



Metro Hartford Region Bike Share Plan



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Contents

1	Introduction	1
1.1	About the Plan	1
1.2	What is Bike Share?.....	2
1.3	How Does Bike Share Work?.....	4
1.4	Why Bike Share?.....	5
1.5	Scope of Plan	7
2	Bike Share in Connecticut Today	8
2.1	University Systems	8
2.2	Community Systems.....	10
2.3	Potential for Synergy with Hartford Bike Share	11
3	Program Vision, Goals, Objectives, and Performance Measures	13
3.1	Goals and Objectives.....	14
3.2	Performance Measures.....	15
4	Market Analysis	17
4.1	Regional Propensity Analysis.....	17
4.2	Bike Share Submarkets	22
5	System Scope and Phasing.....	32
5.1	Visioning and Scenario Tests	32
5.2	System Overview	35
5.3	System timeline.....	36
5.4	Phasing Concept.....	38
6	Business Model	44
6.1	Ownership Structure	44
6.2	Operating Structure.....	46
6.3	Technology	48
6.4	System Funding.....	50
6.5	Financial Projections.....	56
6.6	Role of In-Kind Contributions.....	63
7	Implementation Plan.....	65
7.1	Implementation Timeline and Steps.....	65

7.2	Governance Structure	66
7.3	Administrative Needs	68
7.4	Vendor Contract Requirements	69
7.5	System Transparency	72
7.6	Marketing and Outreach.....	73
7.7	System Equity	75
8	Conclusion.....	76

Figures

Figure 1-1: Typical Dock Based Station	5
Figure 1-2: Example Smart Bike Station	5
Figure 2-1: Zagster Bike Share at Yale.....	8
Figure 2-2: Bicycle Library at UConn Storrs.....	9
Figure 2-3: Mystic Community Bikes.....	10
Figure 2-4: Simsbury Free Bike.....	11
Figure 3-1: Relationship of Vision, Goals, Objectives, and Performance Measures	14
Figure 4-1: Bike Share Propensity Factors.....	18
Figure 4-2: Overall Bike Share Propensity Map	20
Figure 4-3: Hartford Bike Share Submarkets.....	21
Figure 4-4: CTfastrak Bike Share Submarket.....	26
Figure 4-5: New Britain Bike Share Submarkets.....	27
Figure 4-6: Waterbury Bike Share Submarket	29
Figure 4-7: Farmington Canal Submarket	30
Figure 5-1: Methodology for Scenario Exercise	33
Figure 5-2: Project Timeline	36
Figure 5-3: Proposed Scope of Metro Hartford Region Bike Share System.....	37
Figure 5-4: Phase 1 and Phase 2a.....	38
Figure 5-5: Phase 2B	41
Figure 5-6: Phase 2C	42
Figure 5-7: Phase 2C	43
Figure 6-1: Example of a Typical Dock-Based System.....	48
Figure 6-2: Example of Smart Bike with Built In Locking Mechanism	49
Figure 6-3: CitiBank Sponsors New York’s CitiBike System	54
Figure 6-4: Austin Bike Share Bicycle Sponsorships.....	55
Figure 6-5: Harvard Sponsored Hubway Station.....	56
Figure 6-6: Projected Replacement Capital Needs over 15 Years.....	59
Figure 7-1: Implementation Steps	65
Figure 7-2: General Governance Structure	66
Figure 7-3: Suggest a Station Map for Chicago’s Divvy Bike Share.....	74

Tables

Table 1-1: Example Bike Share Systems.....	3
Table 3-1: Goals and Objectives.....	15
Table 3-2: Performance Measures	16
Table 5-1: Scenario Comparison.....	33
Table 6-1: Overview of Basic Ownership Models.....	45
Table 6-2: Direct Operations vs. Contracted Operations.....	47
Table 6-3: Pricing Structure of Sample North American Bike Share Systems.....	50
Table 6-4: Proposed Pricing Structures.....	51
Table 6-5: Comparison of Different Sponsorship Types	55
Table 6-6: Examples of Comparable Trip Rates and User Splits.....	58
Table 6-7: System Expansion Capital Costs by Phase (Smart Bike System)	58
Table 6-8: System Expansion Capital Costs by Phase (Dock Based)	59
Table 6-9: Projected Operating Costs for Phase 1 and 2.....	61
Table 6-10: Projected Operating Costs for Phase 3 (Waterbury)	62
Table 7-1: Total Full-Time Equivalent (FTE) Staff by Phase.....	68

1 Introduction

1.1 ABOUT THE PLAN

The Metropolitan Hartford Region is currently undergoing a series of transformative investments in public transit, including approximately \$1.5 billion being invested in the CTfastrak bus rapid transit (BRT) system and commuter rail improvements along the New Haven-Hartford-Springfield corridor. When completed, rail improvements will provide stronger links to the New York metropolitan area, while BRT will provide high frequency rapid transit between Hartford and New Britain. The impact of the BRT will go beyond the bus only roadway with local and express bus routes serving locations off the busway, including Waterbury. The concept of bike share was initially explored by study partners as a means to leverage these transit investments by providing improved connections to CTfastrak and rail stations. Partners saw potential for bike share to enhance mobility through neighborhoods, encourage physical activity, and help support the region's economic vitality.

The purpose of this plan is twofold: to determine if and where bike share makes sense within the Hartford region and to develop a blueprint for moving forward and implementing bike share. This plan is a true regional effort led by the Capitol Region Council of Governments (CROG) and the Greater Hartford Transit District (GHTD), with additional funding support from the Central Connecticut Regional Planning Agency (CCRPA), the City of Hartford, the City of New Britain, the Council of Governments of the Central Naugatuck Valley (COGCNV) and the Connecticut Department of Transportation. The study examines the feasibility of bike share across an extensive geographic area stretching from the Massachusetts state border to the City of Waterbury.

DecoBike Station in Miami Beach

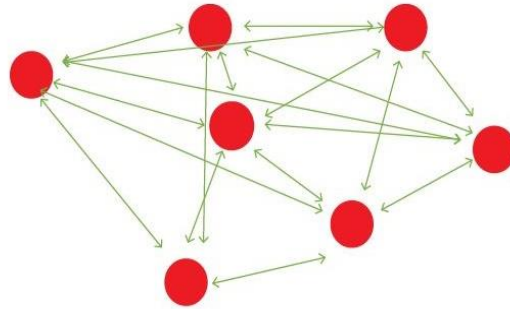


Source: Matt Johnson

1.2 WHAT IS BIKE SHARE?

Quite simply, bike share is bicycle-based public transportation. Bike share systems allow users to access a fleet of bicycles for short-term use. Systems are designed for one-way journeys, allowing a rider to pick up a bike in one place and return it somewhere else in the system. Bike share differs from other modes of public transportation as it is available on-demand. Since users are not tied to a fixed bus route or train line with set schedules, bike share provides tremendous flexibility.

Bike Share is designed to Facilitate Point-to-Point Trips



The concept of bike share originated in the 1960s in Amsterdam, and early bike share systems consisted of specially marked bikes placed around cities for free use. These pioneers of bike share, referred to today as “first generation” bicycle systems, saw limited success as there were few curbs on theft and vandalism. It was not until the arrival of automated locking and payment systems that bike share began to see wide-spread implementation world-wide. Today modern bike share systems are most often fully automated systems. Users use a membership card, kiosk, or phone to unlock bicycles. Vandalism and theft is deterred through robust locking mechanisms, and users typically must provide a credit card or debit card hold to rent a bicycle.

The first major bike share system in North America was Montreal’s BIXI, launched in May 2009. Since then, bike share systems have multiplied rapidly across North America, with over 35 systems in place in the United States alone. The largest bike share systems in the country are located in major cities such as New York (CitiBike), Boston (Hubway), Chicago (Divvy), and Washington DC (Capital Bikeshare), however cities of all sizes feature bike share. A number of small and medium sized metropolitan areas have bike share systems, including Greenville, SC, Chattanooga, TN, and Boulder, CO. Bike share systems are increasingly moving beyond downtowns and inner city neighborhoods and into the suburbs. Capital Bikeshare in Montgomery County, MD and Bay Area Bike Share in Santa Clara County, CA are providing bike share as a means to connect suburban communities to transit and facilitate reverse commutes.

Table 1-1: Example Bike Share Systems¹

System Name	Greenville B-Cycle	Boulder B-Cycle	Nice Ride MN	Capital Bikeshare
City	Greenville, SC	Boulder, CO	Minneapolis & St. Paul, MN	Washington, DC and suburbs
Population of Cities Served	60,000	97,000	684,000	1,218,000
Number of Bikes	28	150	1,550	2,700+
Number of Stations	6	22	170	310+
Annual Ridership	3,200	30,000	305,000	2,725,000
Average Daily / Bike	0.32	0.55	0.91	2.76

As **Table 1-1** illustrates, system size and ridership levels differ widely among bike share systems. Larger bike share systems tend to have a higher utilization per bike because these systems benefit from the network effect of having many possible destinations reachable by bike share, and also because large bike share systems are mostly located in dense urban areas with high travel demand.

Many of the bike share systems in smaller or less dense cities are located in places with a high concentration of visitors or students. San Antonio’s bike share system, for example, benefits from high tourist use, with stations concentrated around major downtown attractions and recreation trails. Other bike share systems, like the Spartanburg, SC and Boulder, CO B-Cycle systems, are located in college towns with a high concentration of students to help drive usage. Not all bike share systems in smaller cities rely on a large tourist or student population. Greenville and Chattanooga have student populations similar or smaller than Hartford’s, and while both are destinations within their respective metropolitan regions, they are not major tourist destinations.

Regardless of what city bike share stations are located in, bike share is most highly used in places where there is a high concentration of destinations within biking distance to one another. Bike share works best in mixed-use communities where bikes can be utilized for a variety of purposes. Neighborhoods with a high concentration of housing, retail, and employment generate trips throughout the day, not just during peak commuting times.

¹ Daily ridership per bicycle an approximate as systems as many of these systems have expanded throughout the year. Precise system size figure for Capital Bikeshare unavailable as the system is current undergoing expansion and adding additional stations and bicycles almost weekly.

1.3 HOW DOES BIKE SHARE WORK?

Most bicycle share systems in North America are dock-based systems, an example of which is shown in **Figure 1-1**. Bicycles are picked up and returned to stations composed of a set of docks and a payment kiosk. The bicycles are locked into the dock, making theft extremely difficult. Dock based systems are often solar powered, allowing for stations to be installed without any electric hardwiring or other in-ground infrastructure.

An alternative to dock-based systems are smart bikes, an example of which is shown in **Figure 1-2**. With smart bikes, the locking mechanism and payment system are on the bicycle itself. Some smart bike systems allow users to lock a bicycle anywhere within a service area, but many establish virtual stations where bikes must be returned.

Who Uses Bike Share

Bike share attracts a diverse base of users. While some bike share users are avid cyclists who use bike share in addition to their own bicycles, a large proportion of bike share riders are new or infrequent cyclists. A study of Capital Bikeshare found that bike share users are more likely to be female, have a lower household income, own fewer cars and bicycles, and are more likely to cycle for utilitarian trip purposes than the typical area cyclist². Bike share users tend to be well-educated but not necessarily well-off, a function of the low average age of riders.³ Survey and trip data show that bike share serves a transportation need for the majority of trips; bike share is utilized for short-one way trips in lieu of another mode. Bike share riders have distinct commute patterns compared to the general population, typically living within a few miles of their place of employment.⁴ Finally bike share shows close integration with other modes of public transportation, with many systems reporting their highest ridership bike share locations at or near major transit hubs.

² Buck, Darren et. al. *Are Bikeshare Users Different from Regular Cyclists? A First Look at Short-Term Users, Annual Members, and Area Cyclists in the Washington, DC Region* [Transportation Research Board](#) 2012

³ Shaheen, Susan et. al. *Public Bikeshare in North America: Early Operator and User Understanding* Mineta Transportation Institute 2012

⁴ *ibid*

Figure 1-1: Typical Dock Based Station



Figure 1-2: Example Smart Bike Station



1.4 WHY BIKE SHARE?

Bike share is a unique opportunity to provide a physically active form of public transportation that integrates with and supports Hartford's current and proposed transit options. These systems provide a short distance transportation option that fills the gap between distances that are too far to walk but too close to justify waiting for and riding other transit options, e.g., bus.

Transportation Network Benefits

Bike share systems give a new option for short distance trips and increase the diversity and effectiveness of a region's public transportation system. Bike share works in conjunction with bus service and walking to provide the "last mile" connections for riders. Bike share enhances options for car-free and car-light households by providing a new public transit mode that is free from schedules or routes. In Hartford, bike share could provide travelers with another means to connect with the existing bus system, the CTfastrak BRT, and the commuter rail line, allowing commuters to transfer from the stop/station and bike farther than they would be able to walk.

Bike share has also been shown to reduce the dependence on personal vehicles. In a multi-city study, 40 percent of bike share users reported driving less often since joining. The same study also found that two percent of members sold their personal vehicles and claimed that bike share had an influence in their decision making.⁵

Health Benefits

Bike share is one of the only physically active forms of public transportation and has the potential to help make a healthier city. In general cycling has been linked with increased cardiovascular health which reduces the likelihood of heart disease and obesity. A health survey conducted by Capital Bikeshare (Washington, DC region) found that 31% of members reported weight loss since joining the program and 27% reported an improvement in personal physique.⁶

Bike share also offers safety benefits to the cycling community at large. Increasing the number of bikes on the streets helps acclimate drivers to sharing the road. A study in the British Medical Journal found that increasing the number of cyclists and pedestrians in a community reduced the relative risk of a collision.⁷ While there is still a risk of injury with cycling, the health benefits have been found to far outweigh the risk of injury.⁸

Economic Benefits

Bike share helps connect riders with local business and generates new trips to retail and tourist destinations. In the Minneapolis-Saint Paul region the introduction of the NiceRide bike share system generated an additional \$150,000 dollars to businesses around bike docking stations.⁹

⁵Public Bikesharing in North America: Early Operator and User Understanding, Mineta Transportation Institute Report 11-26, June 2012, <http://transweb.sjsu.edu/PDFs/research/1029-public-bikesharing-understanding-early-operators-users.pdf>

⁶ Vehicle 4 Change: Health Implications of the Capital Bikeshare Program, December 2012, http://capitalbikeshare.com/assets/pdf/v4c_capstone_report_final.pdf

⁷ Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling, British Journal of Medicine, Volume 9 Issue 3, September 2003, <http://injuryprevention.bmj.com/content/9/3/205.full>

⁸ The Health Risk and Benefits of Cycling in Urban Environments Compared with Car Use: Health Impact Assessment Study, British Journal of Medicine, August 2011, <http://www.bmj.com/content/343/bmj.d4521>

⁹ University of Minnesota Center for Transportation Studies *Catalyst*, July 2012, <http://www.cts.umn.edu/Publications/catalyst/2012/july/niceride/>

Tourism is another significant economic benefit of bike sharing. Tourists can quickly and easily access sites around the city, without the expense of a cab or car rental.

