulative results across the study area. The scores were summarized based on the criteria described in Table 8 to produce the "heat map" shown on Figure 24.

81 Parkin, J., Ryley, T. J., and Jones, T. J. 2007. Barriers to Cycling: An Exploration of Quantitative Analysis. In D. Horton, P. Rosen, & P. Cox (Eds.), *Cycling and Society* (pp. 67-82). Burlington, Vermont: Ashgate Publishing Company.

Figure 24. Potential Bike Share Demand (Study Area)



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**

Potential Bike Share Demand

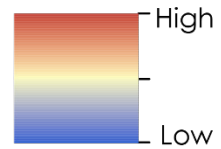


Table 8. Bike Share Weighted Demand Factors

Data Item	Area	Proximity Factor	Total Percentage Points
		0.25 Miles	
Employment Density	20		24
Population Density	20		24
Attractions		12	14
Parks		4	
Colleges / Universities		4	
Additional Attractions*		4	
Bicycle Mode Share	4		5
Proximity to Transit		5	6
Bicycle Infrastructure		10	12
On-road		4	
Off-road		6	
Public Comments		3	3
Equity	10		12
Minority	5		
Poverty (under \$35k for a family of 4)	5		
TOTAL			100
Topography ⁸²		-1	+/-1

⁸² Locations within the study area with average slopes of five percent or higher received a reduction in score of 3 points.

8.2 Demand Estimate Results

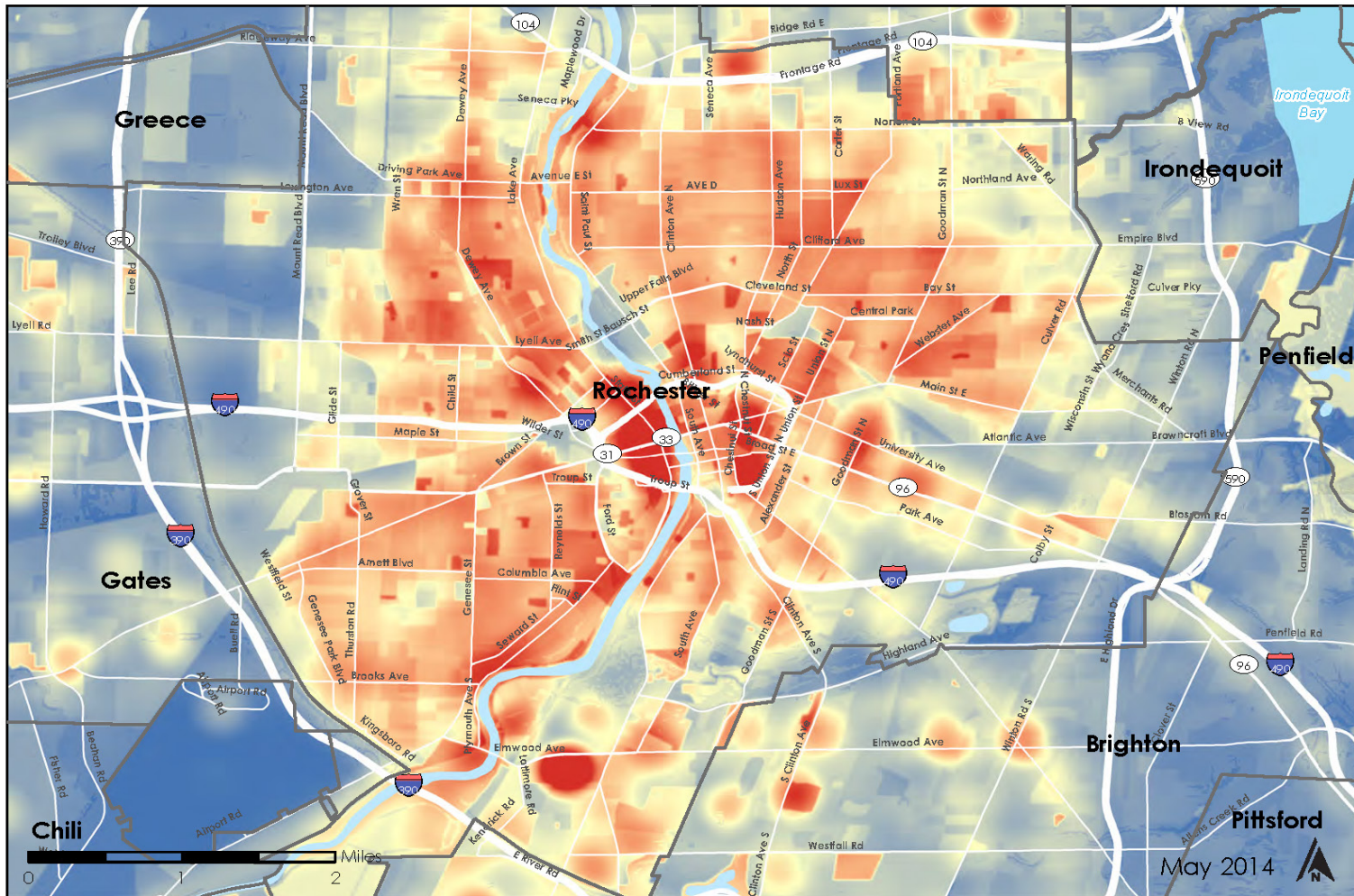
Figure 24 shows results of the demand analysis for the entire study area, which was used to help define more specific market areas for launching a bike share program in the region.

Regionally, the areas outside of Rochester that show the highest potential demand are Brockport, Brighton, the RIT campus, Greece, East Rochester, Webster, Pittsford, Fairport, and various other parks and recreational areas in the region.

Figure 25 shows the results of the demand analysis for the City of Rochester. It shows that the highest demand area is in Center City, with strong demand in Corn Hill, Upper Falls, at the University of Rochester, East and Park Avenue, Brown Square, Public Market, and some areas in the northeast and northwest.

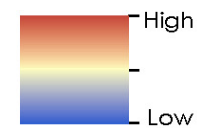
A potential system could include Center City and many of these adjacent neighborhoods, with infill between Center City and University of Rochester area. Potential satellite systems that are not contiguous with the Rochester system could include Brockport, RIT and other regional locations showing demand as previously described. Specific system delineation and phasing will be undertaken in the Business Plan, which is described in Part B of this report.

Figure 25. Potential Bike Share Demand (City of Rochester)




**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY**

**Potential Bike Share
Demand**



9 Rochester Area Bike Share Feasibility Recommendation

The consultant team has taken a two-stage approach to the project, first looking at the overall region and then focusing on the City of Rochester. The larger region between its outlying villages and small cities, and excluding the City of Rochester and several inner ring suburbs, is rural in nature, which is not conducive to bike share implementation. There are, however, areas in which small satellite bike share systems may be feasible. Within the Rochester TMA, these areas include (but are not limited to) the Villages of Brockport, East Rochester, Pittsford, and Fairport, the RIT Campus, activity centers in the Towns of Greece and Brighton, and the City of Canandaigua.

For the City of Rochester, it is the consultant team's recommendation that a bike share system in and around Center City Rochester, with the goals and objectives defined in Section 4, is feasible.

The biggest opportunities for bike share in the City of Rochester are:

- High population density throughout significant portions of the City.
- Young demographics in the potential initial launch areas.
- Diverse income levels and significant minority populations with an opportunity to make bike share accessible to these populations and improve access to jobs and services.
- Strong stakeholder support and potential sponsorship opportunities.
- University and college populations, and supportive administrations.
- Downtown revitalization, including a new transit center.
- Significant access to transit throughout the City.
- Strong community groups for partnerships.

The biggest challenges for bike share in the City of Rochester are:

- Lack of a complete network of bicycle infrastructure in the City.
- Few sources and destinations for visitors in the core of the Center City.
- Small, but growing, bicycle culture.
- Poor neighborhood connectivity in some areas.
- Some streets are not bicycle friendly.

A potential system could include Center City and adjacent neighborhoods that show significant demand potential, with infill between Center City and University of Rochester area. Potential satellite systems that are not contiguous with the Rochester system could include Brockport, RIT, and other regional locations showing demand as previously described. However, it is the consultant team's recommendation that expansion outside of immediately adjacent neighborhoods and to the regional areas occur in later phases.

Part B: Business and Implementation Plan

10 Introduction

This Business and Implementation Plan builds upon the findings of the Rochester Area Bike Share Feasibility Study, which found the implementation of a bike share program to be feasible in parts of Rochester based on the proposed goals and objectives described in the Feasibility Study (Part A of this report). This recommendation was based on a positive analysis of existing conditions which are considered conducive to a successful bike share system.

The Feasibility Study found that implementation of a bike share program in and around Center City Rochester and several inner ring suburbs is feasible. However, because of the rural nature of the larger region between its outlying villages and small cities, some areas were found to not be conducive for bike share implementation. The study also found that some smaller jurisdictions throughout the larger Rochester Transportation Management Area (TMA) may be able to support small satellite bike share systems. These areas include (but are not limited to) the Villages of Brockport, East Rochester, Pittsford, and Fairport, the RIT Campus, activity centers in the Towns of Greece and Brighton, and the City of Canandaigua.

This Business and Implementation Plan builds on the findings of the Feasibility Study. It includes a recommended system implementation area and phasing, analyzes potential governance and ownership structures; performs a financial analysis that compares system costs and revenues and identifies potential funding sources to meet the shortfall; and offers an account of other implementation considerations and a possible timeline.

Part B has been organized into five sections:

- Section 10 provides an introduction.
- Section 11 outlines the proposed system phasing plan.
- Section 12 provides a full exploration of potential business and ownership models and recommends a path forward.
- Section 13 includes a detailed financial analysis of projected costs and revenues for the proposed bike share program and provides a potential funding plan for the system.
- Section 14 explores additional considerations and a timeline related to the implementation of the bike share program.

11 System Size and Phasing

Areas where bike share is likely to be most successful in the Greater Rochester Area were defined based on the program's intended goals, feedback received from the community engagement process, and a heat mapping analysis that looked at existing population and employment densities, the location of attractions, existing transit and bicycling infrastructure, and the concentration of minority and low-income populations (see the Feasibility Study in Part A for more details).

From these inputs, the project team identified areas of the region most likely to support bike share and considered realistic capital and operating funding capacity (so as not to plan a system that was too large to realistically be funded) to develop a proposed phasing plan. The areas are shown in Figure 26 and Figure 27. As shown on Figure 27, it is expected that the core area of the City of Rochester (Central Rochester) and parts of the adjoining Town of Brighton will support a significant bike share network. There are also a number of smaller communities in the region that may be candidates for smaller satellite bike share systems in the future. These areas could include but not be limited to Brockport, Canandaigua, East Rochester, Fairport and Greece, as well as the Rochester Institute of Technology (RIT) campus.

Bike share is expected to have the most success in Central Rochester and as such it is recommended that the Central Rochester system launch first. However, if and when the satellite communities have the interest and funding to launch, there is nothing to preclude them from launching in parallel with the Central Rochester system.

The Central Rochester system is shown on Figure 27 and was divided into four deployment phases beginning with the downtown core and expanding into adjacent neighborhoods. System phasing was broken into manageable sizes that would be small enough to allow the system to be implemented quickly (in terms of securing funding and the timely installation of stations) but large enough to foster ridership and grow support for the system. Expansion should only be considered after an initial operating period, such as one full year, has been evaluated and the intricacies of running the system are better understood. Furthermore this will allow more time to secure additional funding for capital and operating expenses.

The size of each phase (i.e., the number of stations, docks and bicycles in each) was developed based on typical station densities and station sizes observed in peer cities and are summarized in Table 9. Station densities will be higher in the downtown core and become less dense as the system expands into other areas of the city.

Figure 26. Potential Satellite Service Areas

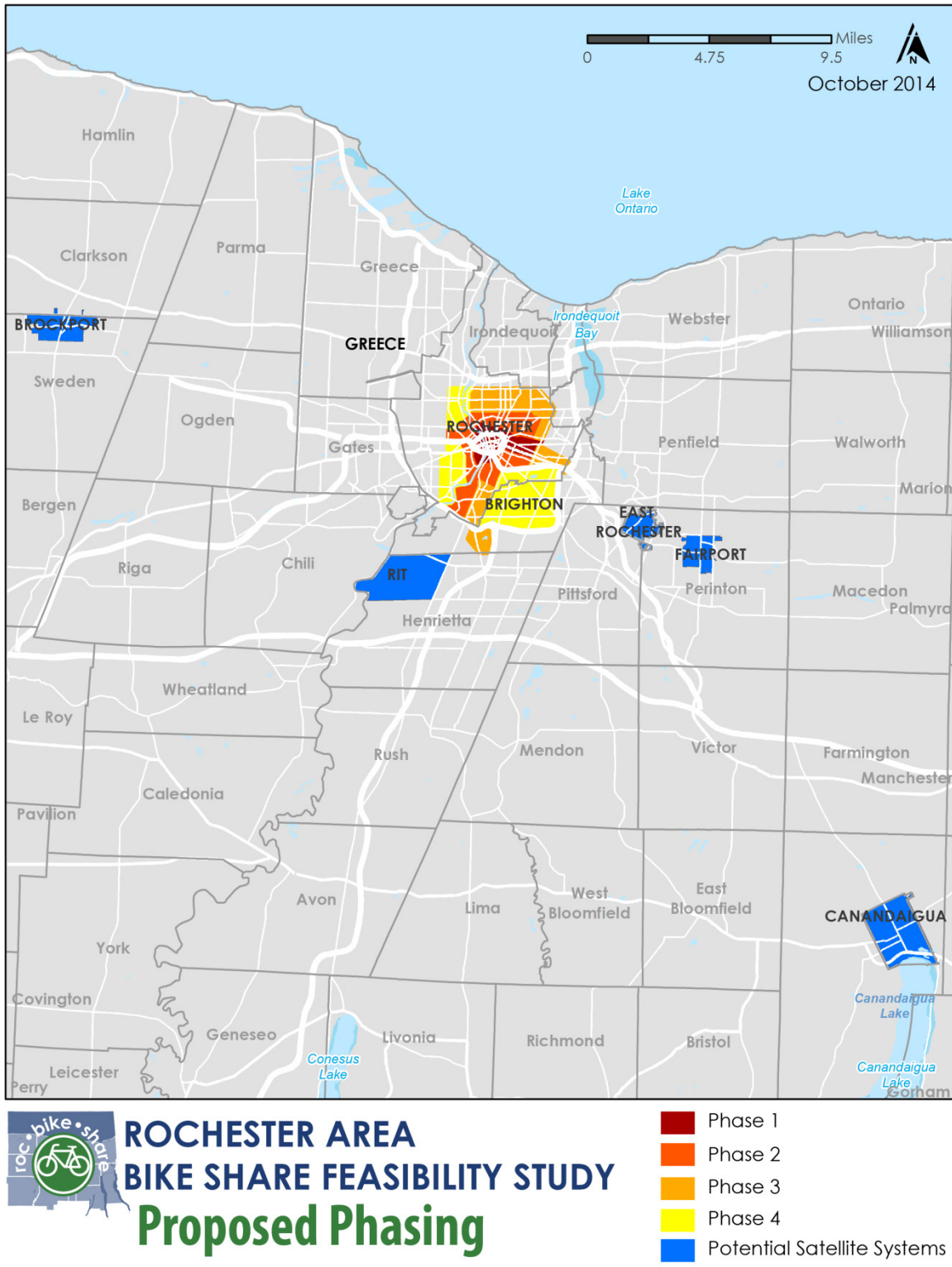
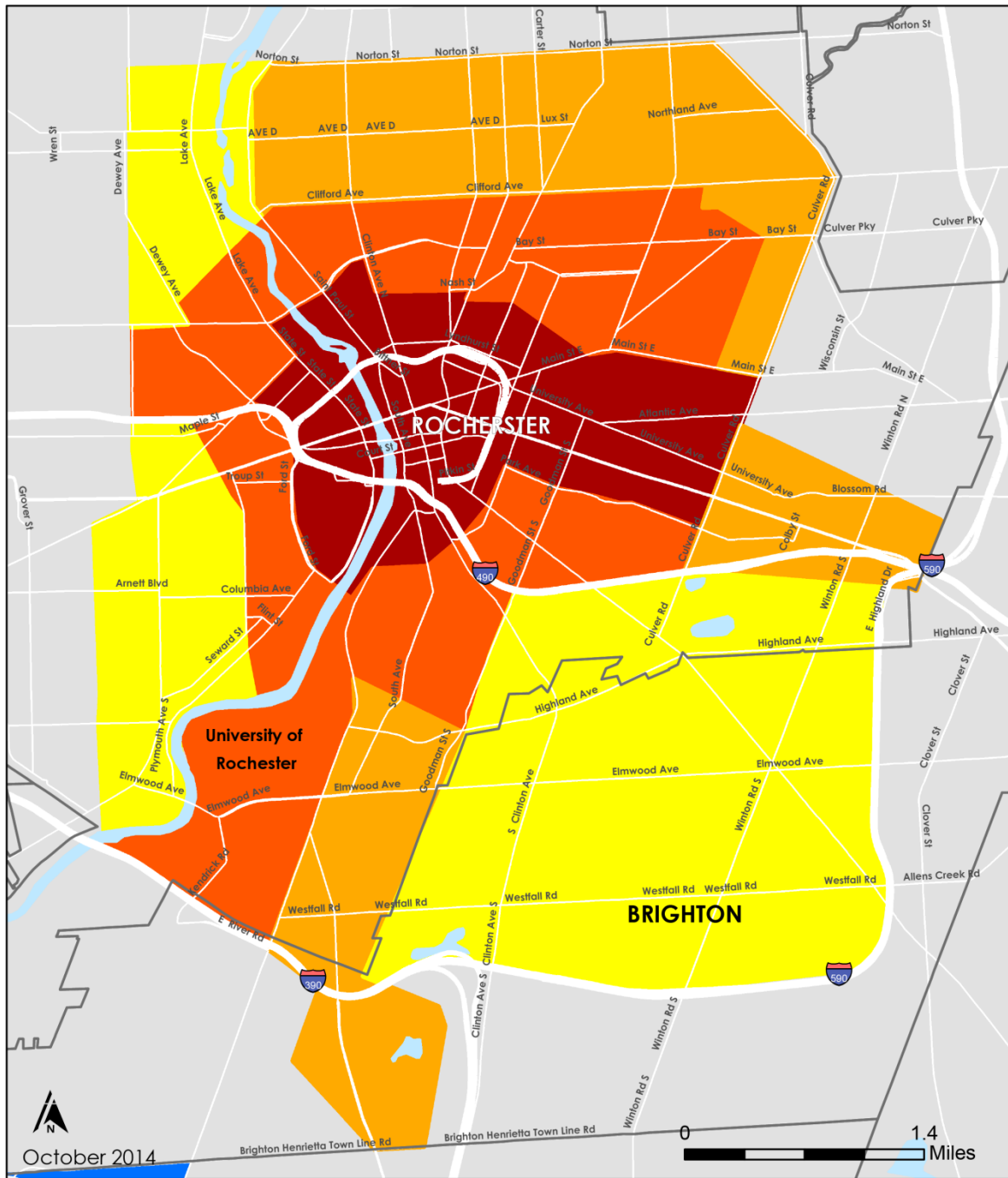


Figure 27. Proposed Phasing (City of Rochester)



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY
Proposed Phasing**

- Phase 1
- Phase 2
- Phase 3
- Phase 4

Table 9. Proposed Phasing Area and Station Density for a Central Rochester Bike Share System

	Area (sq. miles)	Stations	Station Density (Stations / sq. mi.)	Docks	Bicycles
Phase 1	3.2	25	7.8	425	250
Phase 2	5.8	25	4.3	425	250
Phase 3	5.4	25	4.6	425	250
Phase 4	8.3	25	3.0	425	250
TOTAL	22.7	100	4.3*	1,700	1,000

* average station density for all phases of the proposed bike share system

Characteristics of peer city bike share programs are provided in Table 10. Apart from Chattanooga, which has an unusually high station density, peer cities exhibit station densities averaging 4.5 stations per square mile over their entire service area. A system with a station density of 4.3 stations per square mile is proposed for the Central Rochester system. The number of docks per station in the Central Rochester system was also based on the peer cities average of approximately 17 docks per station.