Environmental Benefits

Bike share creates an opportunity to decrease the pollution in our environment. On average, the cars driven in the U.S. produce a pound of CO² per mile driven. In the first year of Denver B-Cycle operations, there was an estimated reduction over 300,000 pounds of CO² and in the four years since the number has risen to over a million pounds annually.¹⁰ Bike share systems help promote greater environmental consciousness in the communities they serve, and many systems provide users customized statistics on pounds of CO² saved by each trip.

1.5 SCOPE OF PLAN

The Metro Hartford Region Bike Share Plan consists of the following components:

- **Bike Share in Connecticut Today:** An overview of existing bike share programs in Connecticut and lessons learned from these local systems.
- **Program Goals and Objectives:** The strategic vision guiding this plan.
- **Market Study:** A region-wide and submarket analysis of the opportunities and challenges to implementing bike share in the Hartford region.
- **Geographic Scope and Size of System:** The recommended scope and size of a bike share system in the Metro Hartford Region.
- **Business Plan:** A detailed plan describing the details of a Metro Hartford bike share system, including: ownership, operating structure, recommended technology, funding model, projected ridership, and system costs and revenue.
- **Implementation Plan:** A plan detailing the critical path items to successfully launching a bike share system.

While this study provides a suggested size and phasing plan for a potential bike share system in the Metro Hartford region, there is no definitive way to declare whether or not bike share is feasible in a region. Feasibility in this study has been defined as whether or not bike share would contribute positively to the goals and objectives identified by the study stakeholders. The proposed system does support these goals and objectives, however the level of ridership, mode share, and other potential measures do not have set targets and therefore do not play into the determination of feasibility. Another key measure of feasibility can be financially based; while there are costs involved in implementing bike share in the Metro Hartford region (see Section 6), whether or not the region can identify funds and is willing to fund the system will be determined after the conclusion of this study.

¹⁰ Denver Bike Sharing 2013 Annual Report, http://denverbikesharing.org/AnnualReports/DBS_2013_Annual_Report.pdf

2 Bike Share in Connecticut Today

A number of communities in the Hartford Region have created bike share programs to serve specific markets. These programs fall into two categories; those that serve educational markets and those that serve tourist and recreational markets. Yale University, Goodwin College, and the University of Connecticut at Storrs have varying underlying goals for their bike share programs, and each has implemented a unique system to improve mobility and accessibility for their student and faculty populations. Mystic Community Bikes and Simsbury Free Bike are both community-led bike libraries that seek to provide access to the tourist market in Mystic and to the Farmington Canal Trail and neighboring communities, respectively. All these programs operate more like bike-libraries than traditional bike share systems and bikes must be returned to the same location they were picked up from by the end of the rental.

2.1 UNIVERSITY SYSTEMS

Yale University is currently in its second generation of bike share (see **Figure 2-1**). Five years ago, at the behest of the university president at the time, the Sustainable Transportation Systems office at Yale started the Y Bike Program, the first generation of bike share on campus. The Y Bike Program enabled faculty and staff to sign out dedicated departmental bikes for trips around campus. The impetus behind the program was to foster a cycling culture in New Haven, particularly among long-term city residents affiliated with the university. The second generation program was funded through a Yale Alumnus and cycling advocate.

Figure 2-1: Zagster Bike Share at Yale



Source: news.yale.edu

Yale piloted a program with Zagster, a bike share company that typically creates closed bike share systems for private entities, e.g., colleges and universities, corporate campuses, hotels, and multifamily buildings. The Zagster system uses branded bicycles, U Locks, and dedicated bicycle racks and requires a cell phone to text a code for unlocking the bicycle. The system currently requires that bicycles be returned to the same station that they were taken from but Yale hopes to enable one-way rentals in the future. After a successful pilot, Yale has signed a contract with Zagster for 50 bikes at 10 locations. Yale is now working to explore expansion of the system into the City of New Haven.

The **University of Connecticut Storrs** currently operates a bike library out of the university's student outdoor recreation program (**Figure 2-2**). The goal of the program is to increase bike riding and awareness about bikes on campus. The initiative came out of the university's sustainability program with the goal of highlighting bicycling as a sustainable transportation option. The program owns 20 bicycles, which can be checked out for free but must be returned by the end of the day. Most students use the bikes to get around campus but they still drive to reach destinations off campus. The campus bike library is particularly popular among international students. University officials are interested in creating a formal bike share program, but the university does not have a dedicated funding source for a closed system. Additionally, the Town of Mansfield is interested in implementing a formal bike share system with at least one station in the newly built intermodal transportation center in Storrs Center.

Figure 2-2: Bicycle Library at UConn Storrs



Source: today.uconn.edu

Goodwin College launched a bike share program in September 2013 with 15 bicycles stored at 3 different locations. The program is intended for students, faculty, and staff at Goodwin but is accessible to the public for general use. The underlying goal of the program is to encourage healthy choices and increase access across the college's growing campus, an idea that came from the college's Health and Wellness Committee. Many students are transit dependent, and bike share

facilitates access to satellite buildings in East Hartford. Goodwin uses Republic Bikes' bike share technology, which is a closed system accessed by a code primarily serving corporate campuses and private entities. The college funded capital costs associated with the system and makes use of the system free to members of the Goodwin community.

2.2 COMMUNITY SYSTEMS

Mystic Community Bikes (Figure 2-3) is a bike library created and run through a group of dedicated community volunteers. The program was started in 2007 with the aim of mitigating parking tensions and traffic congestion in the downtown core while at the same time providing a means for tourists to explore the town. Mystic Community Bikes houses their fleet of bikes at local businesses frequented by tourists, and both tourists and locals sign out bike locks and helmets to access the bicycles. Usage is free but there is a deposit. The system relies on volunteer time, fundraising support through local businesses, and recently, grant writing.

Similar to Mystic Community Bikes, **Simsbury Free Bike** is a seasonal bike library focused on serving recreational riders along the Farmington Canal Trail (**Figure 2-4**). A small group of local bicycle advocates first started the program in 2011. The program now has 10 distribution centers and reported 1,200 riders during the 2013 season. Distribution centers are typically local businesses who also sponsor the system. Riders check out bikes and locks inside the store, a process similar to Mystic Bikes. The rider is required to leave a \$10 deposit for 24 hours of free use. The bikes must be returned to where they were checked out.

Figure 2-3: Mystic Community Bikes



Source: (left) themysticwave.com, (Right) Mystic Community Bikes

Figure 2-4: Simsbury Free Bike



Source: Transform CT

2.3 POTENTIAL FOR SYNERGY WITH HARTFORD BIKE SHARE

Through peer interviews, it is apparent that colleges and universities can be key partners in bike share, however there is little potential for merging existing recreational bike share programs with a public, region-wide bike share system. Community bike share programs have specific goals geared towards recreational users and tourists who typically want to rent a bicycle for several hours up to a full day, while public bike share is designed for short-term use. Public bike share is often well suited to the needs of tourists, but these two particular geographic markets, Mystic and Simsbury, have already found successful community run models. Both systems plan to continue operating under their current bike library model.

Colleges, on the other hand, are focused on increasing mobility on their campuses and expanding the reach of services students can access. Goodwin College has expressed an interest in potentially partnering with a regional system, however UConn's campus is too far from Hartford, connected primarily through highways, to enable it to be part of a metro Hartford system. The proposed downtown campus for UConn Greater Hartford, however, presents an opportunity for coordination with a regional system though that campus does not currently operate bike share. While Trinity College was not able to participate in the peer review, the college's proximity to downtown Hartford makes it a natural fit to be part of the proposed system in Hartford. Trinity College's small bicycle library was initiated by a student group and today is managed out of the college's athletic department.

Yale already has a contract with Zagster and is working with the City of New Haven to explore expanding Zagster beyond the university campus. Yale is also supportive of a region-wide, if not statewide bike share program. The type of technology used currently by Yale may not be scalable to a regional system, and Hartford's bike share system may include a different bike share technology. Hartford will want to continue to include representatives from Yale University and the City of New Haven in project management discussions.

The interview process found that proximity does matter. In addition to UConn, Mystic Community Bikes also mentioned distance from the Hartford area as a reason not to merge their system with the proposed Hartford system. However, Yale did not see the 39 miles between Hartford and New Haven as a barrier to a regional bike share system, perhaps because of existing transit connections and commuter flows between the two urban centers.

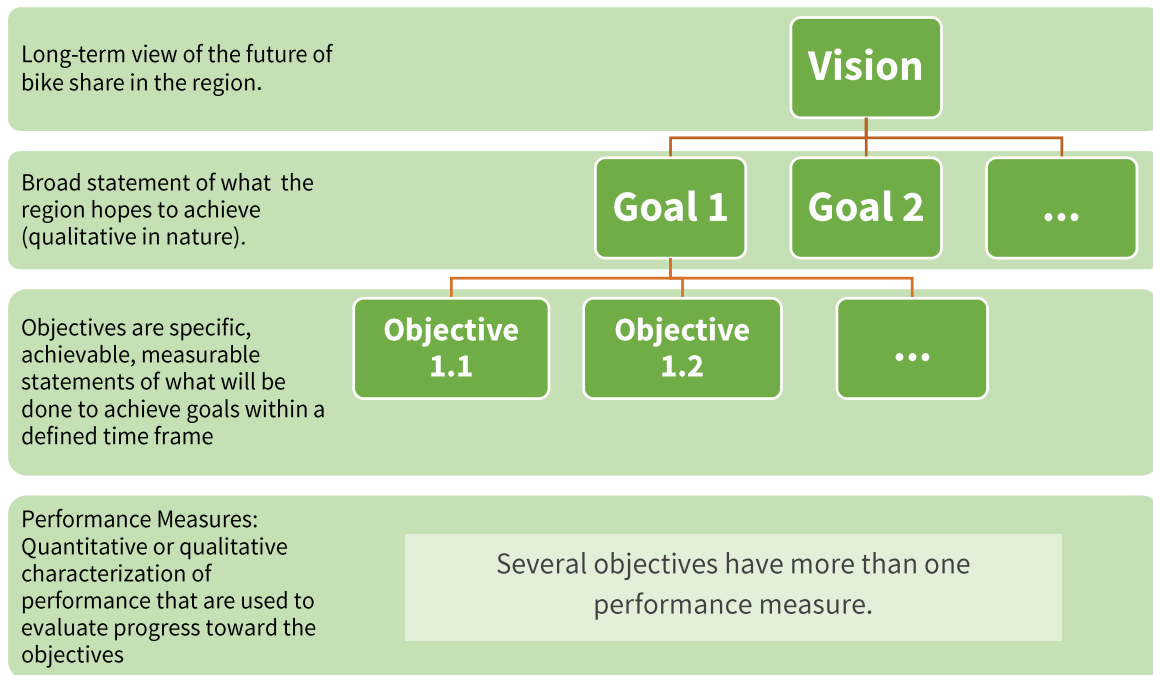
3 Program Vision, Goals, Objectives, and Performance Measures

The first step in the planning process for a new bike share system is developing a strategic vision for the program, including goals and objectives that outline what the region hopes to achieve through bike share. The strategic vision, goals and objectives presented here were developed through input from the project's stakeholder group, including representatives from:

- Bike Walk Connecticut
- Business for Downtown Hartford
- Capitol Region Council of Governments
- Capitol Region Development Authority
- Central Connecticut Regional Planning Agency
- City of Hartford
- Connecticut Department of Energy and Environmental Protection
- Connecticut Department of Public Health
- Connecticut Department of Transportation
- Council of Governments of the Central Naugatuck Valley
- CT Transit
- Goodwin College
- Greater Hartford Transit District
- Hartford Business Improvement District
- Hartford Parking Authority
- Riverfront Recapture
- Town of West Hartford
- City of New Britain
- Transit for Connecticut
- Travelers Insurance
- University of Hartford
- City of Waterbury
- Goodwin College
- Trinity College
- University of Connecticut – Storrs
- University of Connecticut – Greater Hartford

The program vision represents the future that the region would like to see as it relates to bike share. The stakeholders identified their vision for bike share in the Metro Hartford region as a program that would lead to increased transit ridership, better mobility, a more economically competitive region, and a health and recreation benefit, all while providing equitable access to all residents.

Figure 3-1: Relationship of Vision, Goals, Objectives, and Performance Measures



3.1 GOALS AND OBJECTIVES

Goals are typically broad statements that are qualitative in nature while objectives are specific, measurable, and achievable statements tied to each goal. Goals and objectives set a strategic vision for bike share that is instrumental in shaping the recommendations of this plan. During the market analysis (**Section 4**) the system goals were utilized to determine which submarkets were feasible and which ones did not fit within the vision of this plan. During the development of a service concept for bike share in the Hartford region, these goals and objectives helped guide the size and scope of bike share across the region. Finally, in selecting a business model, these goals and objectives helped the planning team determine critical items such as the revenue model, ownership model, and preferred technology. **Table 3-1** lists the goals and objectives for bike share in the Metro Hartford Region.