The four phases of the Central Rochester bike share program are described in the remainder of this section. The assumption for this model is 25 kiosks, 425 specialized bike racks and 250 bikes per phase.

Table 10. Selected Program Characteristics

	Nice Ride Minnesota	Hubway	Chattanooga Bike Transit System	Salt Lake City Green Bikes
Start Date	June 2010	July 2011	July 2012	April 2013
Population	380,000	625,000	171,000	189,000
Stations	168	136	31	12
Bikes	1,296	1,000	300	65
Docks	2,867	2,300	547	182
Service Area (square miles)	34.3	21.9	2.0	-
Station Density (Stations / square miles)	4.3	3.7	15.5	5.4
Station Size (docks / station)	17.1	16.9	17.6	15.2

11.1 Phase One

This phase includes the Center City and the neighborhoods of Grove Place, East End, Neighborhood of the Arts, East Avenue, Park Avenue, Corn Hill, South Wedge, and parts of High Falls and Upper Falls. At just over three square miles, this phase covers over nine percent of the City's total land area and serves 42 percent of the city's jobs and 12 percent of its residents. The mix of uses and higher densities in this area give it the highest potential for bike share demand and would maximize revenue potential that may be needed to support future phases of the system. It is important for Phase One of the system to be set up for success. Public acceptance, significant ridership, and financial sustainability will fuel growth of the system for future phases. Too small of a Phase One system may lead to low ridership and stagnant growth; too large of a Phase One system could lead to difficulty in financial sustainability.

11.2 Phase Two

The second phase will expand the system north, west, and south into traditionally residential neighborhoods. This expansion will add approximately 6 square miles of service area, bringing the overall system service area to approximately 9 square miles. This phase would add service to the Beechwood, Brown Square, Edgerton, Ellwanger-Barry, Genessee-Jefferson, Highland, Homestead Heights, Mayor's Heights, N. Marketview Heights, Park Avenue, Pearl-Meigs-Monroe, Plymouth Exchange, South Marketview Heights, Susan B. Anthony, Swillburg, and Upper Falls neighborhoods.

It is expected that Phase Two will expand bike share service to the University of Rochester, which plays a large role in the community with over 10,500 students and 2,000 faculty and staff.⁸³ Universities tend to be supportive locations for bike share as college students tend to be early adopters of the system. Bike share could provide a link between campus and off-campus housing and entertainment destinations for students, staff, and faculty and enhance the connection between the University and downtown Rochester. It is important to note that the University of Rochester was engaged in this study and supportive of a bike share system that includes both the City and the University, and helps connect students, staff, and faculty to surrounding neighborhoods and downtown. This phase would cover 16 percent of the city's total area and would serve 24 percent of its jobs and 26 percent of its residents.

⁸³ University of Rochester. About Us. <http://www.rochester.edu/aboutus/>

11.3 Phase Three

The third phase will further expand the system north, east and south and add 5.4 square miles to the service area, bringing the overall system service area to just over 14 square miles. This phase would add service to the neighborhoods of Cobbs Hill, East Avenue, Homestead Heights, North Winton Village, Northland-Lyceum, Park Avenue and Strong. This phase would cover 15 percent of the total city area and would serve 11 percent of its jobs and 21 percent of its residents.

11.4 Phase Four

The fourth phase will expand the system westward and southward into the neighborhoods of Edgerton, Highland Park, Josana, Lyell-Otis, Maplewood, Mayors Heights, Swillburg, Upper Monroe and into the Town of Brighton. The expansion would add approximately 8 square miles to the system area.

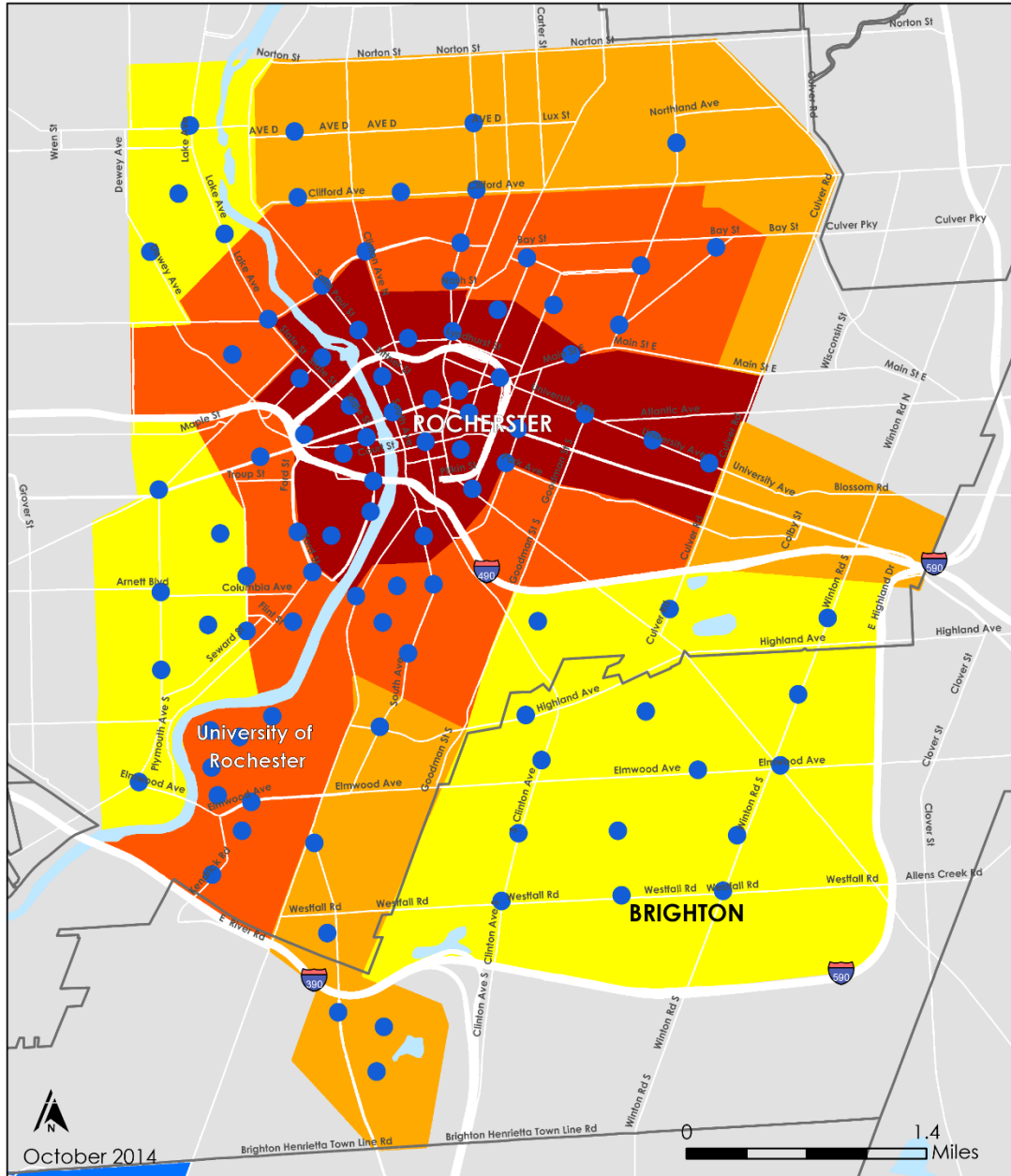
In total, all four phases would cover approximately 22.7 square miles - just over 52 percent of the total area of the City of Rochester and 19 percent of the Town of Brighton. The program would extend service to around 236,000 Rochester residents and 114,000 employees which represents 90 percent of Rochester residents and 80 percent of the Rochester's current employment.⁸⁴ Regarding the Town of Brighton, the program would serve 13,558 residents and 7,996 employees (37 and 33 percent of residents and employees respectively).⁸⁵ The system is also designed to serve a high proportion of minority and low income communities, providing these residents with a new mobility option and an extension to existing transit service.

Preliminary station locations are shown on Figure 28. Identification of a bike share station on these maps does not commit a bike share station to that specific location. These suggested locations are arranged to achieve the suggested station density and are a starting point for future refinement of the plan. Final station placements will require additional public outreach and field work to confirm the availability of space, identify right of way and property ownership, meet the specific needs of the equipment vendor (such as solar exposure requirements), react to potential sponsorship agreements, and identify the interest of the adjacent property and business owners.

84 Based on 2012 American Community Survey Demographic and Housing Estimates (File DP05) and 2011 Longitudinal Employer-Household Dynamics (LEHD) Census Data.

85 Ibid

Figure 28. Proposed Station Locations



**ROCHESTER AREA
BIKE SHARE FEASIBILITY STUDY
Proposed Phasing**

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Proposed Station Location

12 Business Model Evaluation

A key decision in establishing a bike share system is to create a governance structure for the program, and decide who will own and who will operate the system. In general, the following functions are required to mobilize and operate a bike share system:

- Obtain political, public, and other support.
- Raise funds for initial capital and early operating costs.
- Procure the equipment vendor and the operator.
- Administer contracts with the equipment vendor and the operator.
- Own and maintain the system and its assets.
- Evaluate and expand the system.

These functions can be undertaken by one or more organizations. Existing U.S. bike share programs operate under different business models depending on the jurisdiction's funding environment, institutional capacity, and local transportation needs. The relationship between system owners and system operators in U.S. bike share systems is shown in Figure 29. The most common models are systems owned by cities and operated by a private contractor, nonprofit owned and operated, or privately owned and operated. Each model is reviewed in more detail in the section below and an evaluation of the role of public agencies, non-profit organizations, and the private sector in owning and managing a potential bike share program in Rochester are evaluated in Table 11. The evaluation considers a number of criteria including key operating parameters and local priorities identified in the program goals and objectives of the Feasibility Study (Part A). The evaluation criteria included:

- Who will own the system?
- Who will be responsible for raising capital funds?
- Who will operate the system and be responsible for covering operating costs?
- What potential funding sources are available under this business model?
- What is the organizational capacity and interest for this model?
- Does the model allow for regional expansion?
- How does the model meet the goals and objectives for the system, including the following policy goals:

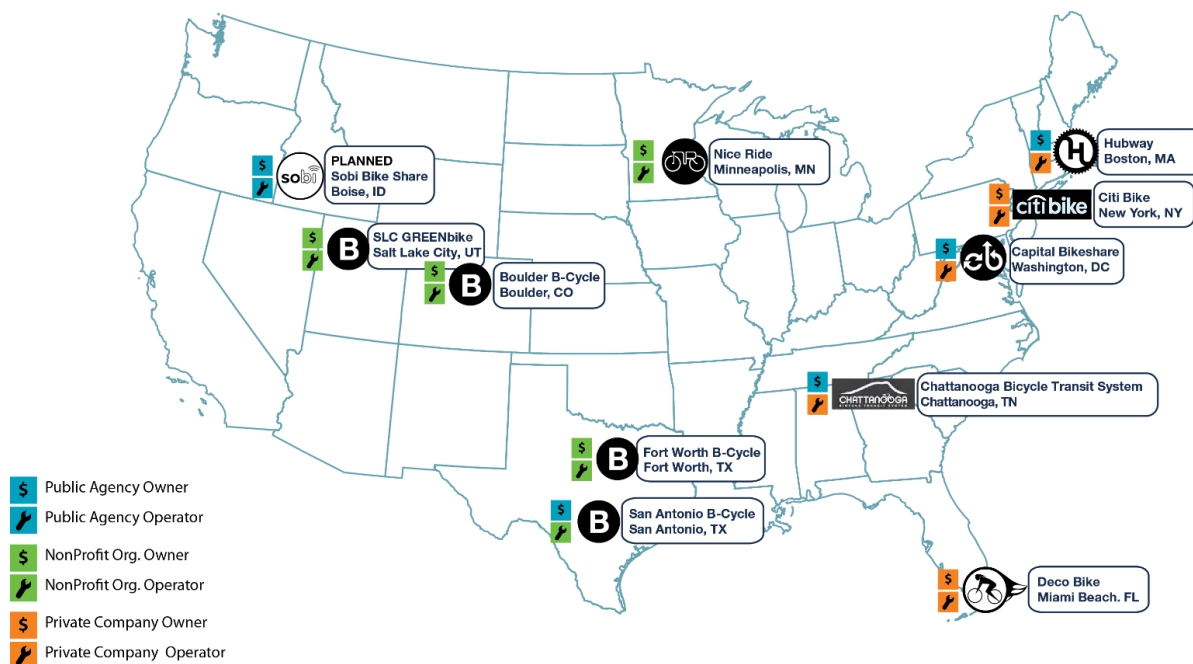
- Mobility: Offer additional transportation options for residents of, students and employees in, and visitors to Rochester.
- Equity: Increase equitable and affordable access to public transportation.
- Economic: Increase the attractiveness of Rochester as a place to live, work, visit and do business.
- Bicycling: Increase the amount of bicycling in Rochester.
- Financial Goal: Create a public-private program that is financially viable and can meet the policy goals.

There are advantages and disadvantages to all of the business model types.

12.1 Private Owner and Operator

Various relationships between bike share system owners and operators (Figure 29). A privately owned and operated system requires no direct public investment into the system. A private vendor is usually given the space on the street by the municipality at no cost and either uses private investment or sponsorship funds to purchase and install bike share stations. The company then earns revenue through membership and usage fees coupled with advertising and sponsorship. The only two systems operating under this model in the United States are DecoBike in Miami Beach (large tourist market) and Citi Bike in New York City (large tourist market, financial capital, global exposure – although it is well-documented that the NYC system is not performing well financially). At the time of writing of this document, many systems in the U.S. have been promised to cities using such a business model, e.g. Phoenix, Atlanta, Tampa, Orlando, Jersey City, and Providence. However, only one has actually launched (Phoenix). All have been delayed due to a lack of funds raised by the private companies. This model minimizes direct public investment, but also minimizes agency control (i.e., agency involvement in decisions on how and where the system will expand), limits funding options to whatever the private sector interest is able to bring to the table and makes it more difficult for a program to meet nonfinancial goals.

Figure 29. Relationship between System Owners and System Operators in Select U.S. Bike Share Systems



12.2 Public Owner, Private Operator

A regional agency-owned and privately operated system is a potential governance structure for the Rochester area. This business model could include RTS or one of its regional subsidiaries as the owner, managing a system operated by a third party contractor. Many regional agencies have been involved in bike share. For example, Hubway’s original request for proposal (RFP) was issued by the Metropolitan Area Planning Commission; Bay Area Bike Share is currently owned and managed by the Bay Area Air Quality Management District (however the Metropolitan Planning Organization is going to be taking over ownership); and the Metropolitan Washington Council of Governments enabled the multiple contracts under Capital Bikeshare to be consolidated into one system. Several transit agencies were involved as original funders of capital for systems, and two are intending on undertaking direct operations in planned systems (Boise, ID and Dayton, OH). A system owned and managed by a regional agency would likely start in Rochester, and subsequently would be well-positioned to expand regionally when other jurisdictions show interest. The largest unknown is whether any regional agencies in Rochester have the organizational interest and/or capacity to undertake bike share system ownership and management.

A city-owned and privately operated system is another prevalent governance structure and is the model for Chicago's Divvy system, Capital Bikeshare in Washington, D.C., and Hubway in Boston, among others. In this structure, the city is responsible for raising capital and operating funds, and owns the system infrastructure including the stations and bikes. It can decide which other functions it takes on and which it contracts to a third party (e.g., marketing and promotions, operations, etc.). This model typically provides the fastest speed to implementation, good fundraising diversity and maintains the most control for the city, but can make regional expansion more difficult (although many regional systems have overcome this). It is unknown whether the City has the organizational interest and/or capacity to undertake bike share system ownership and management.

12.3 Nonprofit Owner and Operator

The nonprofit governance structure has been implemented in dozens of communities around the U.S., and has a number of advantages, but also some complications. Either a new nonprofit can be formed (sometimes housed within a larger organization) or an existing nonprofit can take on responsibility for the bike share system. Typically, a larger system requires a new nonprofit, while a small system can be housed within an existing organization. Funding for equipment typically comes to the nonprofit in the form of public, private, and philanthropic sources. The Board of Directors of the nonprofit often includes city, regional agency, sponsor, and field experts such as legal or accounting professionals who contribute in-kind services. A nonprofit can be set up for regional expansion, and can either undertake direct operations (for example, Minneapolis and Denver) or contract out operations (for example, Seattle). Similarly, it could choose to contract out any other functions to a third party. Operational costs for a nonprofit that undertakes operations directly will typically be lower than a privately operated system, but capacity building can be a lengthy and difficult process.

The ongoing financial responsibility for operations and additional equipment falls to the nonprofit. This structure has a wide variety of funding options and can meet both local and regional goals for a system. However, it can be cumbersome and slow to implement and build capacity for this nonprofit to take public funding, procure a multi-million dollar system, and either operate a system or administer an operating contract.

Table 11 evaluates the different potential ownership models in relation to the stated goals and objectives for a bike share system in Rochester. Based on this analysis, three of the four potential governance structures are viable options for the Rochester area. It is not recommended that a private bike share system be pursued because it is unlikely that the Rochester area market could support a completely

private system. To determine which option should be implemented, the process on Figure 30 should be followed. Some structures provide for easier regional coordination and expansion. However, whatever structure is chosen, there is a track record of intermunicipal agreements to support the coordination and funding between towns and cities that may wish to participate in the bike share program.

Figure 30. Process to establish the proposed ownership model

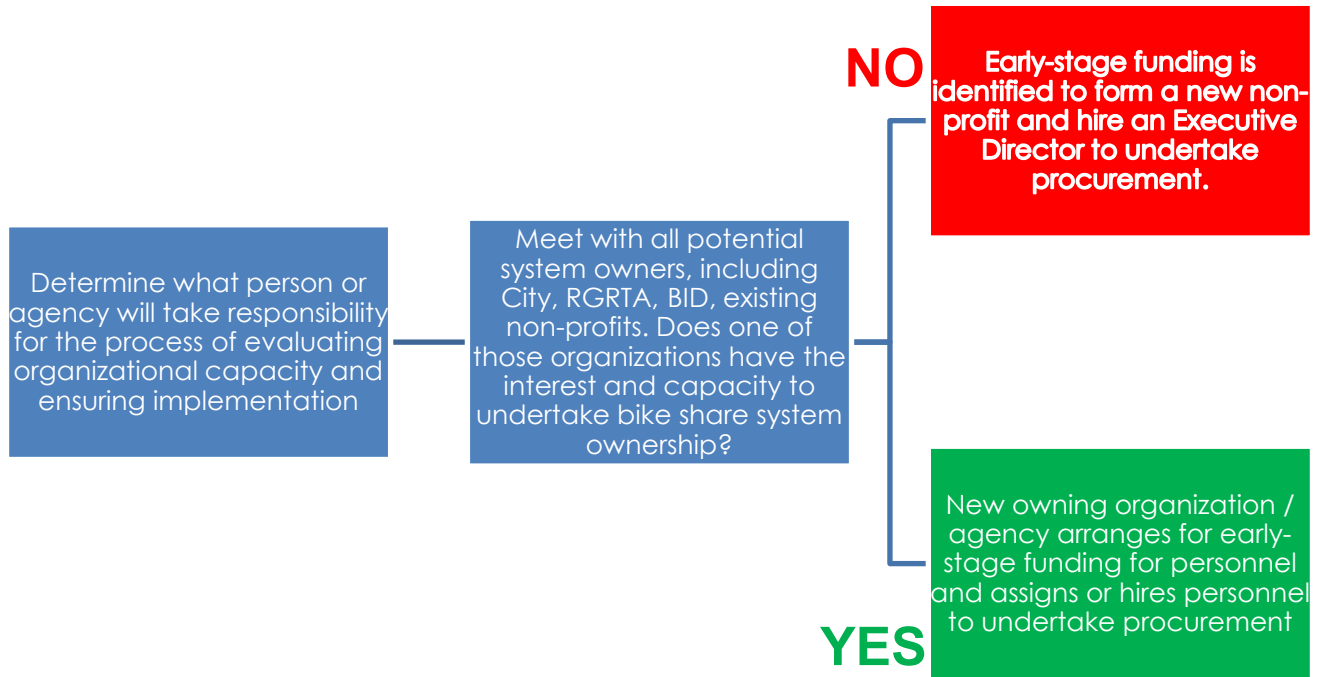


Table 11. Evaluation of Potential Ownership Models in Rochester

Model	Fundraising Responsibility	Potential Funding Sources	Potential for Regional Expansion	Policy Goal 1: Mobility	Policy Goal 2: Equity	Policy Goal 3: Economic	Policy Goal 4: Bicycling	Financial	Other	Examples
Existing or New Nonprofit	Non-profit	● Widest variety of capital and operating funding sources including city, state, federal, private, foundations, as well as diverse, community-based funding	● As an independent body, the nonprofit can establish a regional contracting structure.	● Important to the success of the system and a major goal of the nonprofit. Wider transit decisions are out of the control of the non-profit.	● Pricing structure can be controlled. Social equity is consistent with the community responsibilities of a nonprofit.	● Opportunity for broad community partnerships.	● Important to success and a major goal of the non-profit. Wider decisions on bicycling out of the control of the nonprofit.	● Nonprofit operators tend to operate at lower cost. Can build capacity dedicated to on-going fundraising.	● Broad community support for nonprofits in general. Slow in implementation.	Aspen WE-Cycle, Boulder B-Cycle, Denver Bike Sharing, Madison B-Cycle, Nice Ride Minnesota (Minneapolis).
Regional Agency	Agency (RGRTA or other)	● Wide range of capital funding sources. Public funding sources could be considered for operations.	● Regional agencies are well-suited for multi-jurisdictional expansion.	● Improved transportation options are central to the agency's mission.	● Pricing structure can be controlled. Social equity is consistent with agency goals and responsibilities.	● Agency has significant relationships across the region to promote bike share and partnerships.	● Regional agencies can have influence on bicycling policy, but not necessarily bicycling infrastructure in Rochester itself.	● Private operator more expensive than in-house. Opportunity to bring some functions in-house (marketing).	● Strong transparency of financing and decision making. Private operators bring experience from other cities. Could be slow in implementation	Bay Area Bike Share
City	City	● Wide range of capital funding sources. Public funding sources could be considered for operations.	● Although the City is not set up for regional expansion, many places have created regional systems starting from a City.	● City has significant interest in and control over mobility options within Rochester.	● City can design the system specifically to meet equity goals.	● City can utilize media and political influence to promote the system and create partnerships.	● City in full control of bicycling policy and infrastructure implementation	● Private operator more expensive than in-house. All city-managed systems in US have to date been sustainable financially. Opportunity to bring some functions in-house (marketing).	● Strong transparency of financing and decision making. Private operators bring experience from other cities. Fast implementation. Many successful examples.	Chattanooga Bike Transit System, Capital Bikeshare (Washington D.C.); Hubway (Boston)
Private	Private Contractor	● Has the least variety of funding sources available.	● As an independent body, the private contractor can negotiate new contracts with regional partners to enter the system, however, standards will need to be coordinated.	● Important to the success of the system, but not a primary mission. Wider transit decisions out of the control of the contractor.	● Price structure may need to reflect financial performance. Expansion likely to be demand-driven.	● Strength in branding and marketing in particular in the contractor's interest to attract visitors to the system.	● Important to success of the system, but not a primary mission. Wider decisions on bicycling out of the control of the contractor.	● No successful sustainable private operator examples in smaller cities.	● Unlikely market for a completely privately owned and operated system. Many private systems around the US promised, few delivered.	Implemented: DecoBike (Miami); Citi Bike (NYC) Promised: Phoenix, Tampa, Orlando, Providence, Jersey City

Legend: ○ least favorable for this category ● Somewhat favorable ● Average ● Favorable ● Most favorable for this category

The key step is the first one, where an agency, person, or other organization must take responsibility for determining system management and ownership. This organization must hold individual and group meetings to educate potential managing bodies and find the right “home” for the Rochester area bike share system. The following key discussion points should be highlighted during these meetings:

1. Does managing a bike share system align with the key goals of your organization?
2. Does your organization have similar programs that would help to bring some expertise into the procurement, contracting, and management of a bike share system?
3. Are there functions of your organization that could be leveraged to assist in bike share implementation, such as site planning and/or marketing?
4. Does your organization have the interest and current capacity, or are you willing to create the capacity, to manage the bike share system?
5. Are your attorneys comfortable that your organization’s current insurance will cover any potential risks associated with managing a bike share system, and if not, are you willing to acquire additional insurance to protect from such risks?
6. From a public perspective, is your organization interested in being the public face of bike share, and taking credit for its successes, and responsibility for its challenges?

It is possible that some organization may be interested in helping form a nonprofit, or being a funding partner, but does not have interest in full management. It could be that this organization is an early-stage “home” for a nonprofit before it becomes completely independent. It typically takes at least six months to create a new nonprofit organization, for general administrative setup, forms submittal and receiving an Internal Revenue Service (IRS) designation letter.

Table 12 summarizes the role of partner organizations and funding strategies for bike share systems in the peer cities. These case studies show that there is no single “right” way to form, implement, or operate a bike share system in a community. In all cases, cities have built on the momentum created by those championing the idea of bike share. In some instances, this is a grass-roots community group (such as in Boulder and Aspen, CO), a business improvement association (such as in Salt Lake City), or through the local transit agency (in the case of Fort Worth, TX). Most systems however, receive their impetus through the support of city government. In particular, programs have tended to be most successful (especially in obtaining capital and sponsorship dollars) when there has been early and visible mayoral support for the program.

Membership and user fees generally cover only a portion of the operating cost (up to 35 percent in Boulder, although larger city nonprofit bike share systems such as Minneapolis and Denver operate at 50 to 60 percent) with the remainder needing to be supplemented by other sources, primarily from

sponsorship and advertising. Smaller markets tend to attract numerous smaller sponsors rather than a few large ones. This means a lot of time and effort is required to identify, commit, and retain sufficient sponsorship to make the system financially sustainable.

Table 12. Case Studies of Comparable City Bike Share Systems in the United States

	Nice Ride Minnesota	Boston Region Hubway	Chattanooga Bicycle Transit System	GREENBikes Salt Lake City
BUSINESS MODEL				
Impetus Driven By	City	City of Boston (followed by Cambridge, Somerville and Brookline)	City	City and Chamber of Commerce
Ownership	Nonprofit	Each city owns its own equipment	City	Nonprofit
Operator	Nonprofit	Private	Private	Downtown Alliance
City Role	Funding agent, federal / state grant agent, Board representation, planning	Funding body, sponsorship acquisition, contract management, planning	Contract management, planning partner	Funding partner
Transit Agency Role	None	FTA grant agent	FTA grant agent	None
College Role	Project partner, several stations on campus, sponsor	Stations on campus, subsidized membership, sponsor	Stations on campus, subsidized membership, research	None
FUNDING				
Capital	Nonprofit pursues all funding, including sponsorship, and partners with City for federal, state, local grants	Federal, state grants and sponsorship	City pursued FTA grant through Transit Authority	Nonprofit pursues all funding, including sponsorship, partners with City for federal, state, local grants
Operations	Membership and usage fees (40%); sponsorship	Membership and usage fees (90%) and sponsorship	Membership and usage fees (30%) and sponsorship	Membership and usage fees (30%) and sponsorship

12.4 Summary of Business Model Options

As a summary, many business model options could be appropriate for the Rochester area. It is recommended that based on this study, one organization take responsibility for holding the extensive conversations required to identify the correct model and set it on its way to implementation.

13 Financial Analysis

This section explores the financial needs and performance of a potential bike share program in Rochester and recommends a plan for pursuing required funds. A financial pro-forma was prepared to understand the capital, installation, and operating costs of the proposed bike share system and to forecast potential revenues. The pro-forma evaluates a five-year initial operating period, which is a typical contract length for bike share in the United States. It also considers the sensitivity of a number of the assumptions used in the financial pro-forma, such as the impact of lower or higher than expected ridership.

The funding plan takes the results of the financial analysis to understand the level of funding that is expected to come from membership and user fees and explores what other funding sources are available to meet capital and operating funding requirements. This plan includes a review of possible federal and state funds, local public funding, as well as a review of the role that advertising or sponsorship might play in funding the program.

13.1 Financial Pro-Forma

The financial pro-forma includes a five-year evaluation of expected program costs and revenues starting from six months before system launch, a typical timeline for equipment manufacture and installation. It includes numerous inputs. Where these variables were unknown, information was gathered from membership, ridership and financial data for the comparable systems chosen for this study.

13.1.1 System Size and Phasing Assumptions

The system sizes and phasing recommended in Section 1 were used to develop the financial pro-forma. Some assumptions were made regarding the timing of each phase as shown in Table 13. Phases 2, 3, and 4 are assumed to be implemented in Year 2, 3, and Year 4, respectively. This timeline was chosen so a “steady state” year of just Phase 1 can be evaluated in Year 2 and a steady state year of the whole system in Year 5 can be analyzed. It is assumed that a new expansion is introduced in the second quarter (spring) of the relevant year.

Table 13. Recommended System Size and Phasing

	Phase 1	Phase 2	Phase 3	Phase 4	Total
Installation Date	Q2 Year 1	Q2 Year 3	Q2 Year 4	Q2 Year 4	
Number of Stations	25	25	25	25	100
Number of Bikes	250	250	250	250	1,000
Number of Docks	425	425	425	425	1,700

13.1.2 Business Model Assumptions

The financial model assumes that the system is owned by a public agency or nonprofit and operated privately. The business model does not take into account agency or nonprofit management costs. If an organization were to operate the system directly, costs may adjust downward because in-kind donations and/or efficiencies could be found via utilizing internal resources. Operating costs would need to be revised if the model is different than assumed.

A ratio of 1.7 docking points for every bicycle was used in this analysis. A standard ratio for larger cities is between 1.8 and 2.0. However, there will always be some percentage of the bicycle fleet that is in the warehouse for maintenance, which will bring the on-street ratio into that higher range.

13.1.3 Capital, Installation, and Pre-Launch Costs

This analysis included capital and installation costs for both smart bike and smart dock technologies (Table 14 and Table 15). Refer to the Feasibility Study (Part A) for further details.

Based on an average of recent prices for the major bike share smart dock equipment vendors in the United States, a 10 bike / 17 dock station represents a total cost of \$41,000 per station that includes the base equipment plus shipping and other fees, spare parts, system keys, stickers, and a system map. For smart bike, an assumption of \$2,600 per bike was included (which includes \$100 per bike for shipping). This price can vary widely depending on how many walk-up kiosks and specially designed bike racks are included. For a pure smart bike system with no kiosks and specialized racks, the price will be less expensive. The assumption for this model is 25 kiosks, 425 specialized bike racks and 250 bikes per phase.

In both cases, the pro-forma includes \$1,000 per station for installation, which includes travel for the equipment vendor, and any extra labor and equipment not provided by the equipment vendor. If site

planning and permitting is contracted to a third party, this cost is approximately an additional \$2,000 per station (this is included in the pro-forma). These costs are based on rates quoted in other cities.

The financial model includes a series of system startup costs totaling \$245,000 during the pre-launch period. These costs include:

- Six months’ salary for senior management and administration.
- Administrative costs such as insurance, legal, and accounting.
- Marketing costs such as hiring an agency to establish the name and brand of the system, website development, and marketing materials (brochures, collateral, etc.) and event staff.
- Direct operational costs such as real estate acquisition for this period, vehicle costs, purchase of uniforms and equipment and employee training.

Table 14. Capital, Installation and System Startup for a Smart Dock System

Capital Costs – Smart Dock						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Capital Purchase and Installation	\$1,125,000	-	\$1,195,000	\$2,460,000	-	\$4,780,000
System Startup	\$245,000	-	-	-	-	\$245,000
Total Capital Cost – Smart Dock	\$1,370,000	-	\$1,195,000	\$2,460,000	-	\$5,025,000

Table 15. Capital, Installation, and System Startup for a Smart Bike System

Capital Costs – Smart Bike						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Capital Purchase and Installation	\$650,000	-	\$690,000	\$1,420,000	-	\$2,760,000
System Startup	\$245,000	-	-	-	-	\$245,000
Total Capital Cost – Smart Bike	\$895,000	-	\$690,000	\$1,420,000	-	\$3,005,000

13.1.4 Operational Costs

The pro-forma includes operational costs after the “go-live” date that represent everything needed to keep the system operational, including rebalancing, bike maintenance, station maintenance, customer service, software support, reporting, insurance and all other day-to-day operations. It should also be noted that the cost of system marketing is included in the pro-forma. The operational cost is presented on a per-dock-per-month basis.

This approach is taken for several reasons:

- Docking points are the most accurate representation of a system size, and represent stable infrastructure, as opposed to a bike fleet, which varies on a daily basis due to repairs, rebalancing and seasonality.
- Data is available for this metric from several system contracts around the country.
- It is easily scalable as a system expands.

The pro-forma assumes a per-dock-per-month general operating cost of \$103 in the first year. Systems operate anywhere between \$38 and \$120 per dock per month. The operating cost will ultimately be determined by (1) the wages and salaries offered by the operator; (2) the level of service and intensity of system rebalancing required; and (3) operational efficiencies that can result in cost reductions (e.g., in-kind donations, use of City-owned property for operating space). A certain amount of spare parts replacement will be covered by warranty and/or equipment insurance and therefore is not included in the financial model. However, some annual spare parts and bike replacement has been included for theft, vandalism and regular wear and tear.

13.1.5 System Revenue

There are three basic drivers of system revenue: annual membership, casual membership, and usage fees (Table 16). For revenue forecasting, the pro-forma assumes the rate structure shown in Table 16 that is based on similar pricing structures in other bike share systems and supported by responses to the online survey conducted as part of public outreach. The model of a membership fee, free-ride period, and usage fees for longer rides, has some shortcomings – such as being a potential barrier to entry for lower socio-economic populations.

Table 16. Suggested Fee Schedule for Rochester Bike Share

Access Fee		Usage Fees	
		0-30 min.	Additional Half Hours
Annual	\$85	\$0.00	\$4.00
24-hour	\$8		

Other pricing structures should be considered, e.g., a monthly fee instead of annual membership (e.g., a model similar to cell phone plans) and / or a “per ride” trip fee similar to how transit is priced. Some communities, such as Philadelphia, are considering launching their systems with varied pricing structures. Nevertheless, for this analysis, the traditional pricing structure has been assumed as there is significant data to support related membership and ridership assumptions using this structure.

Revenue drivers and their related model inputs are summarized in Table 17 and are based on trends observed in peer cities.

Table 17. Performance Metrics for Case Study Bike Share Systems and Rochester Model Inputs

NA = Data not available.

	Nice Ride Minnesota	Chattanooga Bike Transit System	Boston Region Hubway	SLC Green Bikes	Model Input	Comments
Annual Members / 1,000 Population / 100 bikes	0.4	1.3	0.6	1.5	1.4	Average Chattanooga and SLC only, lower population cities
Casual Members / Station	373	277	765	500	479	Average
Trips per Casual Member	1.9	1.8	2.6	NA	2.1	Average
Trips per Annual Member	49	23	57	NA	43	Average

Annual Membership Revenues

- Annual Membership Fee: the model assumes an \$85 fee to become an annual member. This amount is in the range of current fees in the U.S. and is also the average rate identified by respondents to the online survey (see Feasibility Study (Part A) for details).
- Members per Person: the model assumes that the system will have 1.4 persons / 1,000 residents / 100 bikes purchasing annual membership and growing 10% annually. This calculation does not include any special membership promotions or group sales to increase membership.

Casual Membership Revenues

- Casual Membership Fee: the model assumes an \$8 daily fee to become a 24-hour member. This amount is in the range of current fees in the U.S. and is also the average rate identified by respondents to the online survey (see Feasibility Study (Part A) for more details).
- Casual Members per Station per Year: casual members typically find out about a bike sharing system by seeing a station. Therefore, the pro-forma uses the metric of casual members per station to estimate casual members. The model assumes that Rochester will annually attract 479 casual members per station.

Usage Fees

Available data from other U.S. systems was used to estimate revenues coming from the system including:

- Rides per Member: data show a range of 20 to 60 rides per year per annual member amongst peer cities. The pro-forma assumes a rate of 43 rides per year for Rochester. For casual members, data show a range of 1.8 to 2.6 rides per member. The pro-forma assumes 2.3 rides per casual member for Rochester.
- Percent of Rides Incurring Usage Fees: data show that approximately 30% of casual trips and 2% of member trips incur usage fees. These numbers are consistent across the systems for which data is public.
- Average Usage Fee Incurred: the average usage fee incurred for annual members ranges from \$4 to \$6 for annual members and \$6 to \$10 for casual members. The pro-forma assumes an average usage fee of \$5 for annual members and \$9 for casual members.

Forecast Results

Using the previously described inputs, the pro-forma was prepared to forecast membership, ridership, capital and installation costs, annual operating costs and system revenues. The output was checked against metrics from peer cities (see Table 18) to ensure consistency with actual results and then analyzed to understand the funding needs for capital and operations.

Table 18. Performance Metrics for Case Study Bike Share Systems and Rochester Model Results

Farebox recovery is the amount of operating cost recouped by membership and usage charges.

	Nice Ride Minnesota	Chattanooga Bike Transit System	Boston Hubway	SLC Green Bikes	Peer System Averages
Trips per Bike per Day	0.8	0.3	3.1	1.6	1.5
Annual / Casual Ridership Split	62%/38%	51%/49%	69%/31%	NA	61%/39%
Farebox Recovery	62%	26%	88%	30%	50%

The forecast results are summarized in Table 19 including the following metrics.

Membership and Ridership Metrics

- **Trips / Bike / Day:** used globally to measure system usage. The pro-forma predicts an average ridership of approximately 0.7 trips per bike per day over five years. This is less than the average rate of 1.5 trips per bike per day observed in peer cities. This lower forecast is because of the dynamics of population and ridership, as compared to peer cities. For example, GREENBike SLC has similar population to Rochester, but high ridership; Boston has high population and high ridership; Nice Ride Minnesota has high population and average ridership. All of these dynamics lead to a higher ridership result. For Rochester, a lower population and average ridership leads to a lower than average ridership forecast.
- **Percentage of Casual and Annual Member Rides:** the forecast output predicts a split of approximately 57% of rides made by annual members and 43% by casual users. This split is similar to the average of the peer cities.

Financial Metrics

- **Farebox Recovery:** this factor is important in understanding the financial needs of the system. The pro-forma shows that approximately 47% of operating expenses will be recouped through membership and usage fees. This number is similar to the peer cities.
- **User Revenue Split:** user revenues are expected to be split approximately 30% from annual membership sales / 40% from casual membership sales / 30% from usage fees. Data for this metric is not released by all cities, however, in most cities this split is approximately 33% / 33% / 33%. The forecasted split in Rochester is reasonable.

A summary of the five-year funding need for implementation of the four phase bike share system in the Rochester area is shown in Appendix B, and includes:

- **Capital and Installation Costs:** \$3.0 million for smart bike or \$5.0 million for smart dock over the five years, which includes capital, installation, system startup, and pre-launch administrative costs for the nonprofit.
- **Operating Costs:** \$540,000 per year on the Phase 1 system and \$2.4 million per year on the full Phases 1-4 system to operate. This estimate includes operating costs and system upkeep and is assumed to be the same for smart bike and smart dock systems.
- **Revenue:** \$215,000 per year for the Phase 1 system, and \$930,000 per year for the full Phases 1-4 system earned in membership sales and trip fees, for a total of \$2.6 million during the first five years of operation.
- **Fundraising need:**
 - Capital: for smart bike, \$890,000 in year 1, \$690,000 in year 3 and \$1.4 million in year 4 if the proposed roll-out schedule is to be maintained. For smart dock, \$1.4 million in year 1, \$1.2 million in year 3 and \$2.5 million in year 4.
 - Operations: netting out the system revenue, \$3.3 million over five years for the expanding system. For the Phase 1 system only, \$1.4 million over five years with approximately \$300,000 per year, or \$1,200 per bike per year.