Table 3-1: Goals and Objectives

Goal	Objectives
Reduce Single Occupancy Vehicle Trips: Promote multi-modal transportation, including biking, walking, and public transportation.	Leverage bike share to improve access to public transit, especially the CTfastrak BRT.
	Ensure bike share is cost competitive compared to other modes.
	Ensure bike share is a safe and convenient mode for users.
Regional Mobility: Increase personal mobility in the Hartford Region, providing people a better way to access destinations throughout the region.	Maximize the number of destinations one can reach, providing enhanced connectivity to work, leisure, and home.
	Leverage bike share to better link communities to recreation and cultural institutions.
	Develop a framework for bike share that can be scaled to a regional level.
Regional Livability: Develop an innovative transportation system that improves the region’s livability and economic competitiveness	Leverage bike share as an amenity to attract business investment and tourism to the region.
	Utilize bike share as a tool to promote an active lifestyle.
	Develop a system that equitably serves all users.
Financial Sustainability: Create a system that is financially sustainable, transparently operated, and accountable	Develop a bike share system that is cost effective to the public.
	Plan to ensure sustainable funding for system growth and maintenance.
	Ensure transparency to bike share operations, including the clear communication of performance and effectiveness to the public.

3.2 PERFORMANCE MEASURES

Performance measures were developed that would allow for measuring the effectiveness of a future bike share system in the region toward meeting the goals and objectives. The purpose of performance measurement is to provide stakeholders and the public a clear and concise way to measure the effectiveness of the Metro Hartford Region bike share program. A set of measures have been developed that fit within the overall framework of the program’s vision, goals, and objectives. Each objective will have one or more performance measurement that can be tracked over time. The program’s first year of operations will provide a baseline measurement, with future progress measured against past years.

Effective performance measurement must be able to tell something meaningful about system performance yet be simple enough to collect and report on regularly. The measurements proposed for the region can be tracked 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. While many of these figures can be tracked in real-time, the full set of performance measurements will only be reported out on an annual basis.

Table 3-2: Performance Measures

Goal	Objectives	Performance Measures (Data Source)
Reduce Single Occupancy Vehicle Trips	Leverage bike share to improve access to public transit, especially the CTfastrak BRT.	<ul style="list-style-type: none"> Percentage of bike share stations within a quarter mile of a CTfastrak station or bus stop on a high frequency route. (Self-collected) User survey data about use of bike share to access transit. (Annual user survey)
	Ensure bike share is cost competitive compared to other modes.	<ul style="list-style-type: none"> Average cost per trip per user. (Annual report) Difference between the average cost per trip per user and the average cost per transit trip per user. (Annual report and CT Transit)
	Ensure bike share is a safe and convenient mode for users.	<ul style="list-style-type: none"> Number of crashes reported through operator. (Operator reports) Self-reported helmet use. (Annual user survey)
Regional Mobility	Maximize the number of destinations one can reach, providing enhanced connectivity to work, leisure, and home.	<ul style="list-style-type: none"> Population and employment within a quarter mile of a bike share station. (Census and MPO data) Number of trips that otherwise would not have been made. (Annual user survey)
	Leverage bike share to better link communities to recreation and cultural institutions.	<ul style="list-style-type: none"> Percentage of trips that are recreational in purpose. (Annual user survey) Percentage of trips that link a neighborhood to downtown Hartford. (Operator origin and destination data)
	Develop a framework for bike share that can be scaled to a regional level	<ul style="list-style-type: none"> Count of residents by zip code from registration information and/or user survey. Number of towns or local jurisdictions with bike share stations. (Self-collected)
Regional Livability	Leverage bike share as an amenity to attract business investment and tourism to the region.	<ul style="list-style-type: none"> Number of active corporate memberships. (Self-collected) Number of active sponsorships by sponsorship level. (Self-collected) Proportion of surveyed bike share users who are visiting the city from out of town. (Annual user survey)
	Utilize bike share as a tool to promote an active lifestyle.	<ul style="list-style-type: none"> Total miles biked per year per member. (Trip data) Reported change in biking and walking. (Annual user survey)
	Develop a system that equitably serves all users.	<ul style="list-style-type: none"> Bike share trips originating or ending in census tracts that qualify as FTA Title VI Census Tracts under CT Transit. (Census) Tracking demographic user profiles through registration and user surveys for age, race, gender, and income. (Census)
Financial Sustainability	Develop a bike share system that is cost effective to the public.	<ul style="list-style-type: none"> Percentage of operations paid for through user fees, private sponsorships, and state and federal grants. (Self-collected)
	Plan to ensure sustainable funding for system growth and maintenance.	<ul style="list-style-type: none"> Number of reports per month of defective or damaged equipment. (Operator reports) Percentage of estimated State of Good Repair needs covered with anticipated funding. (Self-collected) Set and track aggressive fundraising goals for capital budget. (Self-collected)
	Ensure transparency, including the clear communication of performance and effectiveness to the public and stakeholders.	<ul style="list-style-type: none"> Number of visits to the bike share service's website per month. (Operator reports) Annual reporting of the state of bike share that details to the members and public the progress on all bike share performance measures.

4 Market Analysis

The first step in determining the feasibility and potential scope of bike share in the Metro Hartford Region was to conduct a market analysis. Based on the experience of other bike share systems the planning team explored a number of factors that help drive bike share usage. A bike share propensity analysis, or likelihood of bike share ridership, was conducted for a study area covering over 1,000 square miles that extended from Hartford County to the City of Waterbury. The propensity analysis allowed the planning team to narrow down this large geographic region into a handful of bike share submarkets. For each submarket, unique strengths and challenges were identified that helped the team progress toward a concept for the Metro Hartford Region's bike share system.

Because the market analysis is a relative one, that is, comparing the possibility for success of bike share between areas in the Hartford region, this market analysis does not suggest whether or not overall usage of the system will be better or worse than in other cities or regions. The projections for expected usage in each of these markets is covered in **Section 6**, the Business Model. This section is focused on which parts of the Hartford region would be better candidates for implementation of bike share.

4.1 REGIONAL PROPENSITY ANALYSIS

The propensity analysis measures *relative* propensity for bike share across the region by aggregating twelve variables that relate to bike share usage (see **Figure 4-1**). The region was divided into a grid of 1/8 square mile cells and each of the factors were aggregated to this grid. Factors were normalized to a score ranging from zero to one, with four factors given double weighting: population density, employment density, distance to CTfastrak, and density of bicycling infrastructure.

Figure 4-1: Bike Share Propensity Factors

Factor	Definition	Source
Population Density	Population density at the census block level	US Census, 2010
Employment Density	Employment density at the census block group level	Longitudinal Employer and Household Survey, US Census 2013
Retail Employment Density	Employment density (per square mile) of retail jobs at the census block group level. Included as a proxy for density of retail destinations.	Longitudinal Employer and Household Survey, US Census 2013
Population Density (20-39 year olds)	Population density (per square mile) at the census block level of adults 20 to 39 years old	US Census, American Community Survey 2007-2012
Alternative Commute Mode Share	Combined mode share of walk, bike, and public transit commutes at the census tract level	US Census, American Community Survey 2007-2012
Higher Education Institutions by Enrollment	Count of total enrollment of higher education institutions within a quarter mile of each grid cell's centroid	Self-collected. University reported enrollment.
Proximity to CTfastrak	Distance from a CTfastrak station. Includes stops off the guideway in Downtown Hartford	Self-collected.
High Frequency Transit Service	Number of bus routes within a quarter mile of a cell with all day service of 20 minutes or better (6am to 7pm). Routes with frequencies of 10-15 minutes weighted double.	Self-collected/ CT Transit
Density of Bike Infrastructure	Feet of bike lanes within a cell and its adjacent cells	Project participants. Expected trails and bike lanes network at system launch
Proximity to Recreation Trails	Distance from the centroid of each grid cell to the nearest recreation trail	Project participants. Expected trail network at system launch
Density of Cultural Employment	Employment density (per square mile) of arts, entertainment, and recreation jobs at the census block group level	Longitudinal Employer and Household Survey, US Census 2013
Percentage of Commutes Under 10 Minutes	Percentage of commutes under 10 minutes (all modes) at the census tract level. Measurement as proxy for commutes within biking distance.	US Census, American Community Survey 2007-2012
Hotels with a ¼ Mile	Number of hotels within a quarter mile of a cell	Connecticut Hotel Database, Brian Stuckley, 2009

The final propensity analysis, shown in **Figure 4-2** and **Figure 4-3**, identified a number of opportunity areas for bike share in the Metro Hartford region. As the region has developed around historic towns and cities, bike share propensity clusters around a handful of urban centers, including the City of Hartford, City of Waterbury, and City of New Britain. The analysis also revealed opportunities for bike share in suburban areas beyond these cities. For example, along the CTfastrak Corridor there are select opportunities for bike share such as at Flatbush Avenue and around Central Connecticut State University. The suburban towns of East and West Hartford include activity centers within biking distance to downtown Hartford, and these also show a relatively higher likelihood of bike share ridership. Finally a corridor of higher propensity locations

exist along the Farmington Canal Trail stretching south from Simsbury. The propensity analysis helped identify ten “opportunity areas,” places that are potential submarkets for bike share:

- Four opportunity areas exist in the City of Hartford: Downtown Hartford, and portions of the city to the north, south, and west of Downtown.
- Portions of the Town of East Hartford, including areas directly adjacent to Downtown and downriver at Goodwin College.
- West Hartford Center.
- The CTfastrak Corridor.
- Within the Town of New Britain, including downtown and neighborhoods north of I-84.
- Downtown Waterbury.
- Along the Farmington Canal Trail south of Simsbury.

The bike share market as a whole features a number of strengths. The Hartford region benefits from being composed of a number of historic town centers, all of which feature high development densities and an interconnected street grid. Some of these towns also have implemented higher quality cycling infrastructure, such as on-street lanes and sharrows, with more in the plans. While population is dispersed across a number of communities, the region features high employment densities in its downtowns, especially in the City of Hartford, which benefits from a good mix of both private and public sector employment. In peer communities, bike share has benefited from the availability of transit and bicycling infrastructure, as bike share trips are often linked with transit trips. The Metro Hartford Region is home to a growing regional bicycle trail network, and the CTfastrak system will provide Hartford a higher frequency transit system. Other transit and even pedestrian improvements will continue to improve the likelihood of bike share success, such as the TIGER-funded Intermodal Triangle project and the commuter rail and other transit improvements planned and underway.

Overall the Metro Hartford Region does have a number of market weaknesses that bike share will have to overcome. Unlike many of its peers that have already implemented bike share systems, the region is not anchored around major universities, nor is it a major destination for tourists. The cold winter climate would reduce ridership during the winter months. Hartford’s dispersed development patterns also have the potential to negatively impact bike share usage. The opportunity areas for bike share are spread across a wide geographic area, meaning that any regional system would have to function as dispersed nodes; bike share relies on the network effects of having a dense cluster of stations.

Finally while the region’s cities and towns have made strides toward improving cycling infrastructure, overall, including in Hartford, there is a lack of quality cycling infrastructure, especially on-street bike lanes. Other bike share systems show a strong correlation between proximity to high-quality bicycle infrastructure (e.g., bike lanes, trails, and cycle-tracks) and ridership. Many bike share users are new to urban cycling and may not be comfortable cycling exclusively in mixed traffic.

Figure 4-2: Overall Bike Share Propensity Map

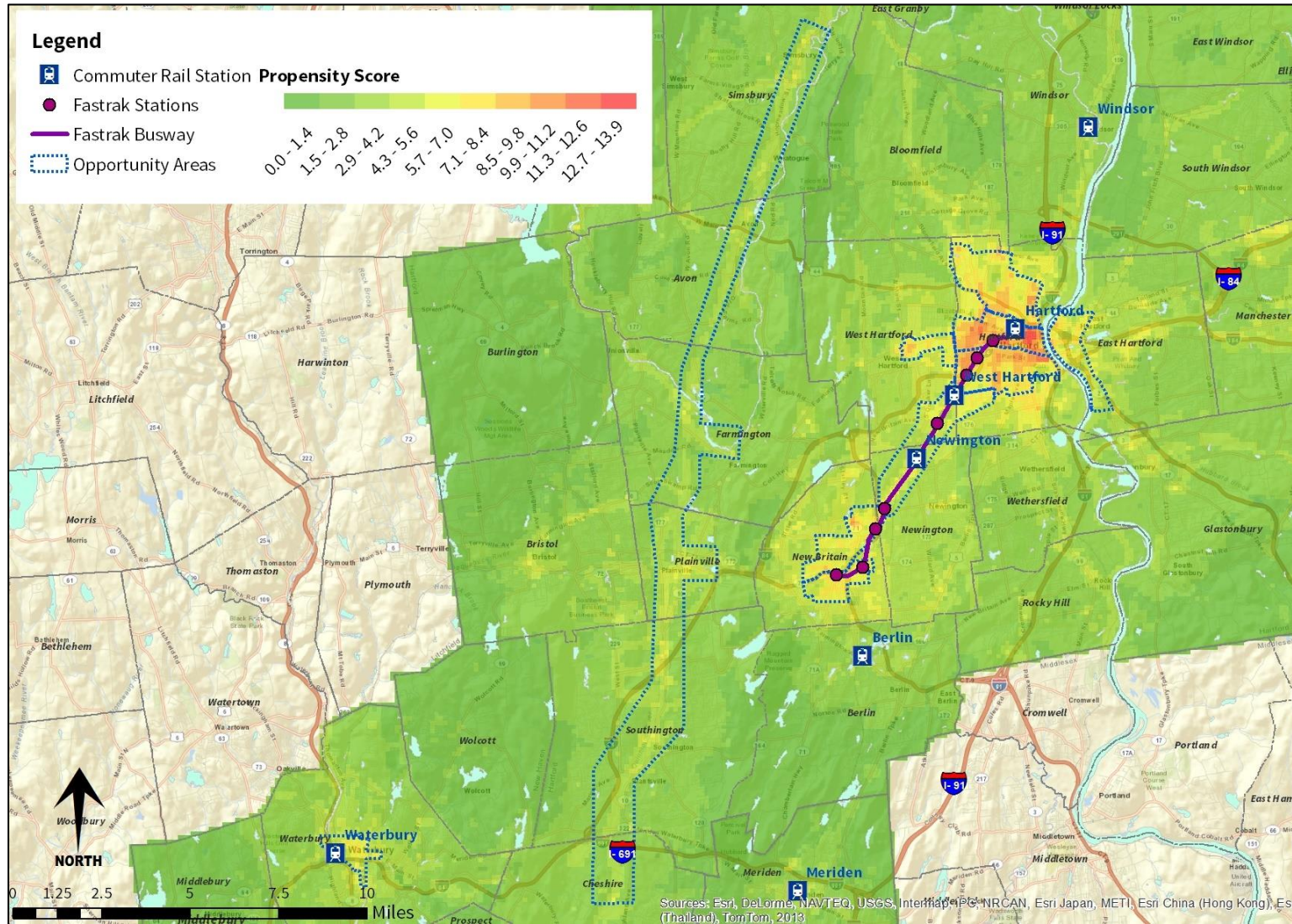
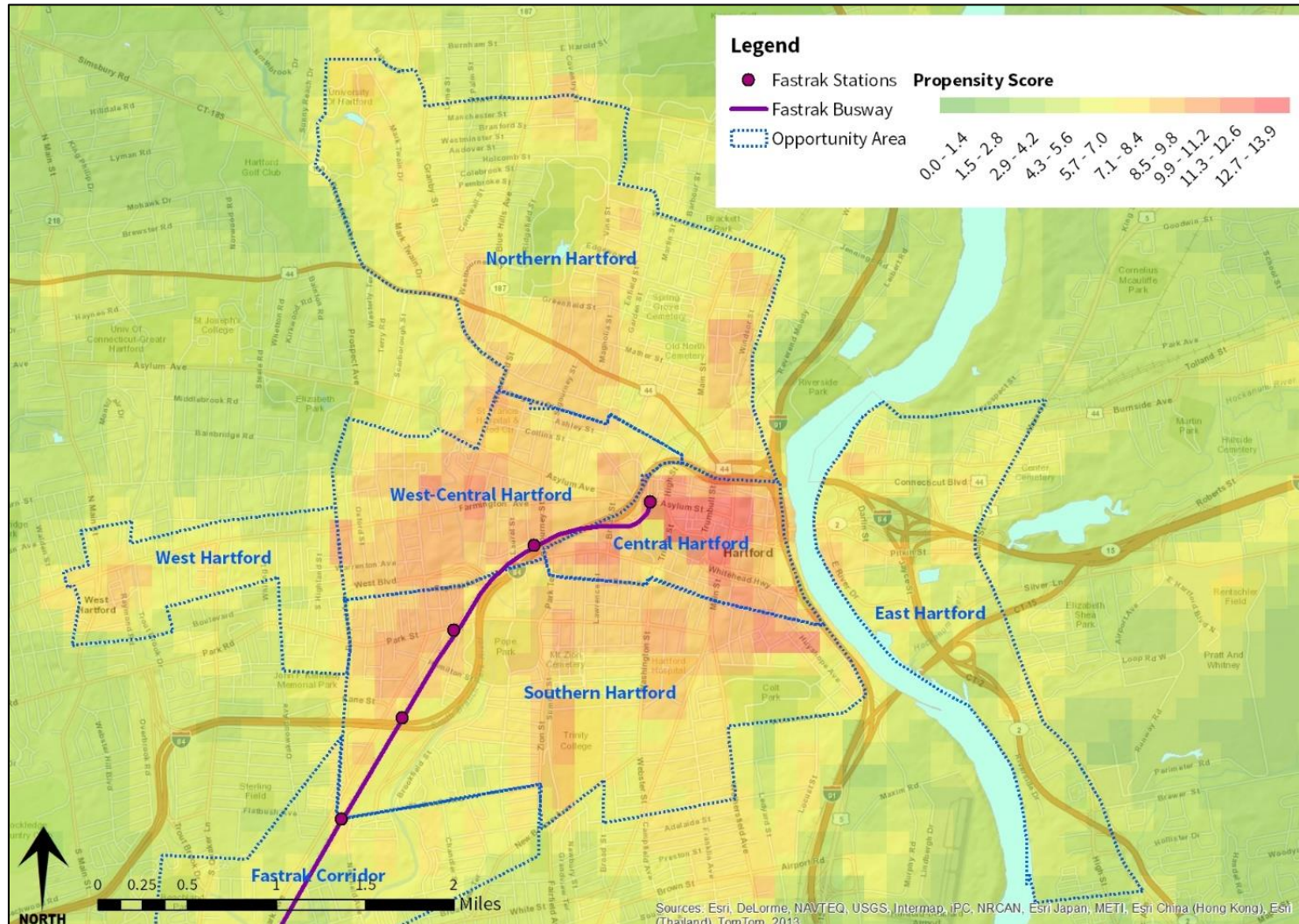


Figure 4-3: Hartford Bike Share Submarkets



4.2 BIKE SHARE SUBMARKETS

The following section provides more detail on each of the 10 bike share opportunity areas in the region. For each potential submarket, individual strengths and weaknesses have been identified to system success and widespread use.

Central Hartford

Strengths	Weaknesses
<ul style="list-style-type: none">▪ Highest overall propensity▪ Concentration of jobs and housing▪ Multiple activity centers▪ Riverfront Trail access	<ul style="list-style-type: none">▪ Challenging cycling environment▪ 9 to 5 destination – underdeveloped as a retail, residential and entertainment center▪ Small submarket size

Central Hartford shows the highest overall propensity for bike share in the region. The downtown is home to tens of thousands of jobs, including the offices of major private corporations such as Travelers Insurance, United Healthcare, the Phoenix Companies, and state government offices. With the Connecticut Convention Center, the area also features the highest concentration of hotels in the entire metropolitan area. The East Coast Greenway and riverfront bicycle trails serve this area as well.

Bike share in Central Hartford would serve a number of user groups, including the large daytime population of employees, visitors staying in local hotels, a growing residential population, and students at Capital Community College and the University of Connecticut’s future downtown Hartford campus. As CTfastrak terminates with a downtown loop in Central Hartford, bike share could provide a last mile connection for riders to and from CTfastrak stations. Bike share could also provide last mile connections for users of the proposed commuter rail station.

The Central Hartford market is not without challenges. While it is home to a growing residential population, the area still lacks vibrancy after working hours and on weekends. Existing retail, dining, and entertainment options are isolated into a handful of small clusters. Finally, there is little existing on-street cycling infrastructure.

West-Central Hartford

Strengths

- Major employment destination
- High densities of housing and employment
- Proximity to CTfastrak station

Weaknesses

- Topography
- Cut off from Central Hartford by I-84

Outside of Central Hartford, the neighborhoods west of downtown have the highest propensity for bike share. The area includes some of the biggest employers in the region, such as Aetna, The Hartford, and St. Francis Hospital. Additional destinations include attractions like the Mark Twain House and Elizabeth Park, along with the University of Connecticut Law School. This submarket includes a number of historical residential neighborhoods composed of multi-family housing. Farmington Avenue, which benefits from the greatest transit frequency in the metropolitan region, is the primary corridor in this submarket.

The primary weaknesses of this submarket are topographical and physical barriers to downtown Hartford. Most of the area is located uphill from downtown, and the incline may lead to more trips toward downtown than from downtown. Moreover, I-84 and the rail line cut off the submarket from downtown and only a limited number of roads cross the freeway/rail corridor from the west.

Southern Hartford

Strengths

- High density residential development
- Vibrant neighborhood serving retail corridor along Park Street
- Potential to attract users at Trinity College
- Good connections to Central Hartford
- Low income community – potential to improve mobility for residents
- Proximity to CTfastrak station

Weaknesses

- Low income community – observed challenges to attracting users
- I-84 forms a barrier to CTfastrak access

The Southern Hartford bike share submarket stretches south from downtown. This submarket stands out for the wide variety of uses within its boundaries, including dense residential neighborhoods composed of apartments and attached housing, busy neighborhood serving retail corridors like Park Street, important employers such as Hartford Hospital, and a student population at Trinity College. The submarket features the Parkville CTfastrak Station, providing opportunities to utilize bike share to connect CTfastrak better to surrounding neighborhoods. The submarket is well connected to downtown with few topographical or physical barriers.

The Southern Hartford submarket has a large lower-income and a Hispanic population. The area could benefit considerably from bike share due to the high-transit usage and proportion of zero-car households, however other cities have struggled to attract lower-income and Hispanic users to bike share. Usage barriers like credit card requirements and lack of awareness of bike share will need to be addressed for bike share to succeed in Southern Hartford.

Northern Hartford

Strengths

- High density development
- High propensity for alternative modes
- University of Hartford
- Low income community – potential to improve mobility for residents

Weaknesses

- Low income community – observed challenges to attracting users
- No tourist market
- Few retail and entertainment trip generators

Northern Hartford stretches north from downtown Hartford to the University of Hartford. The area is composed primarily of dense residential neighborhoods and features a commercial corridor along Albany Avenue and Main Street. Like with the Southern Hartford submarket, the market for bike share is both strengthened and handicapped by the area's demographics. Northern Hartford features high transit usage and a concentration of zero-car households. The concentration of low-income households in this submarket could benefit from bike share but attracting low-income users has been a challenge for other bike share systems. The University of Hartford potentially could generate a number of bike share trips, however cycling connections between the University and downtown need to be strengthened.

Usage in this submarket would be largely driven by attracting local residents to bike share, as the area does not have a major employer presence beyond the University of Hartford. Moreover, the area struggles from a lack of strong retail and entertainment corridors that could bolster ridership by attracting users from other areas. However, it boasts cultural institutions, including the Artists Collective, and some small businesses which may generate bicycle trips within this area.

East Hartford

Strengths

- Potential partner at Goodwin College
- Riverfront trail and connectivity to downtown with Founders Bridge can draw visitors and workers from Central Hartford

Weaknesses

- Auto-oriented
- Large distances between destinations
- Poor cycling infrastructure
- Cut off from other submarkets by the river and I-91

Limited opportunities exist for bike share in the Town of East Hartford. The greatest propensity for bike share is located just across the Connecticut River from Downtown Hartford where a cluster of hotels and apartment buildings are located. Along the river a proposed recreational trail stretches downriver and it will provide access to Goodwin College, another potential location for bike share.

Overall the area lacks good bicycle infrastructure beyond the riverfront trail. Bike share shows the most promise connecting destinations along the Connecticut River and Downtown Hartford, however busy arterial roads and poor cycling infrastructure form major barriers to providing bike share further east.

West Hartford

Strengths

- Vibrant town center – regional retail destination
- Opportunity to provide last mile connection to CTfastrak

Weaknesses

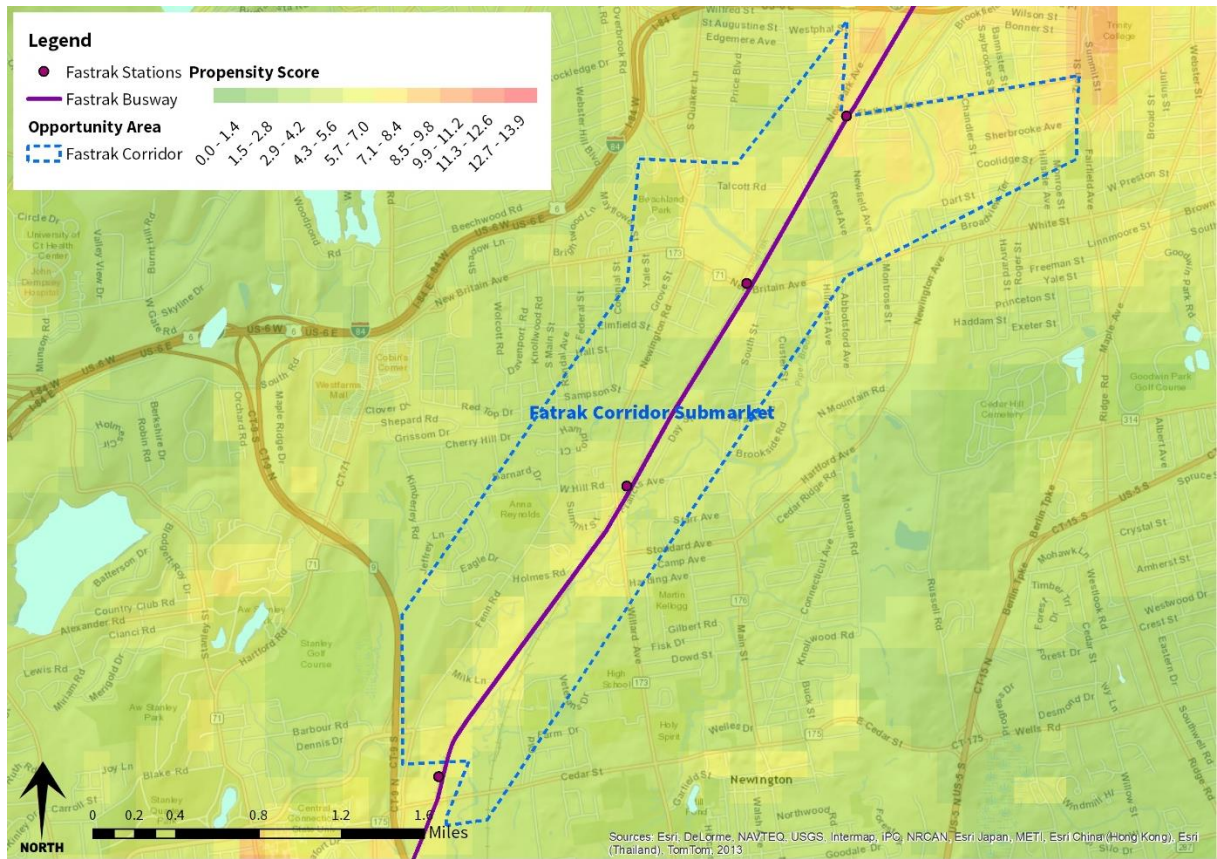
- Little bike infrastructure
- Challenging connections to CTfastrak and Central Hartford
- Lower use of alternative modes than the City of Hartford

Bike share shows promise in the West Hartford town center and along the Farmington Avenue corridor between the City of Hartford and the town center. West Hartford is a major retail, dining, and entertainment destination and features the all-day vibrancy that supports bike share. The submarket's greatest challenge is the lack of strong east-west bicycling connections to downtown Hartford and the CTfastrak corridor. Moreover the market is of limited size, with bike share propensity declining considerably outside the compact town center and Farmington Avenue.