Table 19. Forecast Membership, Ridership, and Financial Performance for Phases 1-4 of the Rochester Area Bike Share Program

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Stations	25	25	44	88	100	100
Bikes	250	250	438	875	1,000	1,000
Docks	425	425	744	1,488	1,700	1,700
Membership and Ridership						
Annual Members	662	809	1,690	3,717	4,304	
Casual Members	10,778	11,975	22,753	45,505	47,900	
Annual Member Rides	17,146	33,636	57,745	127,040	179,076	414,643
Casual Member Rides	22,633	25,148	47,780	95,561	100,590	291,711
Total Rides	39,778	58,783	105,526	222,601	279,666	706,354
Trips per Bike per Day	0.58	0.64	0.66	0.70	0.77	0.69
Operations						
Bike Share Operating Costs	\$392,337	\$538,810	\$971,204	\$2,000,681	\$2,355,088	\$6,258,120
Revenues						
Bike Share Revenue	\$205,270	\$235,784	\$460,431	\$950,743	\$1,038,579	\$2,890,809
User Fee Recovery	52%	44%	47%	48%	44%	46%
Operations Fundraising Need						
Total Operating Fundraising Need	\$(187,067)	\$(303,025)	\$(510,773)	\$(1,049,938)	\$(1,316,508)	\$(3,367,311)
Per Bike Per Year	\$(748)	\$(1,212)	\$(1,167)	\$(1,200)	\$(1,317)	\$(1,197)

13.1.6 Sensitivity Analyses

The financial model shows a funding shortfall. Capital and installation costs, which are one-time costs, lend themselves to one-time funding sources such as grants and/or private donations. Nevertheless the choice of vendor or type of equipment (i.e., smart dock versus smart bike) may change the capital funding need.

Ongoing operating costs are more difficult to fund and typically rely on user-generated revenues and sponsorship. Therefore, reducing operating costs or increasing revenues will reduce the amount of funding required.

A sensitivity test was conducted on the effect of varying assumptions in the financial model and the resulting impact on the second year operating fundraising need. For example, varying the annual membership rate between \$60 and \$110 and the casual membership price between \$4 and \$12 yields a range of the second year operating funding need from \$230,000 to \$370,000. Varying the uptake of annual membership between 1.0 and 1.8 annual members / 1,000 population / 100 bikes and casual members per station per year between 300 and 700 yields a range of the second year operating funding need from \$200,000 to \$390,000. Finally, varying the operations cost per dock per month from \$83 to \$123 yields a range of the second year operating funding need from \$200,000 to \$400,000. The full sensitivity tables are shown in Appendix C. The second year fundraising need was chosen because this is an indication of the steady state performance of the Phase 1 system.

The tests show that the factors that most influence operational funding need are:

- The operating cost per dock per month.
- The attraction of casual members (i.e., the number of casual members per station).
- The uptake and price of annual membership. This assumes no offset in demand from raising the price.

13.2 Funding Plan

Beyond membership and usage fees, bike share systems in the U.S. have generally used three other types of funding: public, private, and advertising/sponsorship. Although most programs use a combination of funding sources, generally, public funds and private foundation grants are used toward capital costs whereas membership and usage fees and advertising/sponsorship revenues are used toward on-going operating costs.

13.2.1 Public Funding

Public funding sources include federal, state, and local funds. Federal funding opportunities include transportation, health, and sustainability programs from agencies such as Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Centers for Disease Control (CDC), Department of Health and Human Services (HHS), and the Department of Energy. There are often additional requirements to the use of these funds such as use only for fixed equipment, “Buy America” provisions or National Environmental Policy Act (NEPA) requirements. These funds are often less flexible in terms of timing. Approximately two-thirds of current bike share systems in the U.S. have used federal funding for capital costs.

The Federal Highway Administration has established a Web page for addressing the U.S. Department of Transportation (USDOT) position on federal funding and bike share.⁸⁶ Bike share program capital costs are eligible under several federal-aid highway program categories. Table 20 reflects FHWA guidance that was updated June 13, 2013, to incorporate programs authorized under the Moving Ahead for Progress in the 21st Century Act (MAP-21).

⁸⁶ Frequently asked Questions and Answers concerning Bike Sharing Relative to the United States Department of Transportation, http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/faq_bikeshare.cfm

Table 20. Bike Share Eligibility by Federal Program

Includes capital and equipment costs, and operations are not eligible.

Program	Fund	Applicability
FTA	Federal Transit Administration Capital Funds	YES
ATI	Associated Transit Improvement	YES
CMAQ	Congestion Mitigation and Air Quality Improvement Program	YES
HSIP	Highway Safety Improvement Program	NO
NHPP	NHPP/NHS: National Highway Performance Program (National Highway System)	YES
STP	Surface Transportation Program	YES
TAP	TAP/TE: Transportation Alternatives Program / Transportation Enhancement Activities	YES
RTP	Recreational Trails Program	NO
SRTS	Safe Routes to School Program	NO
PLAN	Statewide or Metropolitan Planning	NO
402	State and Community Traffic Safety Program	NO
FLH	Federal Lands Highway Program (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program)	YES
BYW	National Scenic Byways Program	NO
TCSP	Transportation, Community, and System Preservation Program	YES

Local public funding could also be considered. The City of Columbus used 100% local funds to cover the \$2.2 million capital and first year operating cost of their 30 station / 300 bike share system that launched in July 2013. They did consider state and federal funding through the Congestion Mitigation and Air Quality Improvement (CMAQ) Program, but would not have been able to receive funds until 2016 and elected to use local funds to expedite the system launch.

13.2.2 Private Funding

Private funding sources are various and include grants from private foundations, private gifts and donations from individuals, and private sector investment. These sources are used in many U.S. cities. Private funding makes up approximately 5-10% of funding in Boulder and Denver.

Some other ways the private sector could get involved is through large membership commitments and programs offered by employers, universities, and the City. These ways could include:

- Bike share membership tied to existing transit pass programs, e.g., discounted memberships could be offered to university students through an increase to the student fee.
- Bike share membership could be added to the offerings available to city employees.
- Corporate membership programs can be used to build enrollment by offering reduced membership rates and the opportunity for employers to sponsor all or a portion of membership costs for their employees.
- Developer incentives and parking offsets could be used to create a mechanism for a development to contribute to capital funding for bike share.
- Crowdsourcing through individuals donating or making contributions online. Kansas City B-Cycle in Missouri recently raised \$400,000 to help expand the system.⁸⁷

13.2.3 Sponsorship / Advertising

Sponsorship and/or advertising are an important element of most U.S. bike share systems. It will be no exception in Rochester and will be required to help fund operations. Other cities have achieved several levels of sponsorship. Examples for each of the different levels are shown on Figure 31 and include:

- **Title sponsorship:** includes branding of all elements of the system including name, color, and representation on all sponsorship elements including at the station, on the bikes, on electronic media, and all other components. Title sponsorship has only been achieved in a few systems around the world – New York (Citi Bike) and London (Barclay’s Cycle Hire), which garner values upwards of \$1,000 per bike per year in those markets.
- **Presenting sponsorship:** in these systems, branding is already developed, e.g., the bright colored bicycles and the name Nice Ride Minnesota in Minneapolis. A single sponsor (such as in Minneapolis or Boston) or multiple sponsors (such as in Montreal) purchase the right for system-wide logo placement, typically on all bicycle fenders or at all stations, and may negotiate for other sponsorship elements. In Minneapolis, Blue Cross Blue Shield has their logo and colors on every bike fender as well as placement on the program website and other media. However, other sponsorship opportunities are available to other organizations and bike and station sponsors can augment larger presenting sponsors. Presenting sponsorship garners on the order of \$400 to \$600 per bike per year.
- **Individual sponsorship offerings:** in this model sponsorship offerings are broken into individual elements and sold off to many smaller sponsors. This model often followed in the interim prior to presenting sponsorship (such as in San Antonio), but may also suit markets with smaller capacity or a desire for broader community support (such as in Boulder).

⁸⁷ Neighbor.ly Helps Communities Build Better Towns, <http://www.crowdsourcing.org/article/neighborly-helps-communities-build-better-towns-/21377>

Overall, sponsorship will be required to support the bike share system in Rochester. The amount that will be able to be generated will depend on the specific assets offered (e.g., whether or not it can include an advertising panel). Based on the business pro-forma, the Rochester area would require \$330,000 per year in sponsorship to support the 250 bikes in Phase 1 and \$1.4 million for the full system. This amount equates to approximately \$1,300 per bike per year. Local companies may be interested in sponsoring stations and larger sponsors (perhaps wanting to get exposure in the student market) may be interested in larger presenting sponsorships.

No specific regulatory issues were identified during stakeholder meetings regarding limitations on sponsorship or advertising in Rochester. However, detailed interviews with city attorneys should be undertaken prior to a sponsorship search to understand whether there are any restrictions that might impact the type of sponsorship or advertising assets that may be sold on a bike share system.

13.2.4 Possible Funding Plan

The 25 station / 250 bike Phase 1 of a potential bike share system in Rochester will require approximately \$900,000 to \$1.4 million in capital funds (depending on smart dock or smart bike) and ongoing operating funds of approximately \$300,000 per year over five years. The remainder of this section recommends a potential funding plan for the Phase 1 system and the potential commitments from local agencies, sponsors and major stakeholders, as well as some additional funding sources for later phases.

Capital Funding

Grant funding should be sought to fund the initial capital for Phase 1. Most grants require a 20% local match. Therefore, an application should be submitted for \$1.1 million. Aiming for the higher number, the system could be smart dock, and if a smart bike system is chosen, it could be larger than originally planned. A local match of \$300,000 would be required. This local match could come from city, sponsorship or private funding. Sources of potential grant funding opportunities include CMAQ, CDC, MAP-21 (which was extended to September 2015), Transit Oriented Development (TOD) grants and region-wide economic development programs.

Federal and state grants would again be sought to fund expansion of the system into Phases 2, 3, and 4, a \$2.9 million commitment requiring a \$700,000 local match.

Capital funding should also be opportunistic. There may be smaller, more nimble health or social equity focused grants that become available and could be used to fund stations, particularly where there are no obvious funding partners. Examples may be the Governor Andrew M. Cuomo's Upstate Revitalization Fund, or the Bloomberg Innovation Grant recently awarded to Rochester to reduce poverty in certain areas by 1%. Similarly, as development or redevelopment occurs, providing a bike share station should become a part of a developer's transportation demand management options. This option may require policy changes or incentives to encourage this activity.

Operations Funding

Funding sources for operations are more limited primarily because federal funding can typically be allocated to capital projects and not ongoing operations and maintenance. Fundraising for operations should consider all available sources including private, philanthropic, sponsorship, and public funding:

- Sponsorship will be an important source of operating funds. Realistically, based on rates obtained in other cities, sponsorship could be expected to generate up to \$600 to \$1,000 per bike per year for title or presenting sponsorship. When seeking title or presenting sponsorship, the value should be determined upon an expanded system, not just the Phase 1 system. Exact valuation should be determined at the time of sponsorship acquisition, potentially by a marketing and media company familiar with the Rochester market. Valuation could range from \$150,000 per year for just a Phase 1 system to \$1,000,000 per year for the full 1,000-bike system.
- Some stations could be funded through direct contributions from private foundations, large employers, business districts, large campuses (e.g., MCC, RIT or U of R), developers and interested businesses. Likely, these deals will need to be incentivized with group or discounted membership for students and employees of these organizations, or providing sponsorship presence on the stations and bikes that they have purchased.
- Private partners could be sought, such as large employers, business districts, large campuses, developers and interested businesses to take part in group or discounted memberships and sponsorship opportunities. Such sponsorship could bring in \$10,000 per station per year. Assuming the low end of the rate (\$5,000 per station per year) and a 50% uptake rate, station sponsorship could generate \$125,000 per year on the Phase 1 system.
- Local public funding through the City or other sources may also be required to fill any operational funding gap.
















Other Strategies

There are several ways to reduce the funding commitment. Capital costs can be reduced through consideration of different vendors and different technologies. It has been found to date that capital funding is easier to identify than operational funding. Most impactful, operating costs can be reduced as shown by very low operating costs implemented by Nice Ride Minnesota and some select nonprofit systems. The operating costs shown in the business model can be reduced if a nonprofit model is chosen. The privately operated system can provide quicker implementation and a high service level through the contracting process. However, this type of operation can be more expensive because a company has some amount of profit margin and cannot claim in-kind services as can be claimed by a nonprofit.

Should a nonprofit operating model be chosen, some strategies to reduce operating costs include garnering in-kind support (donated vehicles, legal, accounting and human resources [HR] services), providing discounted or free operating space, and other strategies that have been employed in other cities. Most importantly, in a small operation, employees should be multi-faceted to operate the most efficient system. For example, a marketing manager can also manage customer service. Such flexibility will allow the operation to have a smaller headcount and lower the personnel costs, which are about two-thirds of the operating costs.

Figure 31. Sponsorship Examples

Source: CitiBike, Nice Ride Minnesota, San Antonio B-Cycle, Denver Bike Sharing.

	Station	Bike	Bike Detail	Website / App	Membership Key
<p>Title Sponsor</p> <p>Example: New York City</p>					
<p>Presenting Sponsor</p> <p>Example: Minneapolis</p>					
<p>Individual Sponsorship</p> <p>Examples: Denver Madison Miami Beach San Antonio</p>					

14 Implementation Considerations

Although there are many items requiring consideration, this section focuses on two key items that have arisen as important considerations over the course of the study.

14.1 Smart Dock versus Smart Bike

As discussed earlier in the report, there are two predominant types of technology on the market as of the writing of this report. Section 2 of the Feasibility Study highlights how each works. Because only Buffalo (and Phoenix) have implemented smart bike systems in an urban setting as of the writing of this report, this decision is especially pertinent to the Rochester area. To date, there are no systems that are hybrid smart dock and smart bike implemented in the U.S., and few, if any, globally. Table 21 outlines some of the advantages and disadvantages for each type of technology in both an urban and university setting.

Table 21. Comparison of Smart Dock and Smart Bike Technologies

	Smart Dock	Smart Bike
Capital Purchase Price	- Still significantly less than other transit options, but more expensive than smart bike.	+ Significantly less expensive than smart dock because no technology is needed on the docking points. Exact pricing depends on how many kiosks and custom bike racks are included.
Understanding of Costs and Operation of System	+ Over 40 systems around the U.S. with well-understood operations and related costs.	- Very few systems in the U.S. with unknown operational costs and issues.
Utility in an Urban Setting	+ / - With large and visible stations, more likely to garner attention from passers-by, be considered part of the permanent transportation infrastructure, have a higher sponsorship valuation and obtain more walk-up visitors because of the easy-use kiosk. Overall these stations likely will attract more revenue to the system. However, this advantage is balanced by a higher capital upfront capital cost.	+ / - Because the docks are “dumb”, they can be separated or non-existent. Therefore, site planning for a smart bike system is much easier. The ability to lock outside a station can potentially lower rebalancing costs. However, these costs savings may be balanced by unforeseen operational costs that may arise, such as “chasing” bikes parked in odd places, like trees, basements; replacing batteries on bikes parked in the shade and other issues.
Utility on College Campus	+ / - Students, faculty and staff know where to go to find a bicycle, and a station is seen as part of the transportation system. However, with higher costs, the limited number of stations will be implemented, making a less dispersed coverage of bicycles.	+ / - The system can “geofence” a station over an area, such that students, faculty and staff can park and find bikes just in front of the building that they need, and not be confined to a single point station. However, bike share bikes may be parked at existing crowded campus bike racks, or personal bikes may be parked at bike share-specific racks, crowding and diluting the system.

In the procurement process, the system owner should create an open set of technical requirements to allow for responses from both smart bike and smart dock vendors. Some technical specifications for the equipment should be left open to be inclusive of multiple types of equipment, including:

- Ensure that the language about the docking point is general – i.e., it does not require that the dock do the locking (which would eliminate smart bike possibilities) or has a means to indicate whether a bike is unavailable. Many current procurement documents require that the dock hold an RFID device, locks a bicycle or accepts membership cards.
- Ensure that the language about the “station” is inclusive of both a smart dock station and a virtual station with no kiosk and only bike racks. Many procurement documents currently specify that the station must communicate to a central server. Many smart bike systems use only a cloud-based app and a personal identification number (PIN).
- Ensure that there is no requirement for membership cards. Many smart bike systems only use PINs.

14.2 Social and Geographic Equity

The stakeholder and public process strongly emphasized that a bike share system in the Rochester area should be designed to serve a large cross-section of the population and neighborhoods outside the Center City core. The system map reflects this goal.

Although the demographic of most bike share systems to date is majority Caucasian middle- to upper-middle class, bike share represents a great opportunity for an affordable transportation option for lower income and minority communities which historically have been marked by low automobile ownership rates and high transit dependency. While bike share systems have typically launched in high demand and revenue generating areas of existing cities, geographic and social equity have become important considerations. The following section identifies strategies for achieving social and geographic equity of a bike share program in the Rochester area.

14.2.1 Barriers to Success in Bike Share in Low Income Communities

The uptake of bike share in both minority and low-income communities has not been significant to date. Bike share programs continue to face challenges reaching these populations, despite a number of innovative approaches, including:

- **Location and surrounding bicycle friendly infrastructure:** In most systems, bike share stations have been located in high demand and revenue generating locations such as downtown and in more affluent neighborhoods. Low income neighborhoods, typically located on the outskirts of the system, have only experienced the installation of very few and sparsely situated stations. The stations tend to be located far away from other stations and in areas that do not include good bike infrastructure. Therefore, potential trips from these stations do not have convenient origins or destinations and the trip is not necessarily a pleasant one. It will be important for Rochester to strongly consider how the planning of the system will affect the location and density of stations in low income and minority communities.
- **Digital Divide:** To date, much of the marketing for bike share programs is done online due to limited marketing budgets. This limitation represents a challenge for the jurisdictions who find it difficult to reach communities that are not regularly online.
- **System access and verification:** Third generation bike share is possible because of the accountability created by the credit card system. Most systems require some credit card verification on file for overage fees and potential bike loss. However, many people in lower-income communities do not possess credit cards (29 percent per an April 2014 Gallup poll). Potential strategies for access depend on the technology chosen, as well as local partner organizations' willingness to take on financial risk. This is discussed in more detail below.
- **Cultural issues:** Bike share is becoming the mark for sustainable, technology-inspired cities, and is now familiar to well-traveled middle- to upper-class communities. There continue to be many communities within bike share cities that have not yet adopted bicycling as part of their everyday lives, do not know what bike share is, or do not understand it. In many low-income communities, cars are seen as a sign of success, and bicycles may be viewed as signs of poverty. Education and outreach campaigns should be considered to help overcome this obstacle.
- **Cost barrier to entry and communication:** Most bike share systems have an annual one-time fee paid at the beginning of the year. Although it is an extremely affordable way to get around the city, the one-time fee can represent the largest barrier to using the system for a low-income person. Rochester should focus on offering alternative payment plans such as a monthly option.
- **Financial sustainability and incentives:** The financial incentives for the city and operator have traditionally not been focused on reaching out to low-income or minority communities. Because they typically must launch quickly for political reasons and have access only to low budgets or must be financially self-sustaining, they tend to focus their outreach resources on early-adopter, downtown and tourist markets which must generate enough revenue to cover the costs of implementation and operation. Outreach programs to low-income and minority communities have typically been high demand and high resource consuming programs which can take a big toll in the total marketing expenditures. Rochester should consider how the proper alignment of equity goals with the incentives offered to a potential operator can help with the marketing and promotion of the system throughout these communities.⁸⁸

⁸⁸ Note that in 2014, the City of Philadelphia, National Association of City Transportation Officials, and People for Bikes were awarded a \$5.9 million philanthropic grant to focus on social equity in bike share, which was the first significant expenditure on this topic. Uses of funds include station locations, marketing and outreach, a program that allows for access for people without credit cards, research and national matching grants.