CTfastrak Corridor

The CTfastrak Corridor includes the suburban areas along the CT Fastrak Corridor, primarily in the Town of Newington.

Figure 4-4: CTfastrak Bike Share Submarket



Strengths

- Connected to high frequency transit
- Trail infrastructure parallels CTfastrak for portions of route
- Potential to integrate bike share with future transit-oriented development

Weaknesses

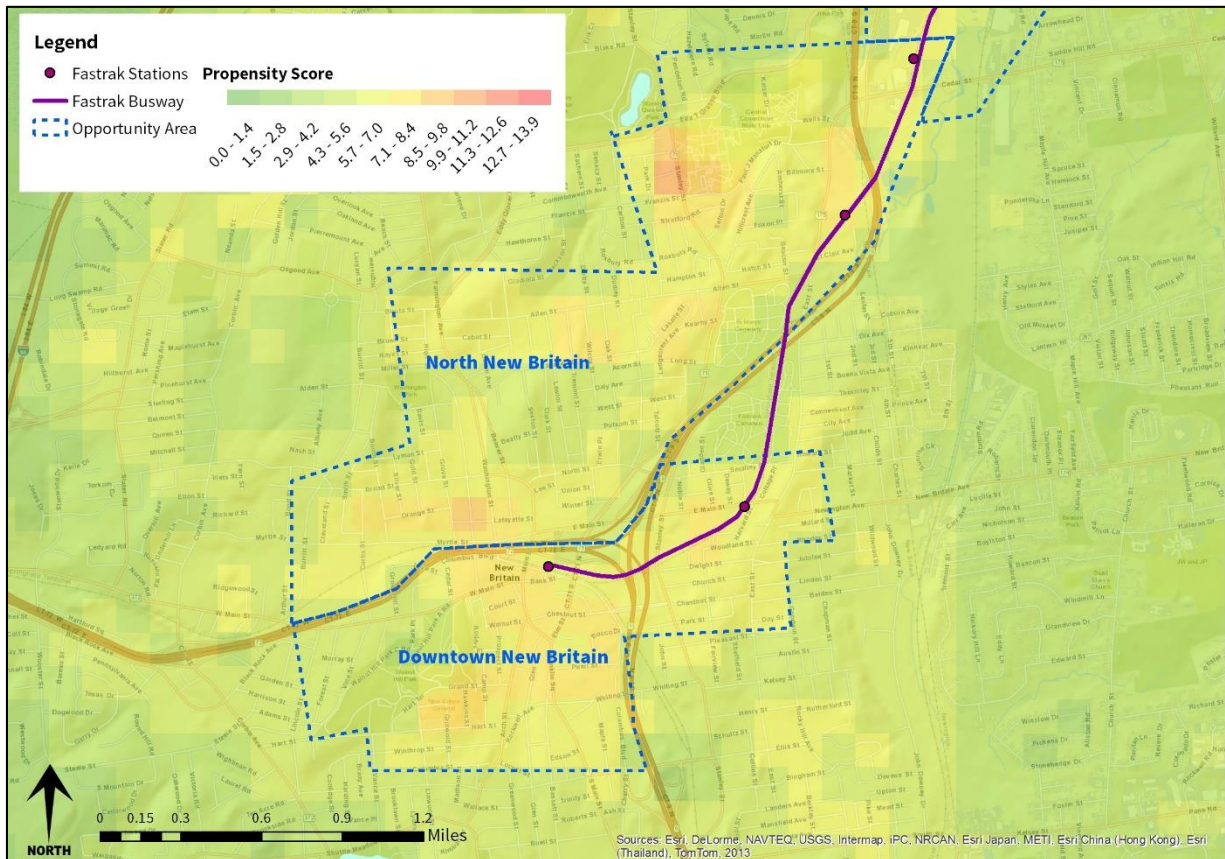
- Low development densities / suburban land uses
- Poor on-street bike infrastructure
- Highly peaked travel patterns to / from CTfastrak
- Untested conditions for bike share

There is a limited market for bike share along the CTfastrak corridor between New Britain and Hartford. Using bike share as a last-mile connection to CTfastrak has the greatest utility in Hartford and New Britain where riders can reach a number of destinations easily within a short-bike ride of stations. In the more suburban areas outside these two communities, the opportunities for bike share are limited by low density development and poor cycling infrastructure. Outside of New Britain and Hartford, the greatest potential for bike share along the CTfastrak corridor is at Flatbush and Elmwood station, where the CTfastrak stations are

near to residential and retail development. South of Newington Junction, bike share can provide recreation opportunities along the new multi-use trail that parallels CTfastrak.

North New Britain

Figure 4-5: New Britain Bike Share Submarkets



Strengths

- Vibrant neighborhood serving retail corridor along Broad Street
- Central Connecticut State University
- Access to CTfastrak

Weaknesses

- Topography – separated from downtown by large hill
- Cut off from downtown by highway
- Only two clusters of activity generators for bike share (CCSU and Broad Street)

North New Britain features two areas that show promise for bike share: Central Connecticut State University (CCSU) and the Broad Street corridor. CCSU features the largest student population in the region and bike share could facilitate intracampus travel and connections to the Cedar Street and East Street CTfastrak stations. Near to downtown New Britain, Broad Street features a vibrant neighborhood-serving retail corridor, surrounded by higher density residential neighborhoods. The primary challenges in this submarket are topography and

infrastructure; Broad Street is less than a mile from downtown New Britain and the CTfastrak, yet a steep hill will be a deterrent to cycling. While CCSU is only a short bike ride from CTfastrak, existing cycling infrastructure will need to be improved between the campus and CTfastrak to make bike share an appealing mode.

Central New Britain

Strengths

- Terminus of CTfastrak
- Commercial hub of city
- Opportunities to connect to local attractors like Walnut Hill Park
- Good cycling infrastructure

Weaknesses

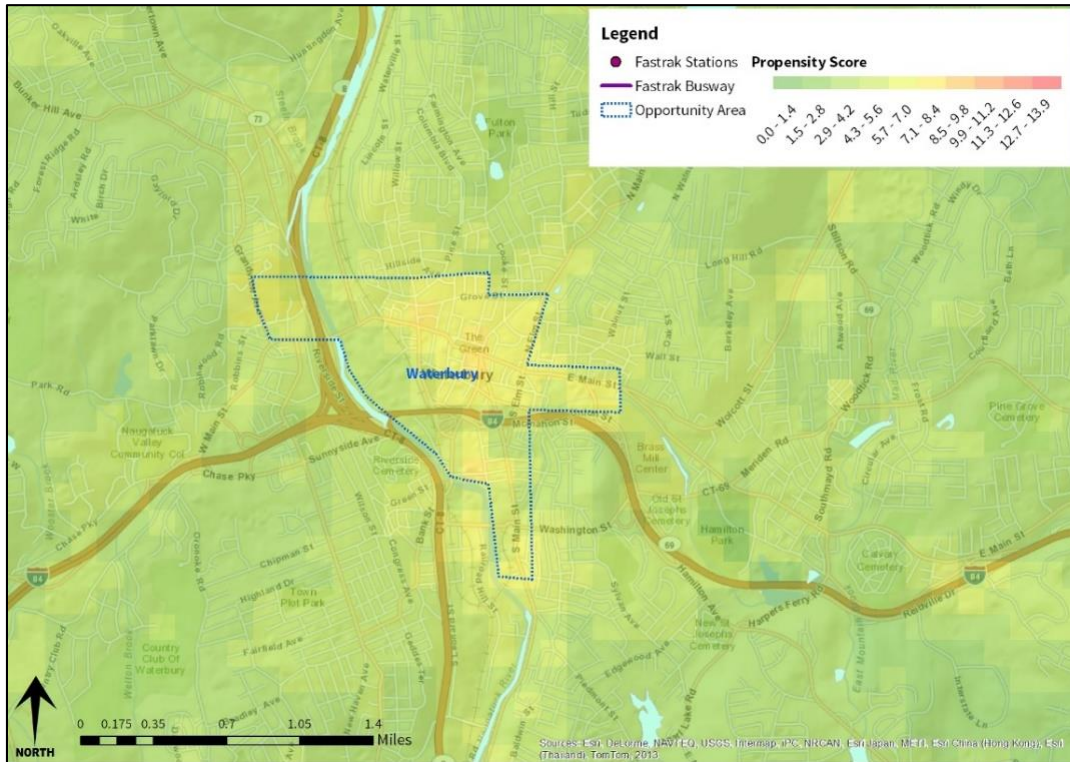
- Highway cuts off East Main Street from downtown
- Downtown lacks a high density of retail and entertainment destinations

Downtown New Britain is the terminus of the CTfastrak corridor. Within a short biking distance of CTfastrak are the main commercial corridors of downtown, important employers such as the State of Connecticut and The Hospital of Central Connecticut, historic Walnut Hill Park, and the New Britain Museum of American Art. The area benefits from a growing network of bicycle lanes and marked share-use streets.

Downtown New Britain has two primary market weaknesses. As in West Hartford, New Britain's downtown is fairly compact and only requires a limited number of stations. Central New Britain also lacks the kind of vibrant retail activity that helps generate use throughout the day.

Waterbury

Figure 4-6: Waterbury Bike Share Submarket



Strengths

- High development densities
- Access to commuter rail and CTfastrak express service
- Interconnected street grid
- Local UConn campus

Weaknesses

- Small overall market size
- Would function as a separate system from the rest of the network
- Lack of bike infrastructure

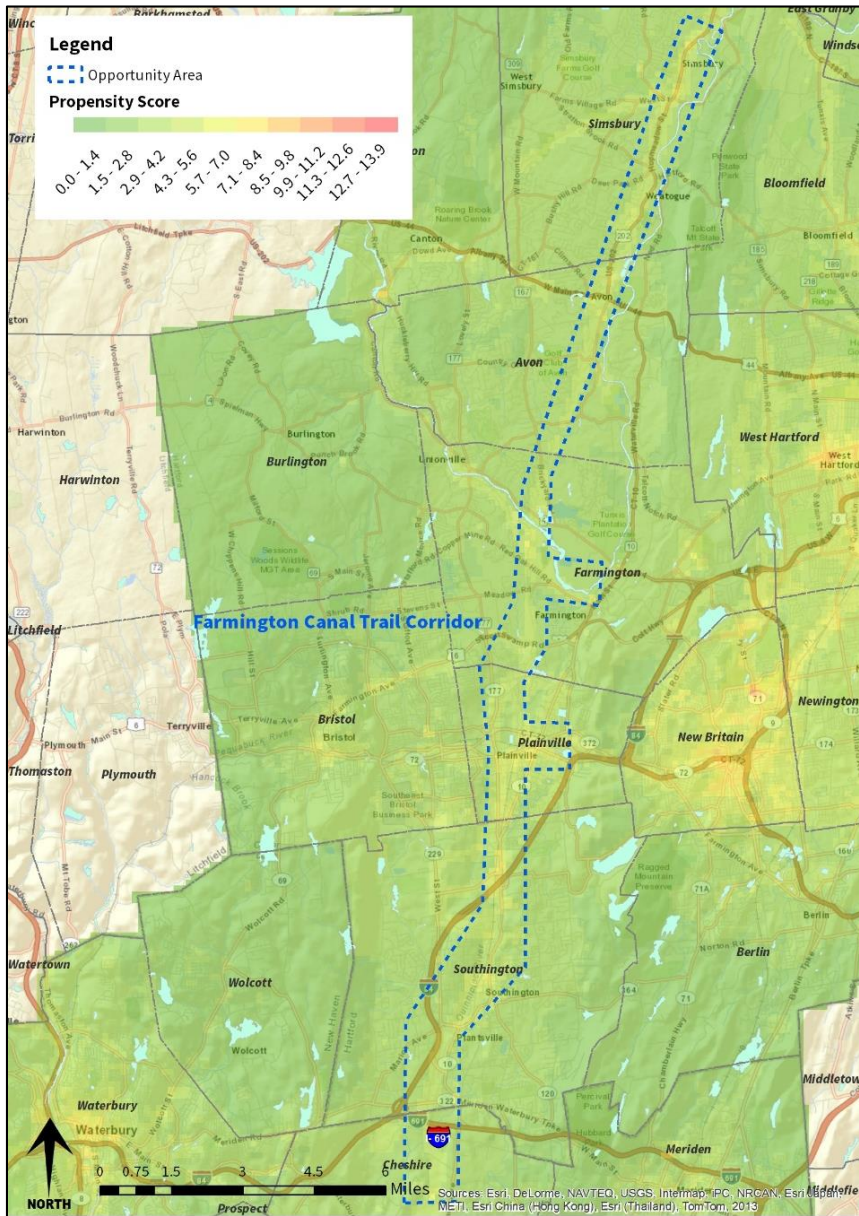
The Waterbury submarket features conditions similar to Central New Britain, with bike share most feasible in the city’s historic center and surrounding higher density residential neighborhoods. Bike share could provide circulation within downtown and improve connections to the Waterbury Metro-North station and other local transit services, including CTfastrak express buses. The greatest propensity for bike share is in the area around Waterbury Green, including at the University of Connecticut Waterbury Campus and St. Mary’s Hospital. Bike share could tie in to the Naugatuck River Greenway, a proposed multi-use path along the Naugatuck River and serve recreation trips from downtown. Finally, bike share could better

connect downtown with Waterbury Hospital across the Naugatuck River, and Brass Mills Center, a large indoor mall to the east of downtown.

Waterbury features a number of challenges for bike share. The overall submarket is compact and could only support a limited bike share system. The submarket is located outside biking distance from other submarkets, resulting in an isolated system. Lastly, the City of Waterbury has limited cycling infrastructure which may deter possible users.

Farmington Canal Trail

Figure 4-7: Farmington Canal Submarket



Strengths

- Popular, heavily used trail
- Potential to serve a tourist and recreational submarket
- Connects to a number of small town centers along its path

Weaknesses

- Mostly reliant on a tourist / casual user market
- Few major destinations along the corridor
- Development densities would require a small scale system – different characteristics from other opportunity areas

The success of Simsbury Free Bike shows the potential for a recreation-focused bike share system along the Farmington Canal Trail. The trail connects to a number of nodes that show some bike share propensity. A system along the canal trail would likely function very differently from bike share in the other submarkets. The system would serve largely a leisure market with a high percentage of trips starting and ending at the same station. Because of the unique nature of this market, the Farmington Canal Trail is likely better served by a simple community-based bicycle library than a full bike sharing program.