14.2.2 Examples from Other Cities

To date, several cities have implemented equity strategies, including:

- *Discounted memberships:* Many cities offer some sort of discount for low income populations. They may be subsidized (in Boston, by the Centers for Disease Control, and as low as \$5), or not subsidized. Residents of the New York City Housing Authority and various Community Development Credit Unions receive approximately 30% off, or \$65 memberships.
- *Station locations:* Many cities have located stations in low income neighborhoods. Typically, these stations have not seen impressive ridership due to a lack of nearby stations, lack of bicycle infrastructure, lack of targeted marketing and other unknown reasons.
- *Access for residents without credit cards:* Credit cards (or debit cards with a credit card symbol) are required by bike share systems to become members and check out a bicycle. These cards create the fundamental accountability that makes bike share possible. Although many systems have discussed possible programs, only Capital Bikeshare to date has implemented a program to address this issue. The Bank on DC / Capital Bikeshare partnership gets unbanked people into the banking system, and then offers them a credit / debit card and a discounted bike share membership.
- *Bike loan program:* Nice Ride Minnesota has identified that automated bike share may not be the solution for all communities. They have implemented an “orange bike” bike loan program, with the goal to get people riding.
- *Jobs program:* Divvy in Chicago has implemented a unique employment program for lower income individuals. Because bike share is a seasonal business, there is often a need for only part-year employees. Divvy has partnered with The Gap. People in the jobs program can work for the bike share program for the good weather months, and then work with The Gap during the holiday season to provide for full time employment. Other programs have jobs programs for people coming out of prison.
- *Outreach:* Philadelphia has implemented a site-focused outreach program for station locations prior to system implementation. This outreach includes door-to-door outreach to ensure input from all members of the community, not just in the highly populated Center City.
- *Health Solution:* Boston Hubway’s Prescribe-a-Bike program allows physicians to give subsidized memberships as health solution.

14.2.3 Recommendations for Rochester

To achieve the goal of equity for the Rochester area, some existing strategies should be employed, and some new ones implemented. The overall goal is to create an inclusive system that incurs a feeling of ownership in all communities in which it is located.

- **Station locations** – the recommended system map includes weighting of census tracts with high proportions of low-income and non-English speaking populations. The proposed phasing plan includes approximately 70 percent of Phase 1 stations in these areas and approximately 50 percent of Phase 1-4 stations in these areas.

- **Discounted memberships** – Rochester should work with the system operator to offer a certain number of discounted memberships for the system. It should be noted, though, that too many low-priced memberships can be detrimental to the financial sustainability of a system, as there will not be enough revenue to support operations. Therefore, it may be reasonable to consider subsidizing such memberships for a robust program.
- **Credit card access** – the issue of credit card access is limited or enabled by the background technology. For example, some bike share systems technically require a credit card to create an account. Others require it by policy only. Rochester must work with the equipment provider to understand whether an account can be created in the system without a credit card. If this is possible, then partner organizations and a small amount of funding can be set up to allow access to people without credit cards with proper identification verification and escrow funding for financial accountability.
- **Marketing and outreach** – although many systems have made some efforts towards creating an equitable system, few have earmarked specific funding for significant marketing and outreach to low income communities. Non-digital marketing can be more expensive than the typical online approach using websites, earned media and social media. A key aspect of successful marketing and outreach is budget dedicated funding for this effort. In addition, two other important characteristics are as follows:
 - **Local champions:** It will be important to the success of the outreach strategy to identify individuals within targeted communities to adopt bike share and spread the word in the specific communication means in their communities. These folks could be political figures, community organizers, or even committed individuals with a proven means to influence their local communities. They can also advise the operator on the best messaging and means to communicate to their communities.
 - **Community organizations:** Rochester already has some strong community-based organizations, such as R Community Bikes and Conkey Cruisers. The bike share program should work closely with these organizations to maximize outreach, membership, ridership and impact in all communities. It is possible that bike share is not the solution for all neighborhoods, and these organizations can help tailor solutions for greater cycling uptake for each applicable neighborhood.⁸⁹
- **Jobs** - A jobs program can be included as part of the bike share system, to include people from all communities at all levels of the organization. One or two strong jobs partners for the bike share program should be identified.

14.3 Station Locations

Stations should generally be placed in safe, convenient, and visible locations. Station locations may include the public right-of-way in the street, on sidewalks, or in parks and other public lands. They can

⁸⁹ Nice Ride Minnesota has worked on equity in bike share over many years since its inception in 2010. In 2014, it started a program with orange bikes where it distributed free bikes for a longer period of time to members of low income communities. This program arose because their experience and surveys showed that the solution to increasing cycling in this community was not access to high-cost bike share station, but just increasing access to bicycles for a long period of time.

also be located on university or other private property through the use of a License Agreement or easement acquisition with the property owner. In all instances stations should be available at all times to the public and to the operator for the purposes of maintenance and bicycle redistribution.

Some stations use wireless and solar technologies, while others have found significant success and costs savings in using A/C powered stations. After site preparation, both types of stations take less than two hours to install. For the solar stations in particular, stations can be easily moved for street construction, utility work or relocated for more optimum performance if desired.

14.4 Implementation Timeline

Following is a potential implementation timeline for a bike share system for Rochester, showing a total timeline to launch for Phase 1 of approximately 18 months:

Table 22. Potential Implementation Timeline

Critical Path Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Decision on governance structure and funding plan	█	█	█															
Identify funds for system installation, equipment and operations	█	█	█	█	█	█	█	█										
Develop procurement documents	█	█	█	█	█													
Issue Request for Proposals for equipment and/or operations				█	█	█	█	█										
Award and sign contract for equipment and/or operations								█	█	█	█							
Site planning and community outreach											█	█	█	█				
System manufacture, preparation for operations, installation and launch												█	█	█	█	█	█	█

The most difficult and unpredictable step of this process is identifying and securing the funds for capital and operations. Whether this process is undertaken in series or parallel with the procurement process will be at the discretion of the organization that owns the system.

15 Bibliography

- About Hubway, History, 2014. <https://www.thehubway.com/about>
- American Road & Transportation Builders Association. Accessed online at: <http://www.artba.org/faqs/#20> on December 12, 2013.
- Atlanta Bicycle Coalition (2013). Atlanta – Decatur Bike Share Feasibility Study. Accessed online at: http://issuu.com/atlantabike/docs/atl-dec_bikeshare_book_lowres# on January 2, 2014.
- Beck, L. et al. Motor Vehicle Crash Injury Rates by Mode of Travel, United States. Published in the American Journal of Epidemiology. 2007.
- Bike Europe. Strong Shifts in 2007 French Market. Accessed online at <http://www.bike-eu.com/Home/General/2008/4/Strong-Shifts-in-2007-French-Market-BIK002778W/> on December 3, 2013.
- British Medical Association. Cycling Towards Health and Safety. Oxford University Press. 1992.
- Center for Disease Control. Bringing Bike Share to a Low-Income Community: Lessons Learned Through Community Engagement, Minneapolis, Minnesota, 2011. http://www.cdc.gov/pcd/issues/2013/12_0274.htm.
- City of Boston Press Release: Mayor Menino Signs First-Ever Bike Share Contract Launching Hubway in Boston, 2011. <http://www.cityofboston.gov/news/default.aspx?id=5075>
- Comprehensive Annual Financial Report. Rochester, NY. 2013. Retrieved from www.cityofrochester.gov.
- Consumer Reports. www.consumerreports.org accessed on December 12, 2013.
- Denver B-cycle 2010 Annual Report. https://denver.bcycle.com/default.aspxAnnualReports/DBS_2010_Annual_Report.pdf
- Federal Highway Administration, Highway Statistics 2011: Urbanized Areas – 2010 Miles and Daily Vehicle – Miles Traveled. Accessed online at <http://www.fhwa.dot.gov/policyinformation/statistics/2011/hm71.cfm> on December 27, 2013.
- Federal Highway Administration. Bike Sharing in the United States: State of the Practice and Guide to Implementation. September 2012.
- Federal Transit Administration’s Frequently Asked Questions and Answers Concerning Bike Sharing Relative to the United States Department of Transportation. Accessed online at http://www.fta.dot.gov/documents/Informal_Q_and_As_Final_6-14-12.pdf on December 26, 2013.
- Fischer, C.M. et al. Prevalence of Bicycle Helmet Use by Users of Public Bikeshare Programs. Published in the Annals of Emergency Medicine, Vol. 60, Issue 2, pp. 228-231. 2012.

Freeman, Nicole. Presentation: The Hubway Influence on New Riders, 2013. Accessed online at: <http://baystateroads.eot.state.ma.us/movingtogether/docs/Freedman-Moving%20Together%202013.ppt.pdf>.

Greater Boston Convention and Visitors Bureau. Statistics & Reports. 2012. Jan. 2014 www.bostonusa.com/partner/press/statistics/.

Greater Rochester, NY Region's Top Private-Sector Employers, 2013. Greater Rochester Enterprise. Retrieved from <http://www.rochesterbiz.com/Portals/0/PortalFiles/Documents/PrivateSectorEmployers2013.pdf> on June 4, 2014.

Hubway Corporate / University Accounts, accessed online at <http://www.thehubway.com/corporate> on December 27, 2013.

Hubway Subsidized Membership Flyer. <http://www.thehubway.com/assets/pdf/flyers/pbhc-subsidized-membership-flyer.pdf>

"Inclusivity is a big hurdle for bike share programs," May 7, 2013. <http://axisphilly.org/article/the-big-hurdle-for-bike-share-programs-inclusivity/>

Jacobsen, P.L. Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling. *Injury Prevention* 2003; 9:205-209. 2003.

Johnston, S. Presentation to Vancouver City Council: City of Vancouver Public Bike Share System, July 2013. Accessed online at: <http://vancouver.ca/files/cov/public-bike-share-staff-presentation-to-council-07232013.pdf> on January 2, 2014.

LDA Consulting. Capital Bikeshare 2011 Member Survey Report. 2012. Accessed online at <http://capitalbikeshare.com/assets/pdf/Capital%20Bikeshare-SurveyReport-Final.pdf> on December 3, 2013.

---. 2013 Capital Bikeshare Member Survey Report. 2013. Accessed online at <http://capitalbikeshare.com/assets/pdf/CABI-2013SurveyReport.pdf> on December 13, 2013.

Lindström, J. et al. The Finnish Diabetes Prevention Study: Lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care*, December 2002, vol. 26 no. 12 3230-3236. Accessed online at <http://care.diabetesjournals.org/content/26/12/3230.full> on December 13, 2013.

Long Range Transportation Plan for the Genesee-Finger Lakes Region. [http://www.gtcmppo.org/Docs/LRTP/2035/Chapter%203%20\(The%20Region\).pdf](http://www.gtcmppo.org/Docs/LRTP/2035/Chapter%203%20(The%20Region).pdf)

Meet Minneapolis. http://www.minneapolis.org/sites/default/files/u7/pdfs/MediaKit_Meet.pdf.

National League of Cities. Integrating Bike Share Programs into a Sustainable Transportation System. 2011.

Nelson, David M. and David Leyzerovsky. The Social Life of CitiBike Stations. Project for Public Spaces. <http://www.pps.org/blog/the-social-life-of-citibike/>. December 3, 2013.

New York City (2009). Bike Share Opportunities in New York City. Accessed online at: http://www.nyc.gov/html/dcp/pdf/transportation/bike_share_complete.pdf on January 2, 2014.

New York City Department of Transportation Press Release. After First 200 Days of Citi Bike, NYC DOT Releases New Data Showing that Significant Number of New Yorkers are Biking, Complementing Transit System. December 12, 2013.

New York State Health Department; Obesity Statistics for Monroe County, accessed online at <https://www.health.ny.gov/statistics/prevention/obesity/county/monroe.htm> on July 14, 2014.

Nice Ride Minnesota Annual Report 2011. Accessed online at: https://www.niceridemn.org/_asset/9n2z8n/

---. Presentation about Nice Ride Minnesota. October 2011.

O'Brien Bikeshare Map. <http://bikes.oobrien.com/global.php>

Parkin, J., Ryley, T. J., & Jones, T. J. Barriers to Cycling: An Exploration of Quantitative Analysis. In D. Horton, P. Rosen, & P. Cox (Eds.), *Cycling and Society* (pp. 67-82). Burlington, Vermont: Ashgate Publishing Company. 2007.

Report, "Bike Chattanooga – First Year of Operations," July 2013.

Rojas-Rueda, D. et. al. The Health Risks and Benefits of Cycling in Urban Environments Compared with Car Use: Health Impact Assessment Study. *British Medical Journal* 2011; 343:d4521. 2011. Accessed online at: <http://www.bmj.com/content/343/bmj.d4521> on January 2, 2014.

Schoner, J.E., Harrison, A. and Wang, X. Sharing to Grow: Economic Activity Associated with Nice Ride Bike Share Stations. Humphrey School of Public Affairs, University of Minnesota. 2012.

Sponsor's Perspective. 2013. Accessed online at www.bikeshare.com on December 12, 2013.

The League of American Bicyclists. Where We Ride: Analysis of bicycling in American Cities. Annual American Community Survey Data Report for 2012. 2013.

The Tower at Midtown. www.thetoweratmidtown.com.

U.S. Census Bureau. Modes Less Traveled. 2014

U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2010.

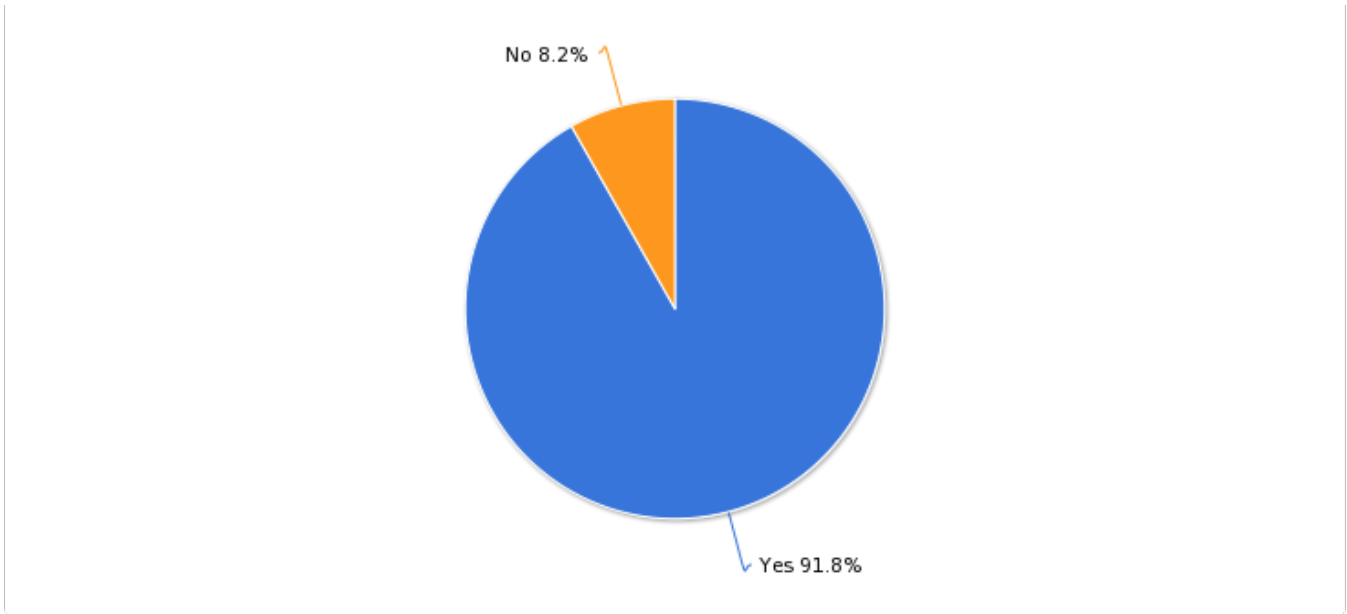
Utah Policy. Live, Work, Play, Bike. <http://utahpolicy.com/index.php/features/featured-articles/2344-live-work-play-bike>. July 2014.

Wikipedia: The Free Encyclopedia. Wikimedia Foundation, Inc. January, 2014.

Appendix A – Online Questionnaire and Complete Survey Results

The following is a summary of input received through the online survey that was linked to the ROC Bike Share Feasibility Study website www.rocbikeshare.org. The survey was open for general comment from April 3 through June 13, 2014.

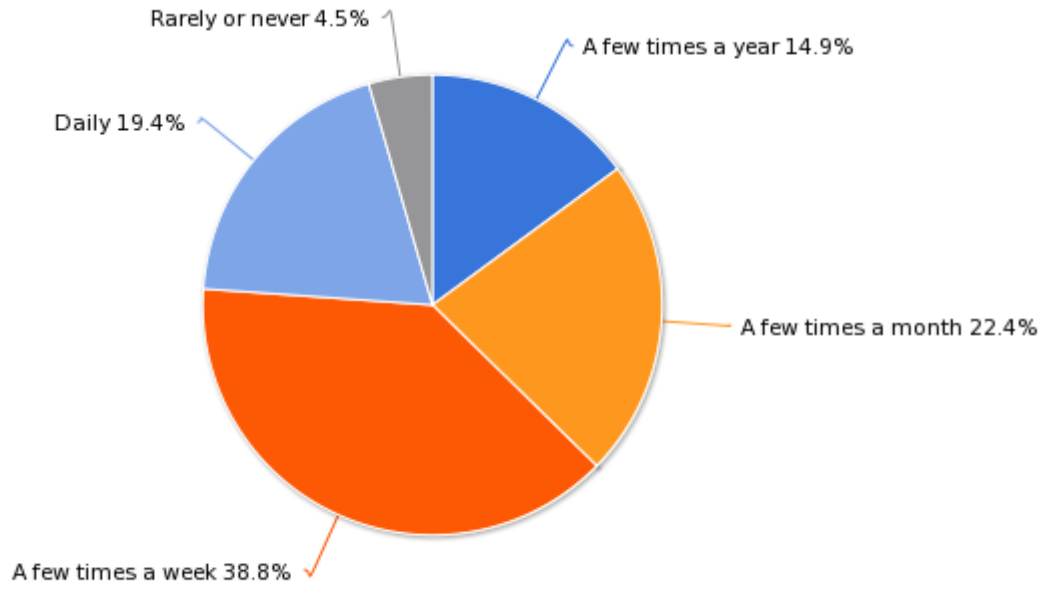
1. Do you currently have access to a working bicycle?



Value	Count	Percent
Yes	67	91.8%
No	6	8.2%

Statistics	
Total Responses	73

2. How often do you ride a bicycle?

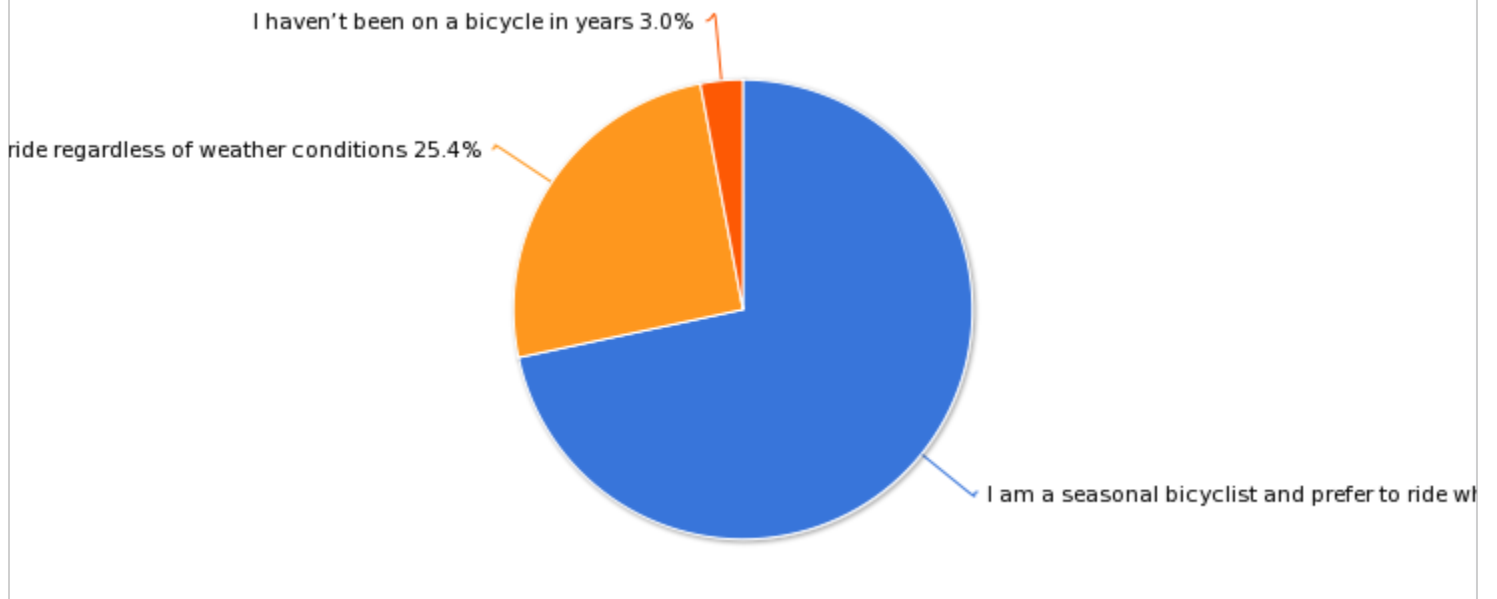


Value	Count	Percent
A few times a year	10	14.9%
A few times a month	15	22.4%
A few times a week	26	38.8%
Daily	13	19.4%
Rarely or never	3	4.5%

Statistics

Total Responses 67

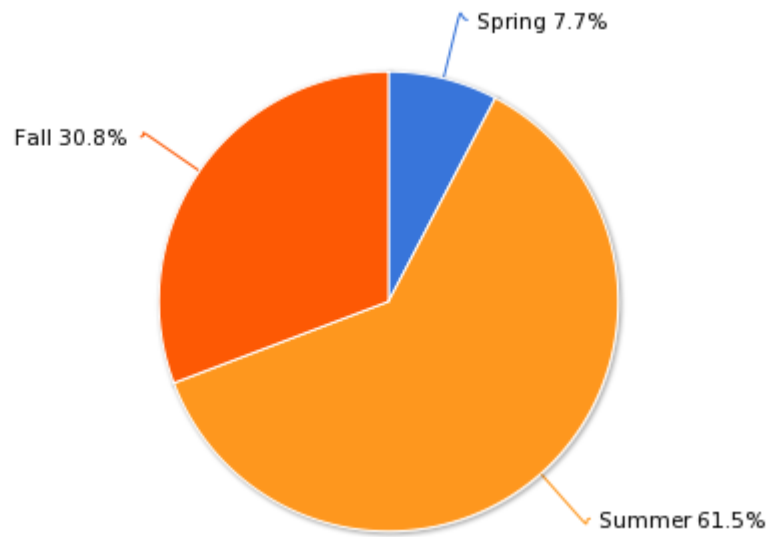
3. Which of the following best characterizes your bicycling behavior?



Value	Count	Percent
I am a seasonal bicyclist and prefer to ride when the weather is nice	48	71.6%
I am a year-round bicyclist and ride regardless of weather conditions	17	25.4%
I haven't been on a bicycle in years	2	3.0%

Statistics	
Total Responses	67

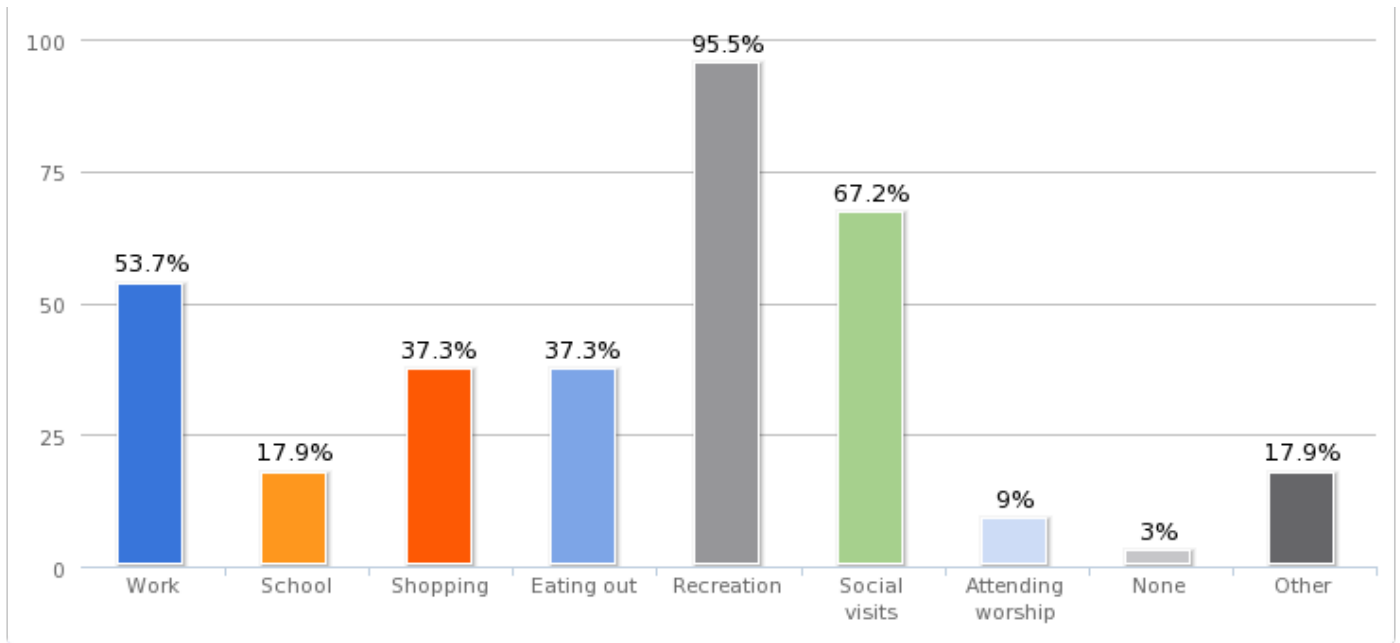
4. What time of the year do you ride the most?



Value	Count	Percent
Spring	1	7.7%
Summer	8	61.5%
Fall	4	30.8%
Winter	0	0.0%

Statistics	
Total Responses	13

5. What types of trips do you currently use a bicycle for?

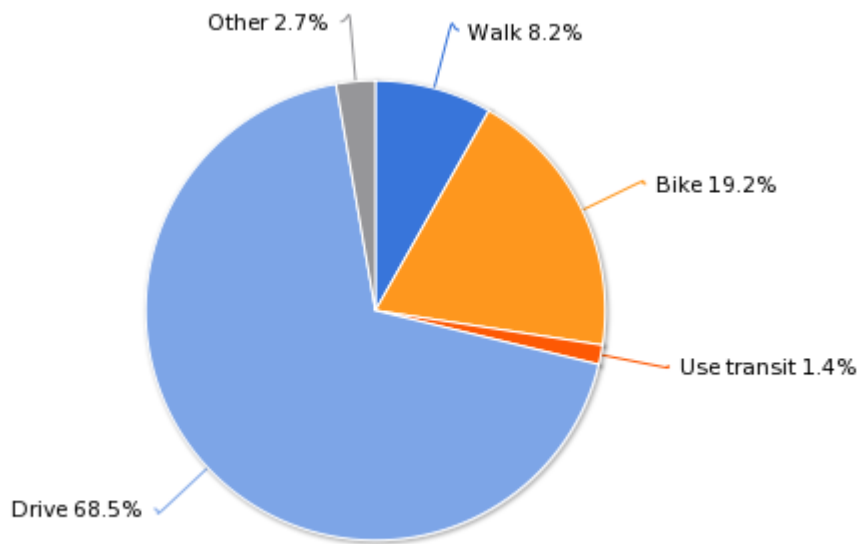


Value	Count	Percent
Work	36	53.7%
School	12	17.9%
Shopping	25	37.3%
Eating out	25	37.3%
Recreation	64	95.5%
Social visits	45	67.2%
Attending worship	6	9.0%
None	2	3.0%
Other	12	17.9%

Statistics	
Total Responses	67



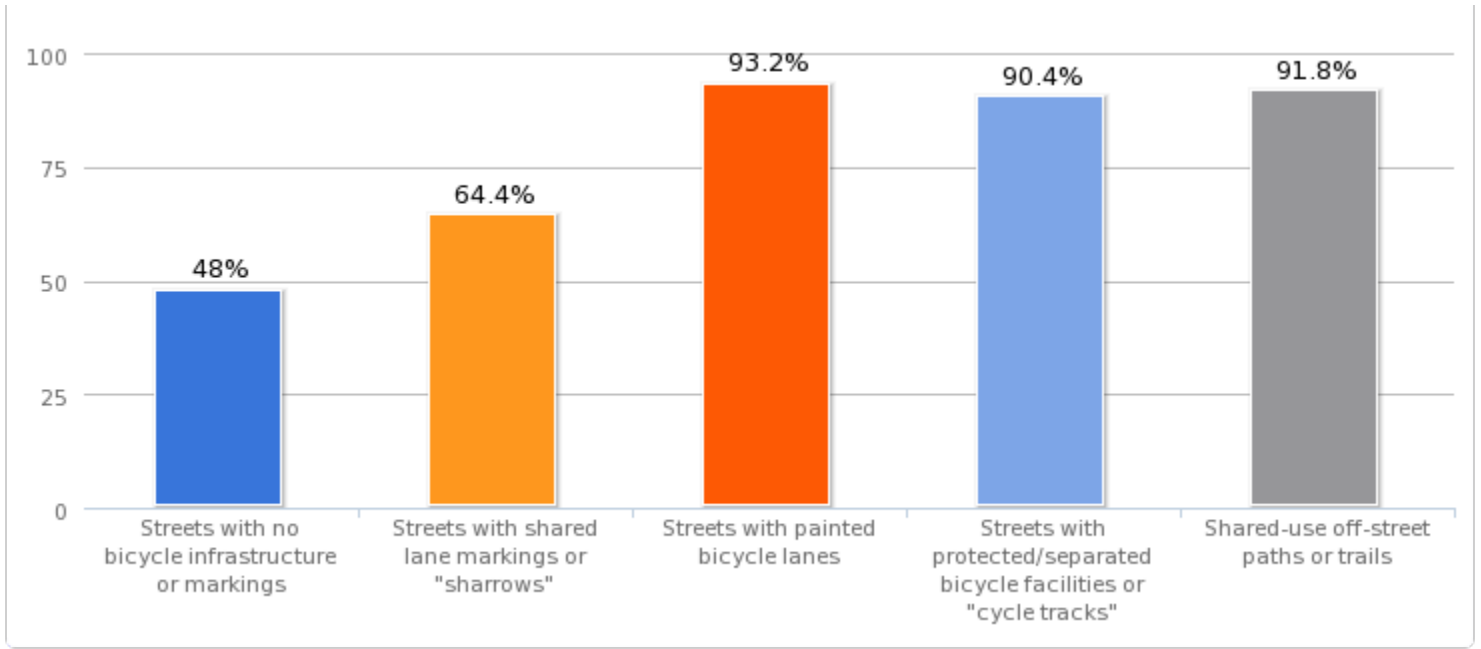
6. What is your primary mode of transportation for daily travel?



Value	Count	Percent
Walk	6	8.2%
Bike	14	19.2%
Use transit	1	1.4%
Drive	50	68.5%
Taxi	0	0.0%
Other	2	2.7%

Statistics	
Total Responses	73

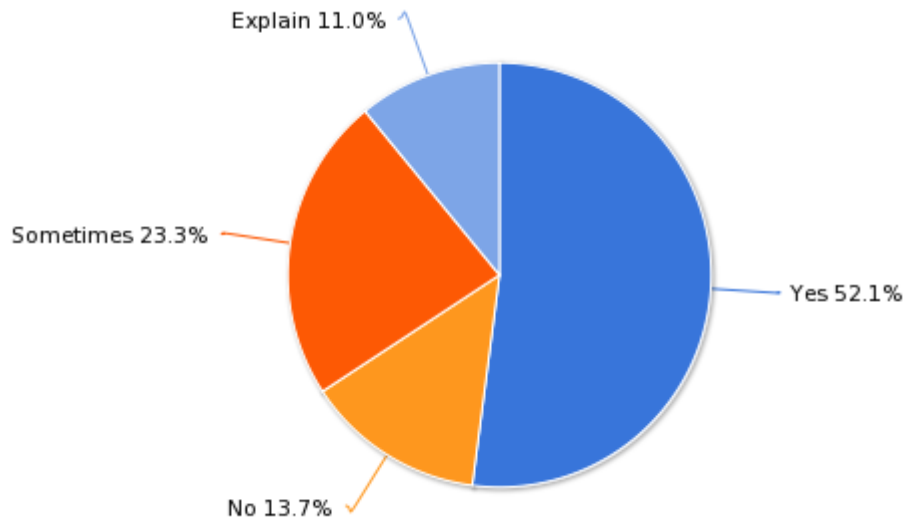
7. Which of these bicycle facilities would you feel comfortable riding a bicycle on?



Value	Count	Percent
Streets with no bicycle infrastructure or markings	35	48.0%
Streets with shared lane markings or "sharrows"	47	64.4%
Streets with painted bicycle lanes	68	93.2%
Streets with protected/separated bicycle facilities or "cycle tracks"	66	90.4%
Shared-use off-street paths or trails	67	91.8%

Statistics	
Total Responses	73

8. Will the existing bicycle infrastructure near a bike share station affect how much you ride/use bike share?



Value	Count	Percent
Yes	38	52.1%
No	10	13.7%
Sometimes	17	23.3%
Explain	8	11.0%

Statistics	
Total Responses	73

9. Have you had an opportunity to use an existing bike share system before?



Value	Count	Percent
Yes	37	50.7%
No	36	49.3%

Statistics		
Total Responses		73

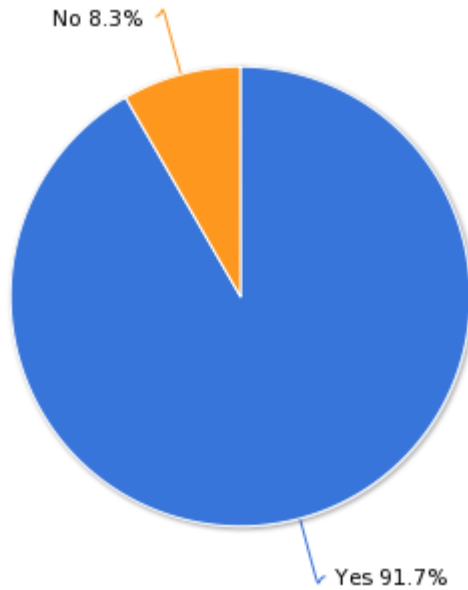
10. Where?

Count	Response
3	Boston
1	Chicago
1	Copenhagen
1	DC, New York
1	Denver
1	Lyon, France
1	Madison Wi
1	Minneapolis.
1	Modena, Italy
2	Montreal
1	Montreal, Boston, Redwood City
1	NYC

Count**Response**

1	NYC, Montreal, Arizona State U
1	Nashville, TN
1	Nashville, Tn
1	New York City
1	New York City, Toronto
1	New York, Madison
1	Paris
1	Paris, New York
1	RIT
1	Test
1	Toronto
1	University at Buffalo
1	Washington D.C.
1	Washington DC
1	Washington DC, Portland, OR
1	Washington, DC
1	chicago
1	new york city
1	paris
1	vacation in other cities & countries
1	washington dc
1	washington dc, amsterdam, berlin

11. Do you think bike share is a good idea for the Greater Rochester Area?



Value	Count
	66
	6

Statistics	
Total Responses	72

12. Please tell us why you think bike share is a good idea for the Greater Rochester Area.

Count	Response
1	Bicycles need to be used more as a means of transportation rather than just recreation
1	Encourage more bike use. Lower carbon use. Provide ease of transport.
1	Environmental benefits, personal/physical benefits
1	Forward thinking population. Green City.
1	Good for everyone involved;good for the environment;practical
1	Healthier, better for the environment, easier for transportation
1	It will reduce auto traffic, lessen emissions, provide easy physical activity
1	Promotes non-automobile traffic and discourages automobile-dependent business and recreation.
1	Provide on demand short distance, 3-6 miles, transportation at low cost.
1	Reduce car traffic, increase exercise, promote sustainability
1	Sometimes I want to go somewhere close without the car but it's a little too far to walk.

Count**Response**

- 1 Take cars off of the road, especially downtown.
- 1 The more bicycle infrastructure we have, the more likely we are to utilize it.
- 1 We need more bikes and less cars on our streets.
- 1 lots of people do not have cars
- 1 people should be able to enjoy rochester on a bike.
- 1 Cycling promotes good health, reduces pollution, and leads to getting more folks out and about. Shops will also benefit - coffee, lunch, dinner, pubs
- 1 New transportation option for residents and visitors, tourism enhancement, economic development - especially for the downtown area.
- 1 Continue the growth of bike use in the area. Reduce/control traffic. Provide revenue to improve bike infrastructure.
- 1 It would be nice to get between some of the pedestrian-friendly areas of the city without needing to get in the car and find parking.
- 1 It will continue Rochester's growth as a sustainable community, give more transportation options to people in low-income areas, and in car-centric suburban areas as well.
- 1 There are a lot of initiatives to improve the roadways for bikes and making it safer for cyclists but people are not currently in the habit of using bikes. I think a bikeshare program makes bikes are more frequently used option, especially if the kiosks are between often used destinations. It would get more bikes on the road and make drivers more aware of cyclists.
- 1 Encouraging active transportation. Facilitating habitual physical activity incorporated into one's daily routine without it seeming like "exercise".
- 1 Because Downtown Rochester is undergoing growth and development - it needs to be easily commutable -successful cities have bike shares. Rochester needs to be accessible, inviting, and fun!
- 1 To help people get from the bus stop to their destination. For people who aren't sure they want to (or can't) invest in or care for a bike. To use for errands & meetings during the work day w/o getting the car. To attract young people to live here.
- 1 With the bike share in D.C. having a car was not a problem. I could take the subway to a general location. Then i could take a bus to get to a specific street. And then I could use the bike share system to get closer to my destination and there were stations everywhere. Rochester could greatly benefit from this in the same manner in that students, tourist, and people in general can get to more places with bike share stations along with the public transportation that is already available. It is an easy and sometimes quicker way to get around a city than a bus.
- 1 Our region could be more "bikeable" than it currently is. One barrier to bikeability is access to bikes, at all income levels. This program would solve that challenge.
- 1 Providing more opportunities for cycling creates more cyclists, which improves safety for other cyclists. A positive feedback loop then draws yet more cyclists. As drivers give up their car, parking demand goes down, yielding more land for development. Rochester becomes a more beautiful and accessible city.
- 1 It's a great way to explore the community. On foot, exploring takes longer. You can use many of the same foot paths with bikes.
- 1 Foster connectivity, especially for college students and young professionals. Will make Rochester more attractive destination for young talent.
- 1 Provide access to bikes for those who do not own them. Great for visiting friends/family. Encourages people to try biking.
- 1 I would use it to get to work instead of driving if locations were within a couple of blocks of my house and office. Parking downtown is enough of a pain to make it worth it.
- 1 Bike Share will offer a healthy and affordable mode of transportation, while adding value to our city.
- 1 More bikers means more customers for local businesses, and more transportation for poorer residents.
- 1 It would increase access to various modes of transportation for city residents, especially those without access to vehicles. This would make it easier for residents to get to areas of the city not served by bus routes.