5 System Scope and Phasing

5.1 VISIONING AND SCENARIO TESTS

Before arriving at a final concept for bike share in the Hartford Region, the planning team explored three theoretical scenarios for bike share expansion and development; it was not the intention that one of these scenarios be selected for implementation, but that the results of the scenario analysis inform the development of a realistic system plan. High level cost and ridership estimates were developed for each scenario which allowed the planning team to better understand the feasibility of bike share across the Metro Hartford Region. The market study identified ten potential submarkets for bike share, and nine of these are included in at least one of each scenario; the Farmington Canal Trail was ruled out for further study as it did not serve the type of market envisioned by the program's strategic goals and objectives. The three scenarios were:

- **Scenario 1: Central-Focused System:** A small-scale bike share system focused on Downtown Hartford and Asylum Hill.
- **Scenario 2: Regional System:** A large regional bike share system centered on Hartford, New Britain, and Waterbury.
- **Scenario 3: CTfastrak System:** A bike share system stretching from Downtown New Britain to Downtown Hartford with the goal of providing last-mile connections from every CTfastrak station to surrounding neighborhoods.

A simple model was developed to estimate ridership and revenue for each scenario, which in total encompassed nine bike share submarkets. The study team assigned each of these submarkets one of four market typologies modeled after peer systems, with distinct ridership rates and station densities (see **Figure 5-1** for an outline of the methodology). The scenario includes a mix of these four typologies, resulting in unique revenue, cost, and ridership outcomes. While the final cost and revenue projections in the business plan are much more refined than this exercise, these estimates allowed the study team to demonstrate to stakeholders the feasibility of various expansion strategies.

Figure 5-1: Methodology for Scenario Exercise

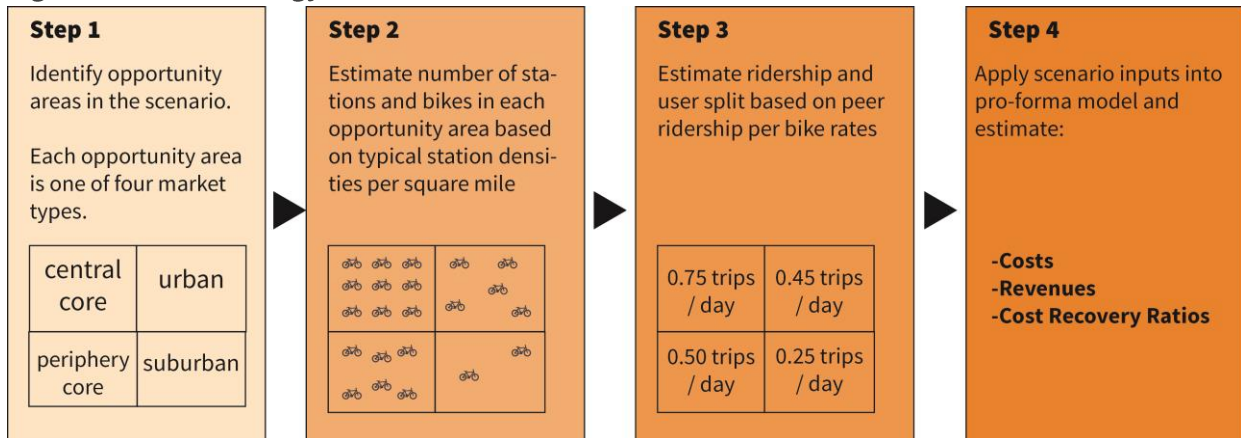


Table 5-1: Scenario Comparison

	Scenario 1 – Central Focused System	Scenario 2 – Regional System	Scenario 3 CTfastrak System
System Size	Up to 85 bicycles	Up to 405 bicycles	Up to 335 bicycles
Ridership	Low total ridership but highest ridership per bike.	Highest total ridership and moderate ridership per bike.	Moderate ridership but poor ridership per bike.
Implementation	Small size would make implementation straightforward and affordable.	Large system would require large initial investment. Additional complication because of geographic dispersion of stations.	Required large initial start-up investment.
Financial Performance	Smallest subsidy required among scenarios.	Highest total subsidy and second highest subsidy per trip.	Moderate total subsidy and high subsidy per trip.
Program Goals	Will improve downtown Hartford livability. Negligible impact on single occupant vehicle trip reduction and regional mobility.	Greatest impact on improving regional mobility. Provide some last-mile connections to CTfastrak.	Will help support CTfastrak investment and improve regional mobility. Poor financial performance.

As **Table 5-1** illustrates, each scenario has its benefits and drawbacks. Scenario 1 would be the simplest and lowest cost option to implement. The system’s small size would require much less capital funding to implement, reduce initial start-up costs, and allow for certain administrative and operating functions to be absorbed by existing organizations. Creating a bike share system in downtown Hartford would also have economic benefits, providing an attractive amenity for employers and the area’s growing residential population. The limited scale of the system however would make it difficult to meet Metro Hartford Region’s goals for a bike share system. A Downtown focused system does little to address single occupancy vehicle (SOV) trips as the

system would not address how people get to downtown, simply how they circulate through it. This scenario does little to improve regional mobility as well, and would not address existing mobility needs like enhancing transportation options for zero-car households.

Scenario 2 does the best job at meeting the program's mobility and SOV reduction goals. The system would provide a true transportation alternative for residents of Hartford, New Britain, and Waterbury. The system would serve urban neighborhoods with high proportions of zero-car households. Moreover the scale of the system would provide a true alternative to short car trips. Riders could use bike share to commute from outlying neighborhoods to Downtown Hartford, or utilize the system to connect to CTfastrak stations in the three core cities. As this scenario has the most bicycles, capital and operating costs would be significant. Trips per bike would be lower than Scenario 1 but higher than Scenario 3. Logistically the system would be challenging to implement, and its large size would require dedicated administrative staff and operating facilities. Implementation is further complicated by the geographic dispersion of the system across three cities.

Scenario 3 excels the most at providing a last mile connection to transit but is likely the least feasible scenario for bike share. The low densities surrounding some CTfastrak stations means that ridership is projected to be very low. As with Scenario 2, start up and implementation would require large capital and operating outlays, including full administrative capacities to oversee the system.

The scenario exercise provided a number of lessons to guide the final concept for the metropolitan region's bike share program:

- **Start off with a small scale pilot:** A pilot in downtown Hartford allows the region to test bike share on a smaller scale system with simplified implementation and administrative needs. A pilot will allow the system owner to build up expertise before committing to large regional system.
- **Grow gradually into a regional system:** A regional bike share system would be expensive and logistically complicated to implement quickly. If the initial pilot succeeds in Central Hartford, the system can be expanded phase by phase into a regional system. A phased approach will allow the system to adjust strategy if certain submarkets underperform or prove more successful than anticipated.
- **Look for selective opportunities along CTfastrak:** Not all CTfastrak stations have suitable conditions for bike share, however there are select opportunities along the corridor to use bike share to connect CTfastrak to nearby destinations

5.2 SYSTEM OVERVIEW

A system implementation and phasing plan has been developed that best reflects program goals while maximizing potential usage and is realistic in terms of how much can be implemented at one time, given the administrative time it takes to launch, implement, and operate a bike share system. The plan does not imply that funding is available for the bike share system; funding will need to be identified before implementation of this plan.

The planning team proposes a regional bike share system with 322 bicycles at 55 locations (stations) across three phases. Phase 1 will focus on building out a core system in the City of Hartford. The phase will commence with a ten station pilot focused on Downtown and Asylum Hill. Based on the success of this pilot, Phase 1 will be completed by adding 20 additional stations in surrounding neighborhoods of Hartford and East Hartford, including potential stations at Goodwin College and the University of Hartford. Phase 1 will form the core of the system and focus on locations with the highest anticipated bike share propensity in the system.

Phase 2 will expand bike share regionally. A total of fourteen station will be added, many of them enhancing access to the CTfastrak BRT corridor. Stations will be located in West Hartford, around select suburban CTfastrak stations, and in central New Britain.

Finally Phase 3 will expand bike share into central Waterbury. This phase will be completed after the successful launch of Phase 1 but can be implemented on an independent time frame from Phase 2, possibly preceding the completion of that phase.

This study does not determine the exact location or final number of stations in each phase but instead provides an approximate service area and system size for each phase. Before the system launches, detailed station location planning will have to be conducted to determine the exact sites of stations. During this process the total system size may change depending on the number of suitable locations for bike share. Furthermore, even at full build-out of this plan additional opportunities exist for bike share in each phase.

It should also be noted that the presence or lack of high quality bike infrastructure may make some locations more or less suitable for bike share. System planners should work closely with the state and municipalities to identify locations where targeted infrastructure improvements can enhance the proposed bike share deployment.

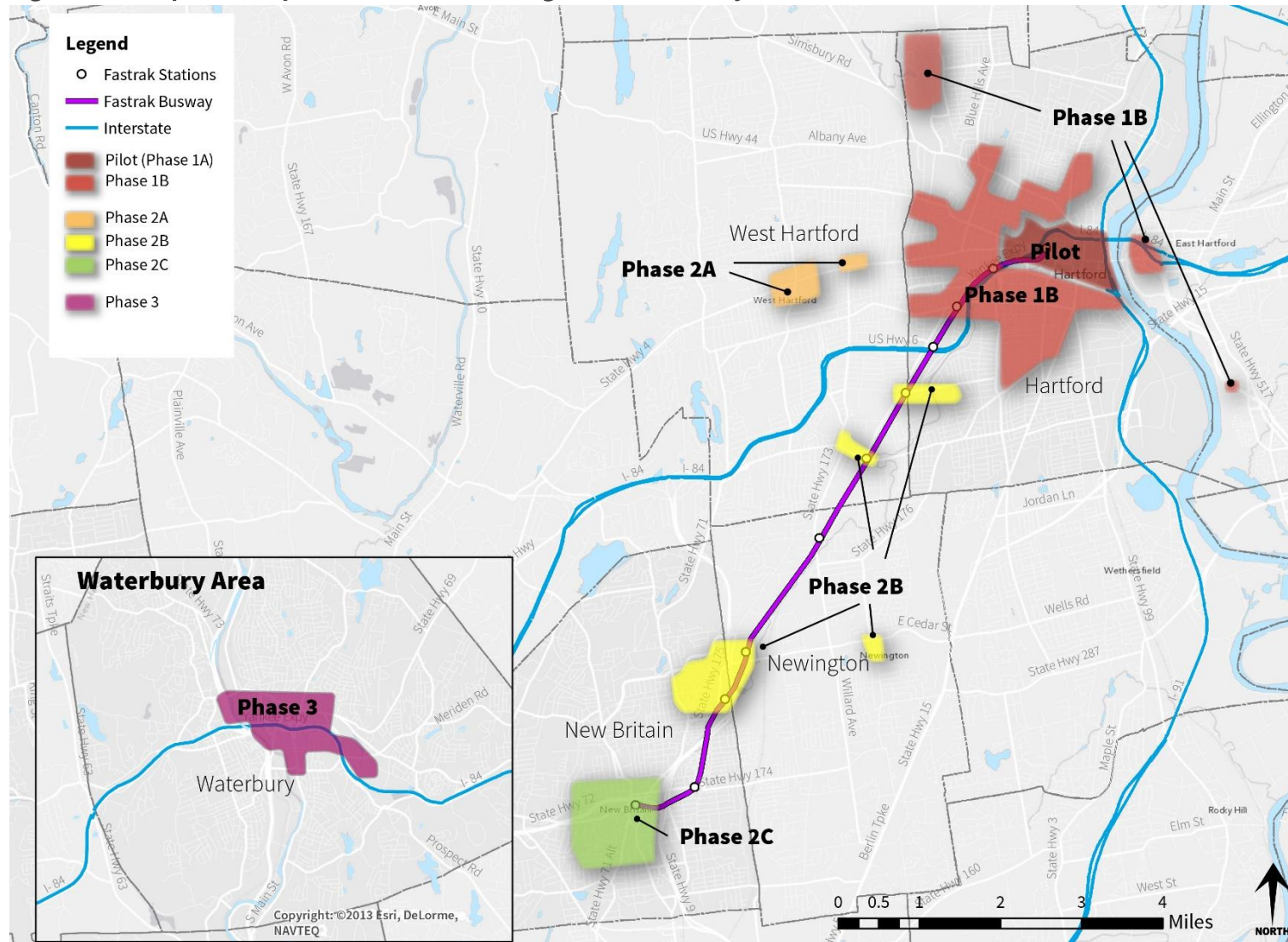
5.3 SYSTEM TIMELINE

The planning team anticipates up to a seven year timeframe to implement the full vision of this plan (**Figure 5-2**). If the region decides to go ahead and implement bike share, the process of procurement, initial planning, and start-up should take approximately one year. The pilot system will be launched first, followed by the completion of Phase 1 within two to three years of the pilot’s launch. Phase 2 will occur in years four and five, while Phase 3 can occur any time after the completion of Phase 1 in year three.

Figure 5-2: Project Timeline

Phase	Pre-Launch	Year	Year 2	Year 3	Year 4	Year 5	Year 6
<i>Phase 1</i>		<i>Pilot</i>					
<i>Phase 2</i>							
<i>Phase 3</i>							

Figure 5-3: Proposed Scope of Metro Hartford Region Bike Share System

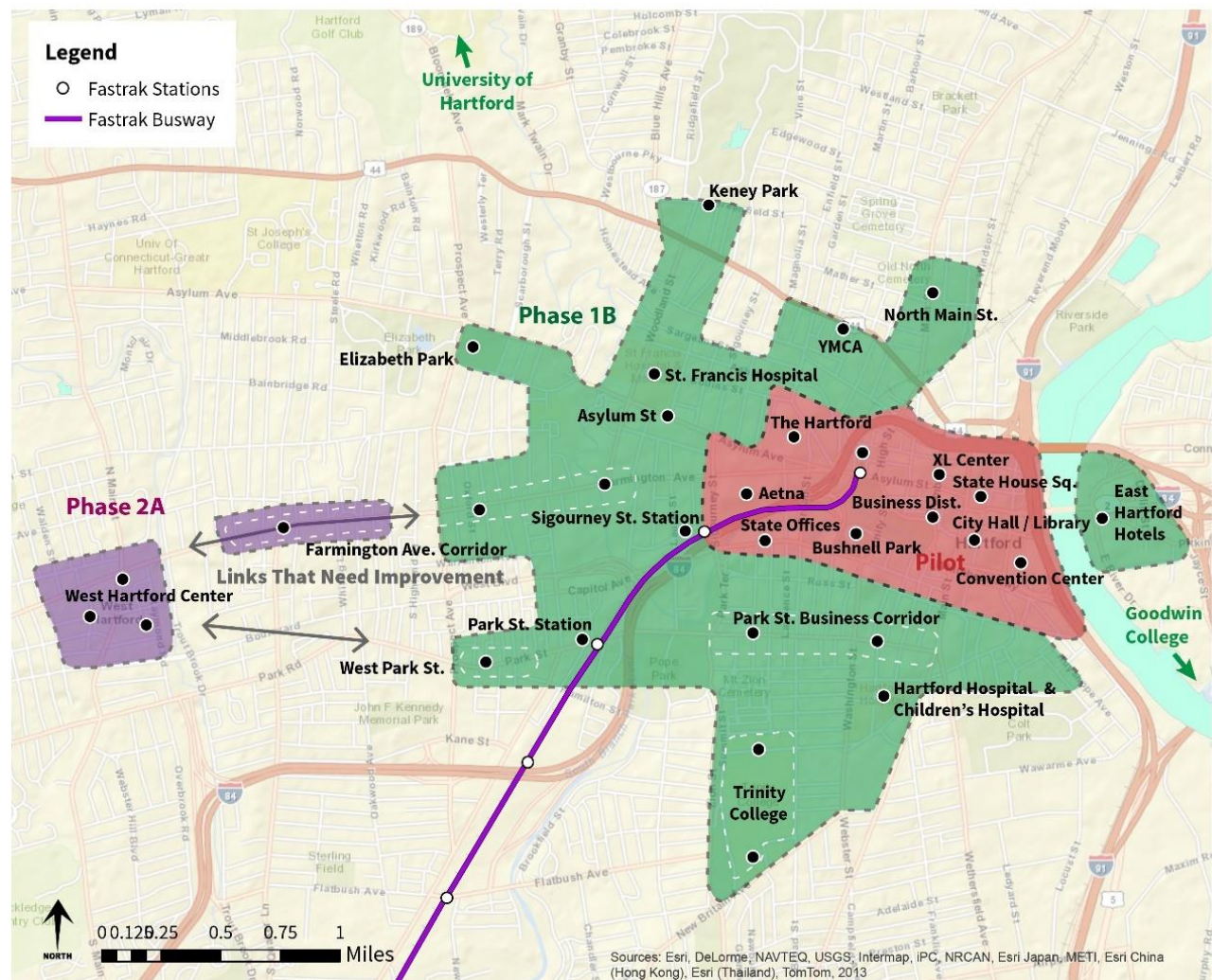


5.4 PHASING CONCEPT

The following section provides additional detail about the size and scope of each phase. To better visualize what bike share would look like in the Metropolitan Hartford Region, the planning team delineated service area boundaries by phase that correlate with the geographic span of the system. Within each service area, dots identify possible bike share station locations.

These locations are intended to visualize the extent of the system, and helped the planning team refine the number of stations needed to serve each phase. The final exact station locations and number of stations will differ because of a number of factors such as funding opportunities, siting restrictions, and public feedback. Before the system is implemented, more detailed planning must be conducted that includes public consultation of station locations.

Figure 5-4: Phase 1 and Phase 2a



Pilot Phase (1A)

The Pilot Phase covers downtown Hartford and a portion of Asylum Hill with 10 stations and 75 bikes. The intent of this phase is to serve primarily the core business district of the Hartford region. Approximately 56,000 jobs are located within this area, including the offices of Aetna, The Hartford, and Travelers. While this area is primarily a commercial district, Hartford's downtown is experiencing a residential renaissance, with population growth of over 65% between 2000 and 2010. Ongoing residential development and the relocation of UConn's Hartford campus to downtown will further bolster its population. Finally downtown hosts a number of major draws for tourists and local residents, including the Convention Center, XL Center, Hartford Library's main branch, Bushnell Park, Wadsworth Athenaeum, Science Center, restaurants, and the State House.

The pilot phase is envisioned to serve primarily circulation within downtown, along with better connections to key destinations from CTfastrak service. Downtown has a number of activity centers that would benefit from stronger linkages. For employees, bike share could make getting to a meeting easier and going out for lunch more convenient. Visitors could use bike share to explore the city and combine multiple sites into one trip. Finally for residents, bike share makes living downtown more convenient and provides an alternative to driving.

Phase 1B

Phase 1B will expand bike share to surrounding locations in the City of Hartford and Town of East Hartford. This phase will consist of 24 stations and 132 bicycles. Unlike the pilot, Phase 1B will serve a large residential population, with approximately 70,000 people living within the phase's boundaries. Neighborhoods like Clay Arsenal, West End, and South Green feature the high residential densities suited for bike share. The Park Street and Farmington Avenue corridors are especially promising as they feature a mix of commercial business and apartments.

Phase 1B also will serve a large amount of employees. Approximately 40,000 jobs are located within the service area. The most prominent employers are the three major hospitals located in this phase, Hartford Hospital, Connecticut Children's Medical Center, and St. Francis Hospital. Hospitals can be uniquely served by bike share as employees work non-traditional hours and are poorly served by typical transit schedules.

Phase 1B will also include a large student population. Over 10,000 students are enrolled at the University of Hartford, Trinity College, and Goodwin College. As interviews with other Connecticut bike share programs show, universities are strong drivers of bike share demand. As with hospitals, students are poorly served by traditional peak-focused transit services.

Within this phase there are a number of major recreation and community centers. Bike share could connect residents to places like the YMCA in North Hartford, Keney Park, Elizabeth Park, and the riverfront trail in East Hartford.

The system is envisioned to strengthen neighborhood mobility. Hartford has one of the largest proportions of zero-car households in the country at 36 percent. Bike share will provide a new transportation option that

complements existing fixed-route transit service. Users can use bike share to travel to the store, access public services, reach parks and recreation opportunities, and travel to work. The phase is designed to take advantage of CTfastrak by connecting users to stations at Park Street and Sigourney Street.

Beyond the 24 stations in Phase 1B, there may be additional opportunities for bike share within the City of Hartford and East Hartford. Residential areas outside the boundaries of Phase 1B in **Figure 5-4**, such as South End and parts of North Hartford scored highly on the bike share propensity index due to their high population densities and transit usage. Additionally, East Hartford could in the future support more bike share stations if cycling infrastructure improves.

Phase 2

Phase 2 is composed of three sub-phases that represent different geographic areas. The timing of these three sub-phases can happen in any order, however a sub-phase should be fully implemented before expansion into another phase commences.

Phase 2A

Phase 2A will serve the West Hartford Town Center as well as potential locations along Farmington Avenue. West Hartford Town Center is a major retail and dining destination for the region. Bike share is envisioned to primarily support trips within the Town Center. Visitors could park once and then utilize bike share within the center. Residents in the town center can use bicycles for commuting or recreational purposes.

Overall the system in West Hartford will be fairly small scale with only four stations projected for Phase 2A. For this phase to be successful, cycling links between the City of Hartford and West Hartford Center need to be improved. Bike share users could easily reach downtown Hartford or CTfastrak at Park Street within 20 minutes or less, however the lack of dedicated bike lanes means that most cyclists would not feel comfortable making the trip.

Phase 2B

Phase 2B will focus on expanding bike share along the CTfastrak Corridor between Hartford and New Britain. Much of the corridor is very suburban and features conditions untested for bike share. The best opportunities for bike share along the corridor exist around Central Connecticut State University (CCSU). The university's campus is located less than a mile from two CTfastrak stations. As CCSU is largely a commuter school, a substantial share of students are expected to ride transit to campus.

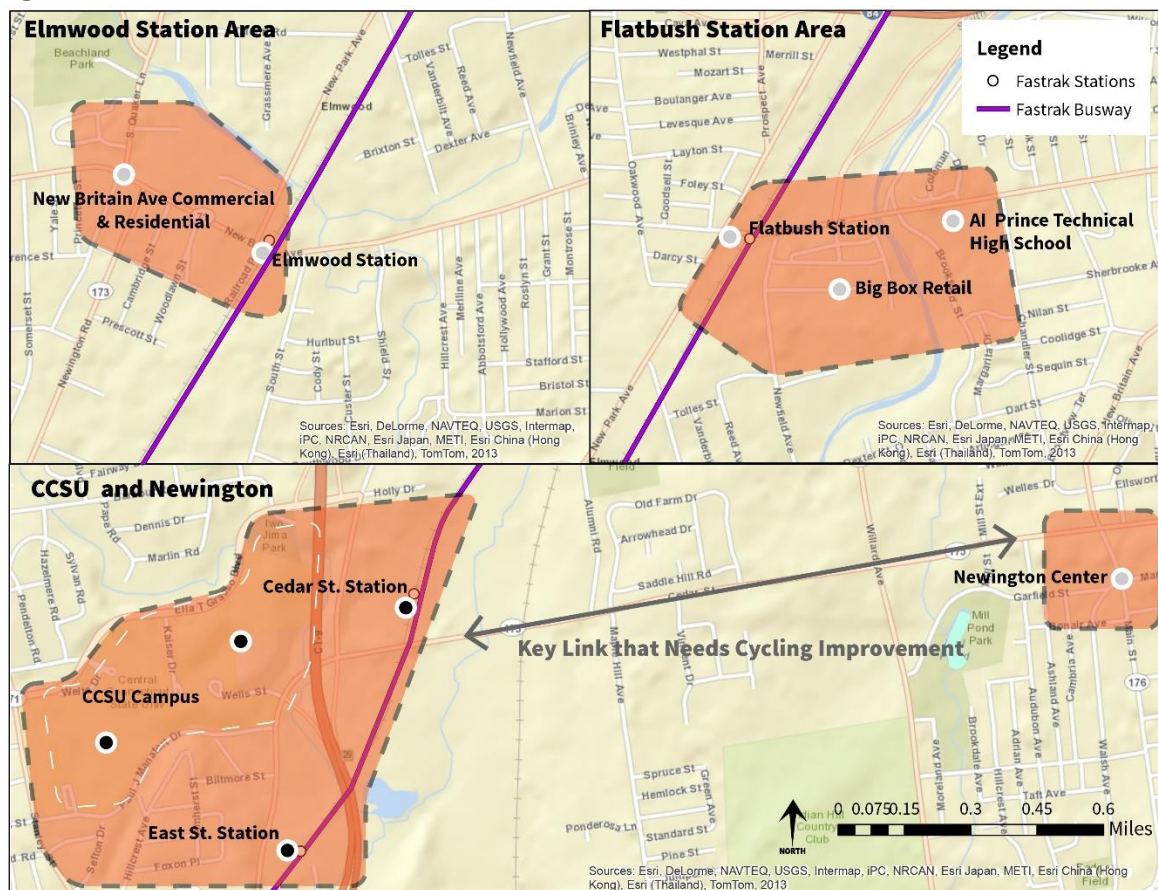
About one and a half miles from the Cedar Street CTfastrak Station is Newington's town center. The historic town center features a strong retail corridor which could be served by bike share. Bike share could easily provide a link between Newington Center, Cedar Street and CCSU. Currently Cedar Street, the only road that connects directly between CCSU and Newington center, has a very poor cycling environment. The expansion of bike share to Newington Center should be done in tandem with cycling infrastructure improvements.

Finally the market analysis showed that bike share could fulfill market needs at the two CTfastrak stations just south of the City of Hartford, Elmwood and Flatbush stations. Flatbush Station is located near to a large

complex of big box retail that could be better connected to the station by bike share. As the station lies just south of the City of Hartford, city residents could use bike share and CTfastrak to access the major retailers near the station such as Wal-Mart. The AI Prince Technical High School, which draws students from a number of towns, is also within biking distance of Flatbush station. Elmwood station is located on New Britain Avenue, which features clusters of retail and multi-family housing half a mile east of the station. In addition the area has fairly good bicycling connections along Quaker Lane into West Hartford Center and Downtown Hartford. While stations in this area have some potential for success, bike sharing in similar land uses in other regions has not yet proven itself.

As the suburban locations included in Phase 2B are a largely untested market for bike share, the planning team recommends a conservative approach to expansion in this phase. The plan only contains four stations for Phase 2B, with the preferred location for these stations being around CCSU, Cedar Street Station, and East Street Station. Based on future funding and the success of these stations, the system can expand to include the other identified areas in this phase.