Count**Response**

- 1 It is a very convenient option for out-of-town guests when I don't have a spare bicycle to loan them.
- 1 (1) It would offer an alternative transportation method for those visiting the area, to see Roc's great sights, and get around town; (2) it would provide Roc citizens who do not currently own a bike the opportunity to access a mode of transport to the market, grocery stores, doc. appts; (3) it would display Roc's commitment to active transportation, and perhaps, help to change our current culture's reliance and prioritizing of the car over other modes of transport.
- 1 It will promote a more bike-friendly and walkable Rochester. It will also encourage people to use mass transit, since they could hop off the bus and grab a bike at various locations.
- 1 provide an affordable, alternative transportation source; promote healthy lifestyles; result in more bike friendly lanes and bike commuters.
- 1 A bike share program in Rochester should provide reliable and convenient transportation to people of all income levels. The best model for this is a "bike library" type system. Avoid credit card requirements, expensive bikes and racks, and high use fees for success.
- 1 The city proper isn't so big, so it's really convenient to get from place to place on a bicycle. If a bike share program were coupled with more aggressive bike infrastructure implementation, I could imagine people using it widely for school, work, and biking our awesome river trails.
Bike share is a great alternative to unreliable public transportation, and saves you from worrying about a stolen bicycle.
- 1 Many fellow students have told me they want to bike but theirs is broken, or need help buying one or similar, and I think this would help draw that demographic off campus and to regional businesses more, and increase quality of the city as a whole -- we certainly need something to boost the local economy and start reviving the city...
- 1 It will make transportation easier and allow people to bike within the city and to Downtown. I live in the city only a few miles from Downtown. I think anything that helps people get Downtown and around town will help revitalize the city and bring people back to it. I would much rather bike Downtown than drive my car, if I could safely and easily.
- 1 It eliminates social stratification between those who can and cannot afford cars. It is a good way to get the community active and there are many existing paths that would be easy to utilize.
- 1 Gives folks a healthy, environmentally friendly option for making short trips...and most trips in this area are pretty short
- 1 Rochester is very easy to bike. It is not too hilly. I would prefer a bike share over my own bike because I then don't have to think of out and back trips, parking, and potential theft.
- 1 Downtown is too big and too sparsely developed (at this point) to walk effectively from place to place (whether from a work or meeting site to a lunch spot or from a dinner/bar to a theater or film or music event). Bike share could be a great way to open this up. Could also help folks who work just outside downtown (like me) access downtown meetings easily and healthfully. Could be a GREAT way to open up our downtown, neighborhoods, and trails/parks to tourists and visitors in the region (who currently need a car to get everywhere even when they're downtown, but could easily bike from a downtown hotel to eastman theater, geva, the MAG, eastman house, restaurants in downtown, park ave or the south wedge, U or R, genesee valey park and the erie canal, high falls, the sports stadiums, maplewood rose garden, seneca park and the zoo, even on to charlotte beach if we had a robust bike share system in place).
- 1 Can serve all types of people, provide access for residents and visitors, it's green and promotes physical activity.
- 1 More people on bikes = fewer people in cars = less pollution, less congestion, safer streets, healthier population (which = lower healthcare costs)
- 1 It would get people out into the community more and a bike share is great for the environment. It would be good for both bikers and drivers because more bikes on the road will lead to both groups' awareness of how to share the road. And it would be good for drivers because it gets drivers off the road and onto bikes!
- 1 revenue for city; promotes biking; promotes roc as a bike city; great tourism perk; positions roc as progressive, active community and among top cities in us and globally: san fran, nyc, DC, paris all have bike share programs
- 1 Improve transportation access and promote green transportation Rochester is a small city and would really benefit from a program like this!
- 1 Rochester is not that large of a city. You can easily get around on bicycle. Unfortunately, there is sufficient infrastructure in place to allow people to feel safe riding their bikes.
- 1 It's a great service for commuters and tourists alike, and it's becoming a feature of urban life that people expect from progressive cities (and thus it contributes substantially to local economies).

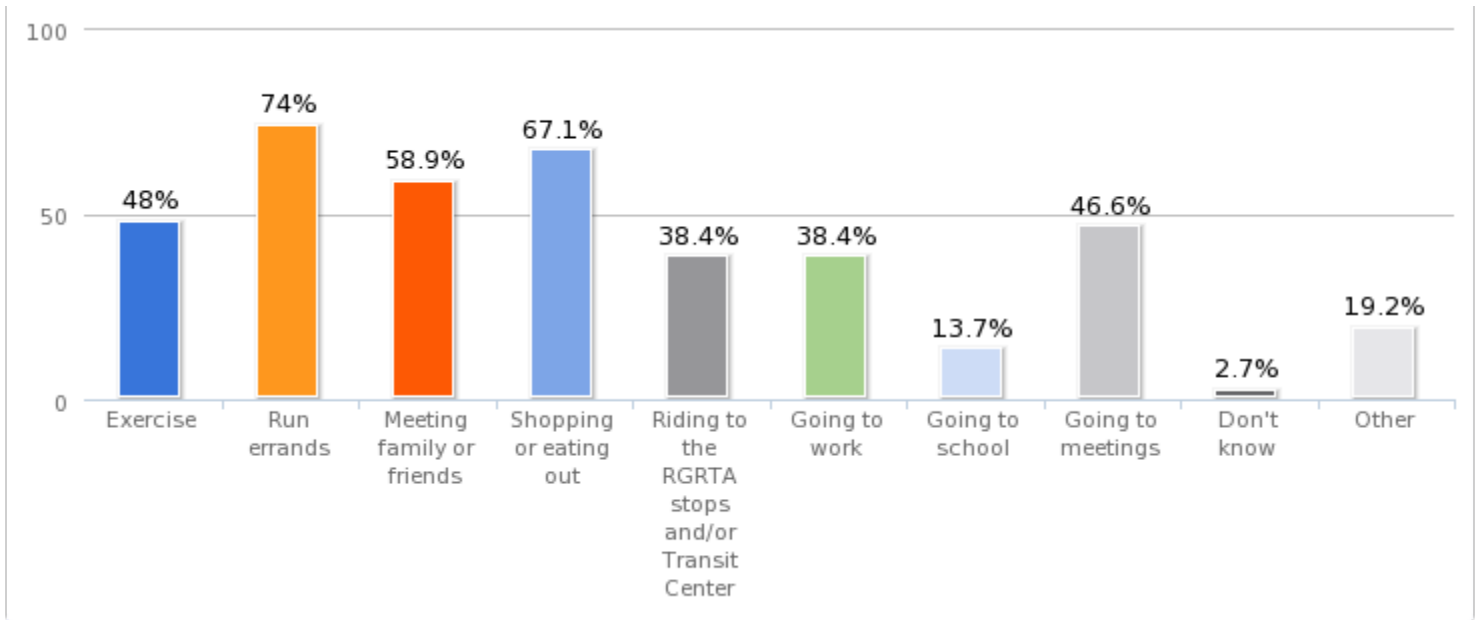
Count**Response**

- | Count | Response |
|-------|--|
| 1 | It is better for the environment, people's health, and will promote exploring everything the city has to offer. |
| 1 | More people will bike, drivers will take bikers more seriously. Easy and quick way to get around in a pinch. Mirroring ideas of bigger cities. |
| 1 | Ready access to working bike. Also, could travel somewhere by car, then use bike for short trips during the day, return home by car. |

13. Please tell us why you don't think bike share is a good idea for the Greater Rochester Area.**Count****Response**

- | Count | Response |
|-------|---|
| 1 | it will be too expensive for us to use also we don't know how to use nice things... |
| 1 | I don't think there is that much advantage in taking a bike to one station to the next. If I am going out on a bike I will probably be okay bringing it on a round trip. And I personally already own 2 bikes which are stored in a shared garage with 4 other bikes. I think this would be a good service for tourists. Unfortunately this is Rochester, and if that's what you're banking on, probably won't work. |
| 1 | I have trouble identifying the locations where a large number of people would be, and then want to ride a bicycle away from. I don't see enough tourists. Who are the people that are going to rent the bikes? Workers who drove to work and want to go for a lunch time ride? Tourists? People who show up at Gen Valley Park and want to ride along the canal -- but don't have a bike, and therefore want to rent? |
| 1 | I wouldn't feel safe riding a bike most places in the City. Montreal has a really well developed bike-lane system so getting around the city on bike was easy and safe. Rochester is not there. |
| 1 | The roads are not yet equipped to handle a great influx of bikers (ie. lack of bike lanes, dangerous potholes, awareness) |

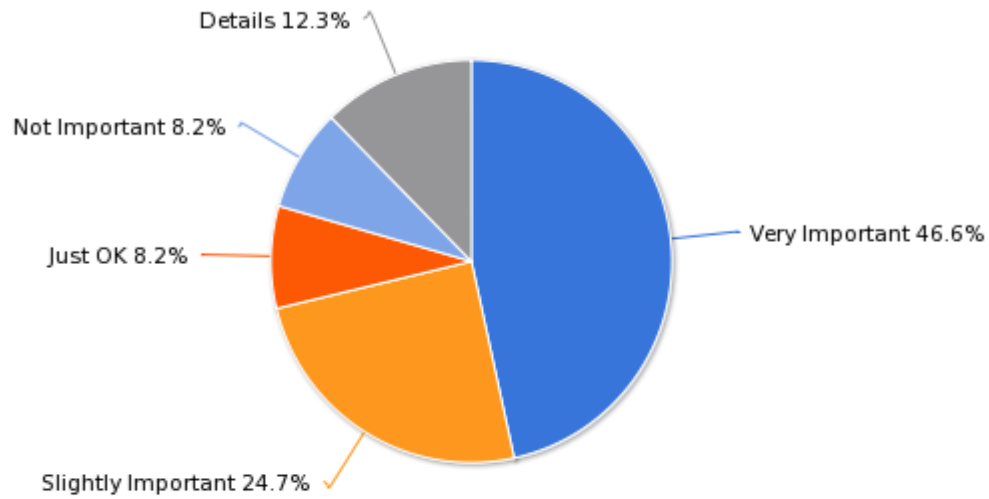
14. If bike share were available, throughout Greater Rochester Area what types of trips do you think you would use the bikes for?



Value	Count	Percent
Exercise	35	48.0%
Run errands	54	74.0%
Meeting family or friends	43	58.9%
Shopping or eating out	49	67.1%
Riding to the RGRTA stops and/or Transit Center	28	38.4%
Going to work	28	38.4%
Going to school	10	13.7%
Going to meetings	34	46.6%
Don't know	2	2.7%
Other	14	19.2%

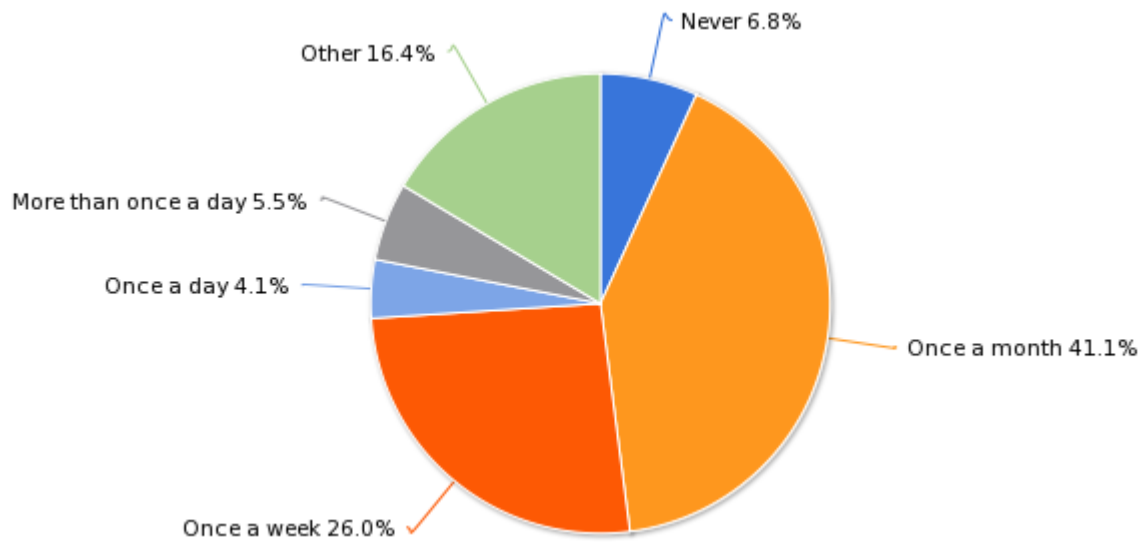
Statistics	
Total Responses	73

15. How important would it be to implement a regional bike share system where users from different communities within the Greater Rochester Area could use the bicycles in multiple locations/jurisdictions, not just within the city limits?



Value	Count	Percent
Very Important	34	46.6%
Slightly Important	18	24.7%
Just OK	6	8.2%
Not Important	6	8.2%
Details	9	12.3%
Statistics		
Total Responses		73

16. About how often do you think you would use bike share?



Value	Count	Percent
Never	5	6.9%
Once a month	30	41.1%
Once a week	19	26.0%
Once a day	3	4.1%
More than once a day	4	5.5%
Other	12	16.4%

Statistics		
Total Responses		73

17. How much are you willing to spend on an annual bike share membership?

How much are you willing to spend on an annual bike share membership?

Average Rank
86.90

Annual membership fee:

- Count: 60
- Min: 0 / Max: 200
- StdDev:47.87

Average Rank
22.54

Monthly membership fee:

- Count: 56
- Min: 0 / Max: 197
- StdDev:27.82

Average Rank
7.74

Daily or casual membership fee:

- Count: 58
- Min: 0 / Max: 120
- StdDev:15.33

Average Rank
13.50

Weekly membership fee:

- Count: 48
- Min: 0 / Max: 85
- StdDev:14.05

18. Are there any other membership lengths/types we should consider?

Count	Response
1	10 ride pass/ 20 ride pass, so on
1	3 days
1	4 hour rental (half day) = \$6
1	6 months
1	?
1	Bike library system: "Bike for a Buck"
1	Booklets of 10 or 20 uses, etc
1	County supported bikeshare
1	I'd want to pay by ride.
1	In Montreal it was a per day fee and quite low, around \$5 I think
1	Lifetime/Sponsor @ \$1,000+
1	Not able to enter info for last question: I'd be willing to spend \$35/year or \$5/day, \$10/week
1	Not think I can think of.
1	Pay per use
1	Per Ride.
1	Punchcard style - \$20/ for 10 trips
1	Seasonal membership
1	Subsidies for low income. RCSD, Prescribed from doctor
1	Three Months
1	White bike program: Free to use, send the bill to city hall
1	bike for out of towners
1	biking season, like a 6, 7, or 8 month pass (May-Oct)?
1	hourly or weekends/ weekdays only
1	lifetime/sponsor
1	no
1	package of x number of rides per fee
1	Are you suggesting you would have to first be a member to use it? That would cut the market down significantly to those who had the foresight to become members before using.
1	Paying nothing for a short ride - bike shares are all about access, right? The lower the price, the lower the commitment, the wider-used the service. In Paris there was a feeling that we could always just hop on, with no membership fee, and it was much cheaper than public transpo.
1	As a result, the service became a crucial part of everyday life.

Count	Response
1	Make prices affordable enough that low income community members will be able to participate or a subsidy program for low income individuals to apply for
1	Student pricing; bike shop "while we repair your personal bike, please use the regional share program" pricing
1	Option for employers, government agencies, developers, etc., to provide memberships to their clientele.

19. Please let us know which of the following objectives are the most important for the GTC to focus on while implementing its bike share program. (Drag and drop each of the possible objectives in order of importance to you).

Item	Score ¹	Overall Rank
Expand the on-road bicycle facility network to accommodate more bicycle trips around station locations.	453	1
Integrate bike share as an extension of transit.	433	2
Optimize the number of origins and destinations that can be served by a bike share system serving as many neighborhoods and destinations as possible.	408	3
Develop a system that engages and serves users in minority and low-income communities and improves their access to key destinations, such as jobs, educational centers and recreational centers.	393	4
Promote a culture of safety among bike share system users.	360	5
Educate the public about safe biking practices and rules of the road.	311	6
Plan for and ensure sustainable capital funding for system growth and ongoing equipment replacement.	295	7
Provide station locations not only throughout Rochester but also in neighboring jurisdictions and eventually expand into a regional system.	251	8
Focus the system only in the denser parts (i.e. more residences, businesses, and overall activity) of the City of Rochester and/or major destinations such as large employers, retail, museums, arts/entertainment, public market, transit center, Amtrak station, other	213	9
Cover all capital and operating expenses without public assistance.	95	10

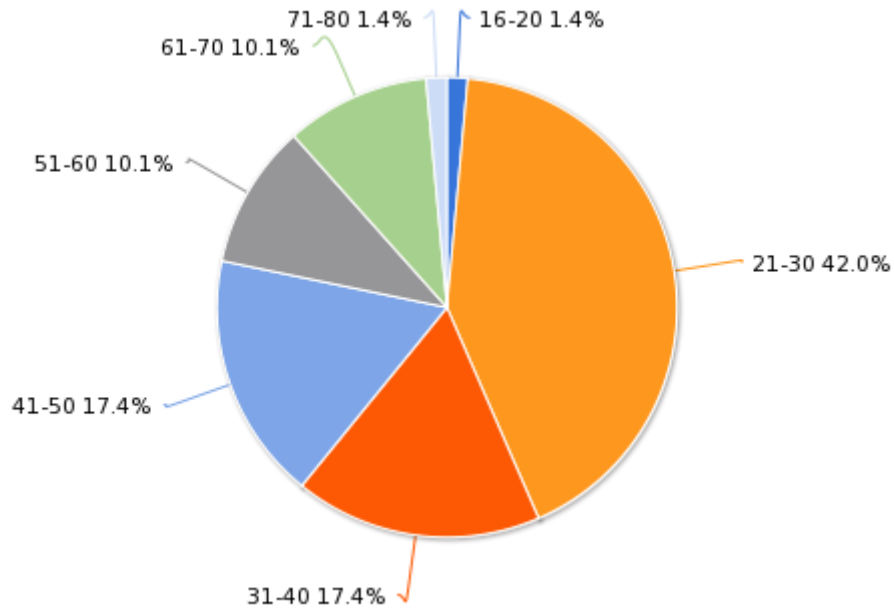
Total Respondents:

¹ Score is a weighted calculation. Items ranked first are valued higher than the following ranks, the score is the sum of all weighted rank counts.

20. Are there any other goals/objectives that a potential regional system could/should focus on?

Count	Response
1	Connect dense areas with universities. Consider very small systems in villages in the region.
1	Engaging youth
1	Ensure there will locations readily available for people who are visiting the city as well.
1	Expand biking routes.
1	Marketing any system developed
1	Not able to manipulate or read choices in previous question
1	Regional focus should work to connect college campuses.
1	no gentrification
1	the affordability of such a system so that low-income individuals living in the city can afford to use the bikes.
1	focus downtown, connect colleges and the bike paths (including going up to the beach and the canal)
1	position rochester as a bike-friendly city and region that people can visit and explore without needing to rent (or bring) a car. help to further develop our downtown as a 24/7 activity hub, not only for employment but also housing, retail, entertainment, culture, dining, arts, etc. grow transit ridership and level of service, boost walking, calm traffic, improve the quality and multimodality of our downtown street experience and position ourselves to be able to convert some of our current (oversupply) of downtown parking into new mixed use development.
1	Perhaps there needs to be some kind of distinction made between "residents" uses and tourists.
1	Look for positive and non-linear feedback loops that enable the next steps, not only for bikesharing, but other goals, such as successful pedestrian malls or other land use impacts, which feed back into cycling.
1	Clearly identify the market segments/population groups/activities/etc. that bike share is to facilitate. The goal should be on providing people with improved access to desired destinations by a healthy, environmentally beneficial, traffic relieving way.
1	I think starting small in the denser areas with good mass transit and highly frequented destinations is a good idea!
1	partnering with local businesses to sponsor stations by their business -- advertises the business and hopefully will attract business to their particular store, while subsidizing the system costs. Ditto for universities
1	Public service education program to make automobile operators aware of bicycles and rights of cyclists to use roads.
1	MUST do something about Main Street. The way it is now, it is very perilous for cyclists and a major deterrent to cycling in the center city. The four-lane road allows only buses in the right lane, so it's not a good place for cyclists as they are being borne down upon by buses all the time; riding in the left lane pinches cyclists between buses and cars. People ride on the sidewalks down there because the street isn't safe and is intimidating; and having cyclists on sidewalks isn't safe either. Something MUST be done about Main Street downtown to make it more bicycle friendly. Reducing East Main Street to two lanes would help too, as that is also a rough place to ride. Improving the intersection of Circle/Main/Railroad/Goodman for cyclists and pedestrians will make a big difference for cyclists to get to the Public Market, which I'm sure would be a primary destination for cyclists and bike share users if it weren't so damn scary.
1	zip cars, pot holes, bike lanes, motor vehicle operators education and awareness, responsible and considerate biking.
1	Make Downtown more accessible to bikers and pedestrians. Maybe closing off a major section of main street to create a pedestrian and bike friendly square where people can hang out, shop, eat, etc.

21. Age

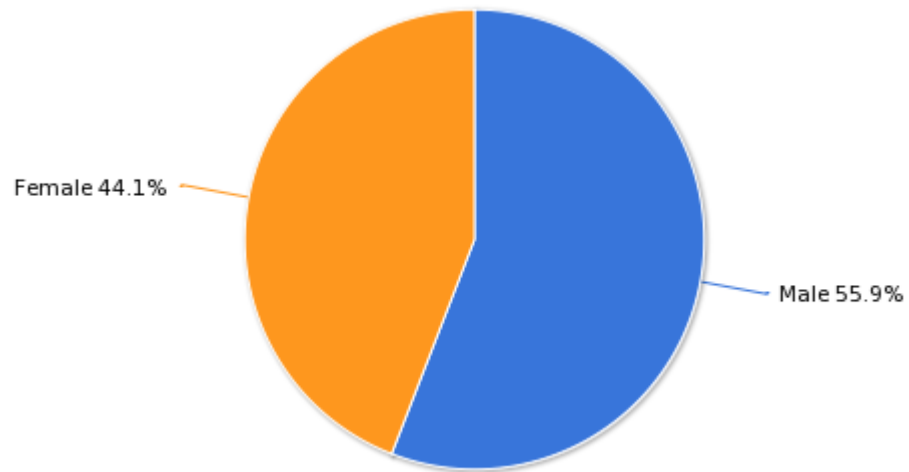


Value	Count	Percent
16-20	1	1.5%
21-30	29	42.0%
31-40	12	17.4%
41-50	12	17.4%
51-60	7	10.1%
61-70	7	10.1%
71-80	1	1.5%
80 or older	0	0.0%
Prefer not to say	0	0.0%

Statistics

Total Responses	69
Sum	2,344.0
Average	34.0
StdDev	14.5
Max	71.0

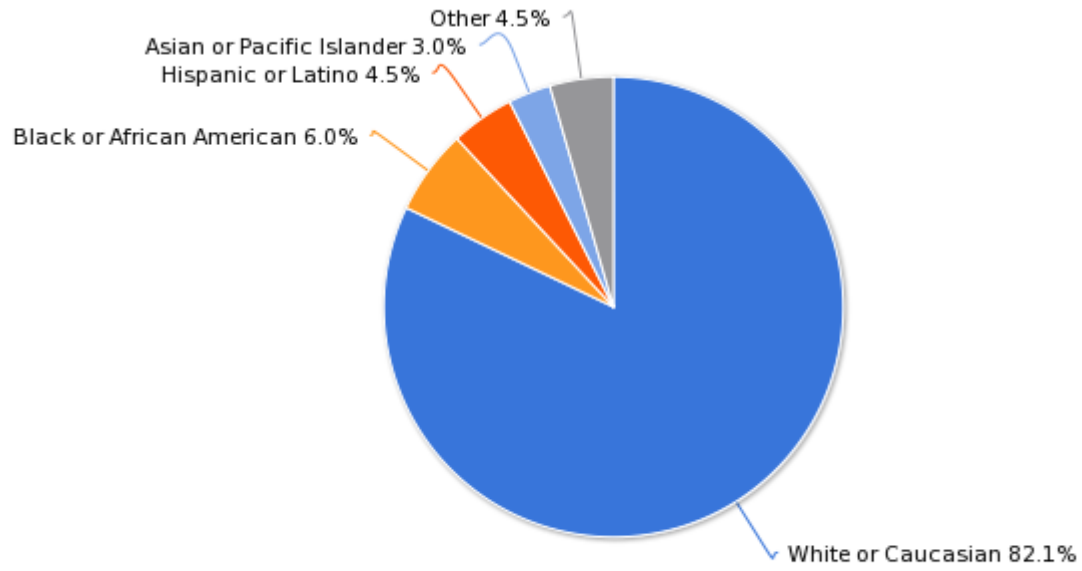
22. Sex



Value	Count	Percent
Male	38	55.9%
Female	30	44.1%

Statistics	
Total Responses	68

23. Ethnicity



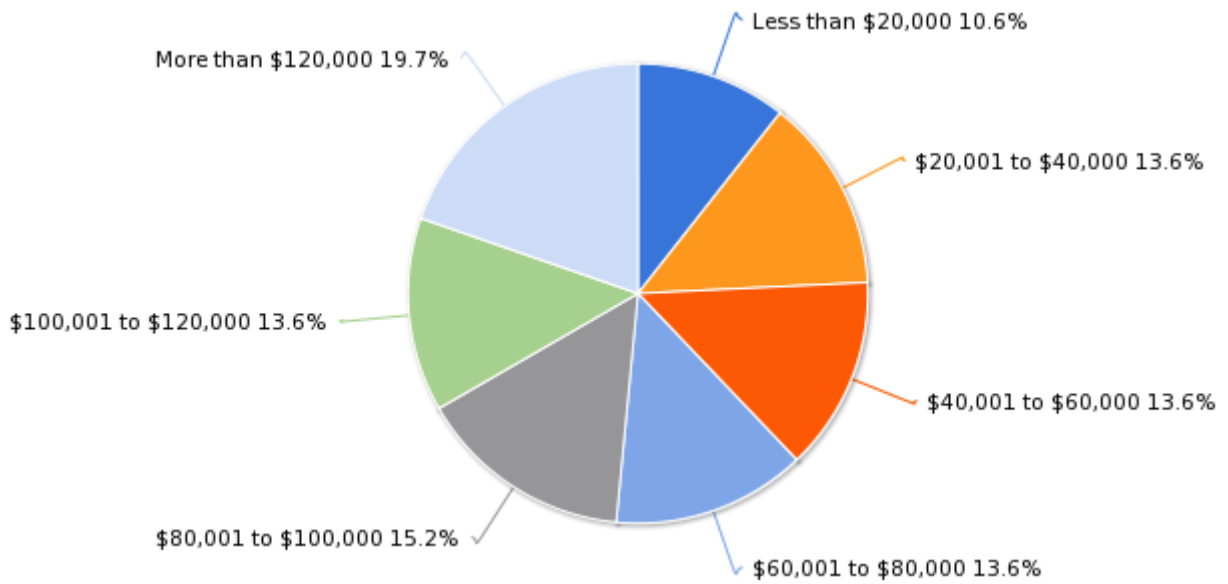
Value	Count	Percent
White or Caucasian	55	82.1%
Black or African American	4	6.0%
Hispanic or Latino	3	4.5%
Asian or Pacific Islander	2	3.0%
Native American Indian	0	0.0%
Other	3	4.5%

Statistics		
Total Responses		67

24. How many people reside in your household?

Count	Response
16	1
29	2
8	3
10	4
2	5
1	6
1	7

25. What is your annual household income?



Value	Count	Percent
Less than \$20,000	7	10.6%
\$20,001 to \$40,000	9	13.6%
\$40,001 to \$60,000	9	13.6%
\$60,001 to \$80,000	9	13.6%
\$80,001 to \$100,000	10	15.2%
\$100,001 to \$120,000	9	13.6%
More than \$120,000	13	19.7%

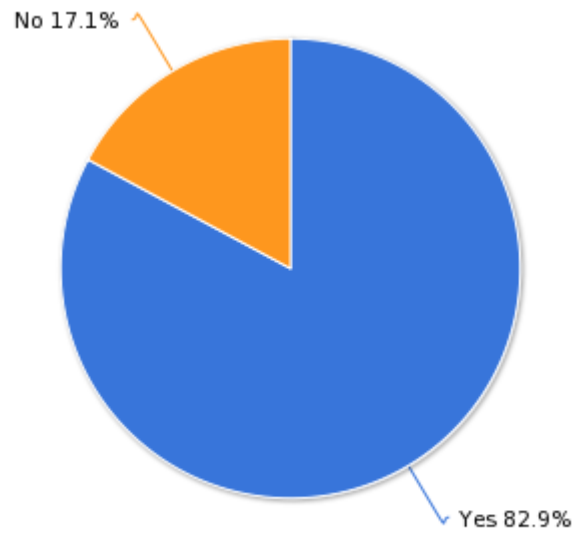
Statistics

Total Responses	66
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26. 5-digit zip code for your home address

Count	Response
1	14051
1	14414
1	14424
2	14450
4	14534
1	14580
1	14605
9	14607
8	14608
2	14609
6	14610
2	14611
4	14613
1	14615
3	14618
13	14620
3	14621
4	14623
2	14625
1	20832

27. Are you currently employed?



Value	Count	Percent
Yes	58	82.9%
No	12	17.1%

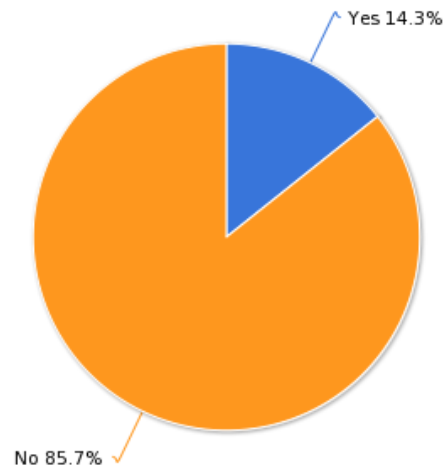
Statistics	
Total Responses	70

28. What is the zip code of your place of employment?

Count	Response
1	10011
1	14020
1	14445
1	14450
1	14454
1	14467
1	14489
1	14534
1	14564
3	14604
1	14605
1	14606

Count	Response
12	14607
3	14608
2	14609
1	14610
2	14613
4	14614
1	14615
2	14618
4	14620
1	14621
5	14623
1	14625
4	14627
1	14642
1	20910

29. Are you currently enrolled in school?



Value	Count	Percent
Yes	10	14.3%
No	60	85.7%

Statistics		
Total Responses		70

30. What is the zip code of the school you attend?

Count	Response
1	1
8	14623
1	14627

31. Please provide any additional comments here:

Count	Response
1	Hope it happens soon!, thank you.
1	It's really nice to see this coming to Rochester. Let's make this city progressive.
1	Let's be participating in the public riding trend like other big cities. EVERYONE benefits!
1	Love the idea of a bike share - have seen it in NYC and Boulder/ Denver!
1	Main Street must be redesigned for safer cycling!!!
1	Please make an effort to involve inner city residents in decisions
1	Thanks for doing this. Very important.
1	This is a really well done survey!
1	already on email list - don't need to enroll again. thanks for doing this.
1	don't screw the city taxpayers
1	good luck!
1	this survey failed on chrome several times before i switched to IE to complete it
1	As is shown by my previous comments, I am not sold on the feasibility/need for bike sharing in Rochester. I am hugely pro-bike, so I should be an easy person to convince -- but I am not convinced. The "story" about its purpose and need is not clear to me-- yet.
1	Don't half ass it. If a station isn't close to my start point and end point, I'm not going to use it. In fact, I might be a poor survey choice. I'm a bicycle commuter, I'll probably still use my own bike 90+% of the time.
1	Promoting courtesy and safety to cyclists will be very important. Non-cyclists and casual cyclists can be put off by the sometimes reckless behavior of people cycling on the road
1	I think this is a great idea!! I am sure if people can pick up a bike in Brighton and drop off at UR, they will be greatly used by commuters.
1	I am all for expanded biking presence, but I am afraid this program could not be sustainable. Maybe start small and go from there. One spot in RIT/UR, one spot downtown, one spot in Charlotte. The river path is a very nice resource.
1	I have written a bike share concept at https://docs.google.com/document/d/1-Ymd6T_slxRynDAGxISRMB5k4we0uweHkqpOxtzYTBE/edit?usp=sharing I also encourage you to read the Bicycle Library concept document at http://cyclesforchange.org/sites/cyclesforchange.org/files/pdf/bike_library_best_practices_web_0.pdf
1	love that you are looking into this. hope that this study determines that this is a feasible and beneficial program for our city. i think it would be terrific!
1	Thank you for exploring this possibility! I had assumed based on reading that Rochester wasn't large enough to sustain a Bikeshare system, but would be delighted if we could make it happen.
1	I run a resource (Rocville.com) devoted to improving the quality of urban life for Rochesterians by advocating for more walkable, vibrant neighborhoods. I would love to help in any way I can!

Appendix B – Annual Ridership and Financial Forecast

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Stations	25	25	44	88	100	100
Bikes	250	250	438	875	1,000	1,000
Docks	425	425	744	1,488	1,700	1,700
Membership and Ridership						
Live annual members	662	809	1,690	3,717	4,304	11,182
Members per bike	2.6	3.2	3.9	4.2	4.3	
Member rides	17,146	33,636	57,745	127,040	179,076	414,643
Casual rides	22,633	25,148	47,780	95,561	100,590	291,711
Total rides	39,778	58,783	105,526	222,601	279,666	706,354
Casual members	10,778	11,975	22,753	45,505	47,900	138,910
Trips / Bike / Day	0.58	0.64	0.66	0.70	0.77	0.69
% Rides Casual	56.9%	42.8%	45.3%	42.9%	36.0%	41.3%
% Rides Annual	43.1%	57.2%	54.7%	57.1%	64.0%	58.7%
Fundraising Need						
Capital Purchase + Installation	\$650,000	\$ -	\$689,585	\$1,420,545	\$ -	\$2,760,130
Phase 1	\$650,000	\$ -	\$ -	\$ -	\$ -	\$650,000
Phase 2	\$ -	\$ -	\$689,585	\$ -	\$ -	\$689,585
Remaining Phases	\$ -	\$ -	\$ -	\$1,420,545	\$ -	\$1,420,545
System Startup	\$243,607	\$ -	\$ -	\$ -	\$ -	\$243,607
Agency Administrative Costs, Pre-Launch	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Capital and Startup Costs	\$893,607	\$ -	\$689,585	\$1,420,545	\$ -	\$3,003,737
System Revenues						
Phase 1	\$205,270	\$235,784	\$245,068	\$259,556	\$273,076	\$1,218,754
Phase 2	\$ -	\$ -	\$215,364	\$246,852	\$255,168	\$717,384
Remaining Phases	\$ -	\$ -	\$ -	\$444,334	\$510,336	\$954,670
Total System Revenues	\$205,270	\$235,784	\$460,431	\$950,743	\$1,038,579	\$2,890,809
Agency + Operating Costs						
Agency administrative costs, post-launch	\$ -	\$ -	\$ -	\$ -	\$ -	
Operating Costs						
Phase 1	\$392,337	\$538,810	\$554,974	\$571,623	\$588,772	\$2,646,516
Phase 2	\$ -	\$ -	\$416,230	\$571,623	\$588,772	\$1,576,626
Remaining Phases	\$ -	\$ -	\$ -	\$857,435	\$1,177,544	\$2,034,979
Total Bike Share Operating Costs	\$392,337	\$538,810	\$971,204	\$2,000,681	\$2,355,088	\$6,258,120
Total Agency + Operating Costs	\$392,337	\$538,810	\$971,204	\$2,000,681	\$2,355,088	\$6,258,120
Operating Shortfall						
Phase 1	\$(187,067)	\$(303,025)	\$(309,906)	\$(312,067)	\$(315,696)	\$(1,427,762)
Phase 2	\$ -	\$ -	\$(200,867)	\$(324,771)	\$(333,604)	\$(859,241)
Remaining Phases	\$ -	\$ -	\$ -	\$(413,100)	\$(667,208)	\$(1,080,308)
Total Operating Shortfall	\$(187,067)	\$(303,025)	\$(510,773)	\$(1,049,938)	\$(1,316,508)	\$(3,367,311)
Farebox Recovery	52%	44%	47%	48%	44%	46%
Fundraising Need (System Revenue netted out of operations)	\$1,080,673	\$303,025	\$1,200,358	\$2,470,483	\$1,316,508	\$6,371,048
Total Operating Shortfall per Bike	\$(748)	\$(1,212)	\$(1,167)	\$(1,200)	\$(1,317)	\$(1,197)
Total Cost (Capital + Operations + Agency, not including System Revenue)	\$1,285,944	\$538,810	\$1,660,789	\$3,421,226	\$2,355,088	\$9,261,857
Revenue per Bike	\$821	\$943	\$1,052	\$1,087	\$1,039	
Revenue per Station	\$8,211	\$9,431	\$10,524	\$10,866	\$10,386	

Appendix C – Sensitivity Tables

Year 2 Operating Shortfall

if the Casual Membership Price is...

	\$ 4	\$6	\$8	\$10	\$12	
<i>and the</i>	\$60	\$(371,138)	\$(347,188)	\$(323,238)	\$(299,288)	\$(275,338)
<i>Annual</i>	\$80	\$(354,968)	\$(331,018)	\$(307,068)	\$(283,118)	\$(259,168)
<i>Membership</i>	\$85	\$(350,925)	\$(326,975)	\$(303,025)	\$(279,075)	\$(255,125)
<i>Price</i>	\$90	\$(346,883)	\$(322,933)	\$(298,983)	\$(275,033)	\$(251,083)
<i>is...</i>	\$110	\$(330,713)	\$(306,763)	\$(282,813)	\$(258,863)	\$(234,913)

if the Annual Members per Population is...

	0.0010%	0.0012%	0.0014%	0.0016%	0.0018%	
<i>and the</i>	300	\$(384,795)	\$(374,497)	\$(364,199)	\$(353,901)	\$(343,603)
<i>Casual</i>	400	\$(350,620)	\$(340,322)	\$(330,024)	\$(319,726)	\$(309,428)
<i>Members</i>	479	\$(323,621)	\$(313,323)	\$(303,025)	\$(292,727)	\$(282,429)
<i>per Station</i>	600	\$(282,270)	\$(271,972)	\$(261,674)	\$(251,376)	\$(241,078)
<i>is...</i>	700	\$(248,095)	\$(237,797)	\$(227,499)	\$(217,201)	\$(206,903)

if the Operations Cost per Dock per Month is...

	\$83	\$93	\$103	\$113	\$123	
<i>and the</i>	300	\$(259,139)	\$(311,669)	\$(364,199)	\$(416,729)	\$(469,259)
<i>Casual</i>	400	\$(224,964)	\$(277,494)	\$(330,024)	\$(382,554)	\$(435,084)
<i>Members</i>	479	\$(197,965)	\$(250,495)	\$(303,025)	\$(355,555)	\$(408,085)
<i>per Station</i>	600	\$(156,614)	\$(209,144)	\$(261,674)	\$(314,204)	\$(366,734)
<i>is...</i>	700	\$(122,439)	\$(174,969)	\$(227,499)	\$(280,029)	\$(332,559)

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