Figure 5-5: Phase 2B

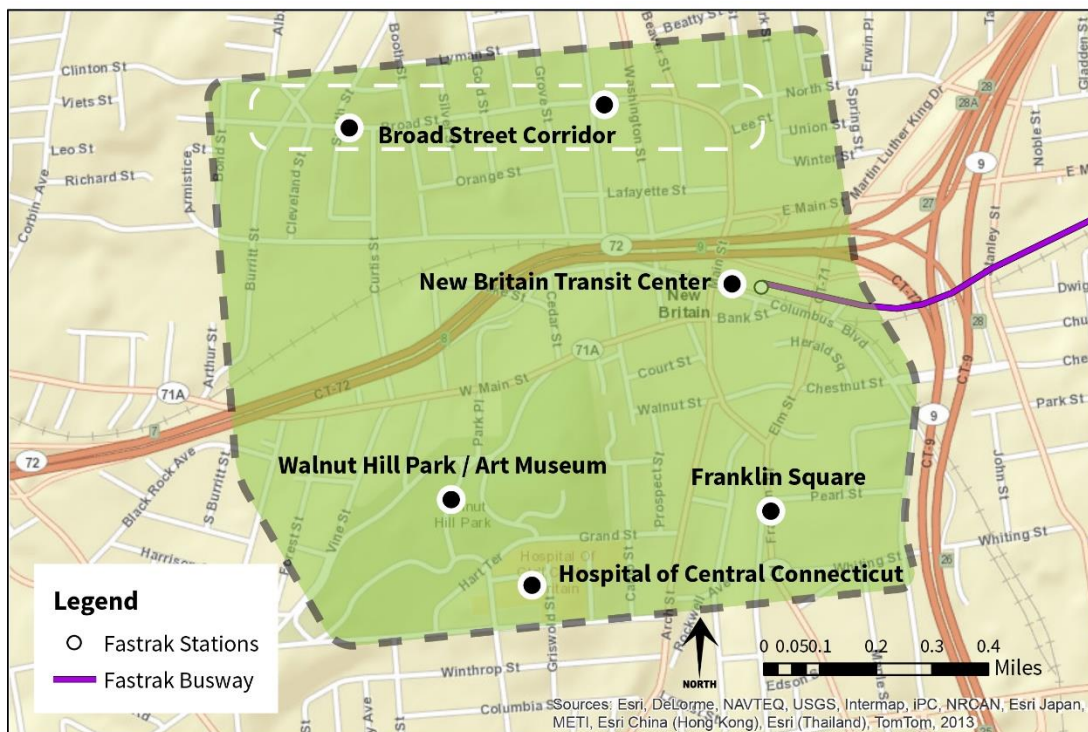


Phase 2C

Phase 2C covers central New Britain and the Broad Street corridor to the north of downtown. The focus of the system will be the new transit center at the New Britain CTfastrak Station. This station will be a major transit hub for future CTfastrak bus service. Additional bike share stations can serve state offices at Franklin Square, the Hospital of Central Connecticut, Walnut Hill Park, and the Broad Street commercial corridor. The phase is projected to need six stations.

Phase 2C is expected to provide improved connections between key destinations in New Britain and the CTfastrak station. The service area is focused on the densest part of New Britain and has high population densities and moderate commercial densities. The service area connects major employers just beyond walking distance to CTfastrak, such as the Hospital of Central Connecticut and the Public Utility Regulatory Authority (PURA) by Franklin Square.

Figure 5-6: Phase 2C

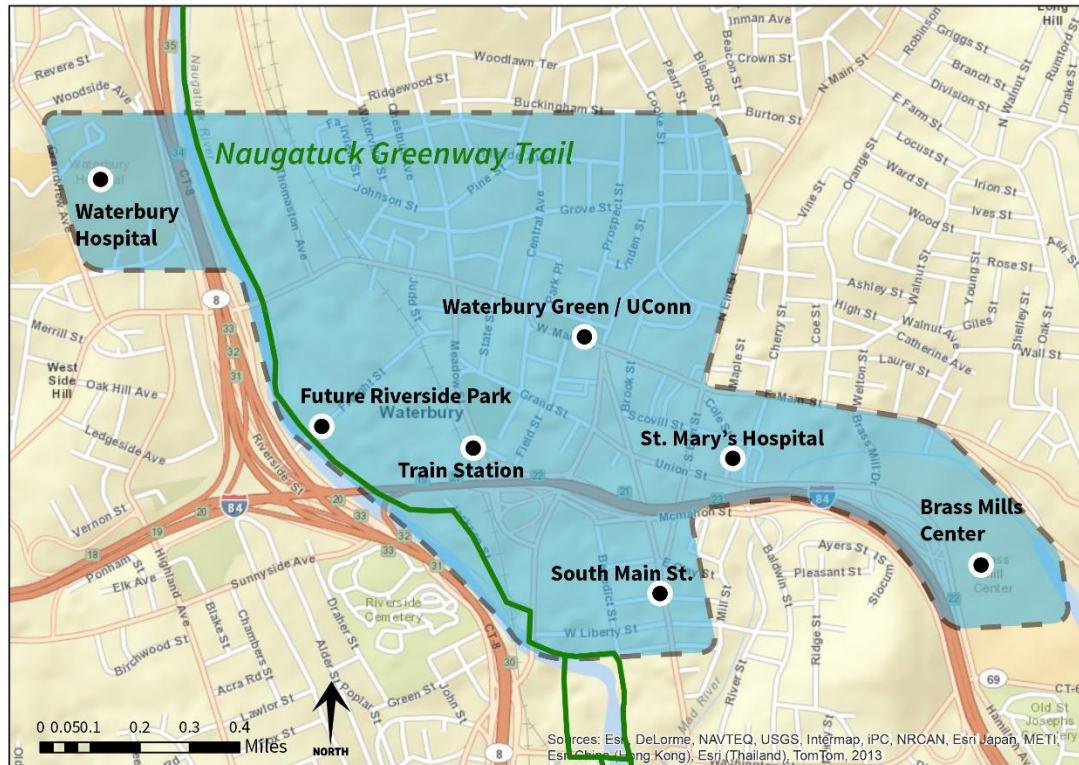


Phase 3

Phase 3 focuses on the core of Waterbury and includes seven stations. The relative small size of the system and lack of connections to the rest of the bike share network will mean this phase will have fairly low ridership. The success of the system in Waterbury is contingent on the completion of the Naugatuck Greenway and Riverfront Park. The Greenway, which is currently under design, will connect downtown Waterbury with destinations up and down the Naugatuck River. The Riverfront Park will transform derelict land along the river into a 16 acre public park.

Along with providing recreation opportunities along the Greenway, bike share can serve a number of employment and retail destinations in central Waterbury such as St. Mary's Hospital, UConn Waterbury, and the Palace Theatre. The system will extend to the east along East Main Street as far as the Brass Mills Center, Waterbury's largest shopping mall. To the west, the system will stretch across the river to serve Waterbury Hospital.

Figure 5-7: Phase 2C



6 Business Model

Developing a business model is an important part of planning for the implementation of a new mode like bike share. There is a tremendous degree of diversity in how North American bike share systems are operated, and every bike share system has developed its own business model that reflects local context. A bike share system's business model can be divided into four basic components:

- Ownership Structure
- Operating Structure
- Technology
- User Fare and Fundraising Strategy

The Metro Hartford Region has a number of characteristics that help shape the recommended business model. The bike share service area is large, covering a number of independent jurisdictions. The towns and cities that fall under this plan include dense downtowns, traditional town centers, and suburban areas, and a system must be flexible enough to scale easily to these varying contexts. Additionally, because of today's competitive funding climate for transportation projects, a bike share system in the Metro Hartford Region will require a lean operating structure and strong private sector funding commitment.

6.1 OWNERSHIP STRUCTURE

While most bike share systems are the result of partnerships across multiple organizations and entities, every system has a project owner that purchases and owns the equipment. A number of ownership structures are represented by bike share systems in North America. All systems fall into three broad ownership categories: public, non-profit, and for-profit; within these categories there is a great degree of diversity. For example, a publicly owned system can be owned by local government, a public agency, or an independent public authority. A non-profit system can be owned by an existing organization or a new non-profit can be established with the sole purpose of operating bike share. Finally, for-profit systems can include both systems established independently of government support or through a public solicitation for bike share.

With each model comes strengths and weaknesses (see **Table 6-1**). Typically, for-profit systems have only succeeded in places where there is either very high density of demand, or in niche markets such as tourist destinations. Non-profits were early pioneers in North American bike share and a number of existing systems are non-profit owned; however in the absence of an existing non-governmental organization to champion bike share, a new one has to be established from scratch. Most of the large bike share systems in North America are owned by a public entity, allowing for public oversight of planning and implementation.

Table 6-1: Overview of Basic Ownership Models

Owner Type	Common Funding Sources	Strengths	Weaknesses	Examples
Public	City, state, and federal funds; bonds; private fundraising.	<ul style="list-style-type: none"> ■ Allows for maximum public control and access to public funds. ■ Quick start-up as no new organization must be created. ■ Depending on system size, administrative costs can be absorbed by public entity. 	<ul style="list-style-type: none"> ■ Less nimble in procurement and decision making; sensitive to changes in political support. 	Capital Bikeshare (Washington DC), Hubway (Boston)
Non-Profit	Private fundraising; City, state, and federal grants.	<ul style="list-style-type: none"> ■ Nimble. ■ Can more easily attract private fundraising. ■ Non-profits typically retain a degree of public oversight, either through board representation or informally. 	<ul style="list-style-type: none"> ■ Extensive effort devoted to fundraising. ■ If no existing non-profit exists, a new one must be created. 	NiceRide Minnesota, Greenville B-Cycle (South Carolina)
For-Profit	Private	<ul style="list-style-type: none"> ■ No financial burden on the public / minimizes public risk. 	<ul style="list-style-type: none"> ■ Limited public input into station locations. Because of overriding financial concerns, stations are concentrated in only high-use areas. 	DecoBike (Miami), CitiBike (NYC)

For the Metro Hartford Region the preferred ownership structure is for the system to be owned by a single regional public entity. The Greater Hartford Transit District (GHTD) and the Capitol Region Council of Governments (CRCOG) are proposed as possible system owners. Connecticut has a long history of utilizing regional agencies to provide services across multiple jurisdictions and even state-wide. For example the Greater Hartford Transit District serves a number of functions, including operating Connecticut’s statewide FTA Drug and Alcohol Test Consortium. While both GHTD and CRCOG have defined boundaries, both have run programs that extended beyond their official boundaries, so jurisdictions beyond those borders would not be precluded from participating in the bike share program. While the regional entity would legally own the system, partners would play key roles in administering and supporting bike share.

Having a single regional agency in charge of bike share will allow the system to be easily scalable from a Downtown Hartford only pilot to a true multi-jurisdictional system. Even though a regional entity would own the system, local jurisdictions will play a major role in supporting bike share and will be key partners in developing the system. Public ownership was selected as the preferred option because it allows for the greatest flexibility to use public funds and will ensure the highest degree of public accountability. Moreover

the system, especially in the smaller pilot phase, can rely on existing resources to support bike share. As program administration during the pilot phase is not anticipated to be a full-time job, employees could spend part of their time on other agency initiatives or programs. Moreover, administrative costs would be reduced by negating the need for additional office space, IT systems, payroll, or human resources. Unfortunately, due to staffing constraints at both organizations, additional staff would have to be hired to administer the system. The planning team recommends that the public entity owning the system establish or affiliate with an existing 501(c)(3) non-profit to facilitate private fundraising and donations for the program.

6.2 OPERATING STRUCTURE

There are two common operating structures for bike share (**Table 6-2**). A number of North American bike share systems are directly operated, meaning that the system owner also operates the system. Directly operated systems are most common among non-profit owned systems like NiceRide in Minnesota and for-profit systems like DecoBike in Miami. While direct operations allow the owner the greatest degree of control, direct operations require the system owners to develop extensive expertise in bike share operations.

An alternative operating structure in bike share, and the more common one among large systems, is to contract out operations to a third party vendor. The responsibility of the vendor can vary but typically includes most of the day-to-day operating functions like maintenance, rebalancing of bicycles, and customer service. The benefit of contracted operations is that system owners with no prior bike share experience can quickly launch a system. Vendors help reduce the risk of rolling out a bike share system by bringing national or even international expertise to the program.

As with many aspects of business models for bike share, not all systems fall neatly within these two operating structures. For example, a system may contract out only limited operating functions like maintenance, or it can be directly operated by the system owner but have a national bike share vendor support start-up. As bike share is a quickly evolving industry, operating structures continue to evolve as well.

For the Metro Hartford Region, the preferred system will have day-to-day operations handled by a third party vendor or multiple vendors. Contracted operations are well suited to the Metro Hartford Region for a number of reasons. The bike share system is envisioned to be easily expandable, even allowing for jurisdictions outside the region to join in. Having contracted operations allows the system to be more seamlessly expanded as communities can join an existing vendor contract. For example, Capital Bikeshare in the Washington DC region is actually owned by four jurisdictions; because all four contract to a single vendor the user experience is one of a unified bike share system.

Table 6-2: Direct Operations vs. Contracted Operations

Model	Pros	Cons	Examples
Directly Operated	<ul style="list-style-type: none"> Provides the system owner greater control over system costs and delivery of bike share to the market. 	<ul style="list-style-type: none"> Significantly increases the operational burden of bike share on the system owner. Requires that the operating entity have a degree of bike share expertise. 	NiceRide Minnesota, Deco Bikes Miami
Contracted Operations	<ul style="list-style-type: none"> Reduces the risk borne by the system owner. Allows systems to rely on the expertise of vendors with nationwide experience. Minimizes owner staffing needs. Insurance requirements and liability can be transferred to vendor. 	<ul style="list-style-type: none"> Owner removed from daily operations of the bike share system. Potential for higher costs because vendor profits account for a portion of operating costs. 	Chattanooga Bicycle Transit System, Hubway (Boston)

Contracted operations will also reduce the burden on the system owner to both launch bike-share and handle day-to-day operations. No local public entity or non-profit was identified that had suitable expertise to operate a bike share system. By contracting operations, a future bike share system can benefit from a vendor’s national experience.

Contracted operations allow the owner to share some of the risk of launching and operating bike share with a partner. A contractor typically has an insurance policy which covers most liabilities and indemnifies the system owner and property owners that host stations.

This business plan envisions that Hartford’s bike share system owner will have a lean structure with staff time spent primarily on overseeing the bike share contract, marketing and promotions. The bike share vendor would handle most functions associated with daily operations. See **Section 8.3** for more detail on the responsibilities of the administrative staff, and **Section 8.4** on the responsibilities of the bike share vendor.

6.3 TECHNOLOGY

Bike share technology is rapidly changing as new companies continue to enter the North American bike share equipment market. Since the launch of Montreal’s Bixi bike sharing system in 2009, most new systems have featured solar powered stations with automated docks that secure bicycles. Users can typically track bicycle availability over a smart phone or online, and access bicycles through a membership card or at a station kiosk. These systems have proven successful because of their durability and theft deterring design. One major downside of many dock based bike share systems is that they are expensive and often do not feature an integrated lock that allows for users to lock the bicycle up during their journey.

A number of firms are introducing dock-less systems and “dock-light” systems that utilize no docks or simplified docks. These systems feature smart bikes with built-in locking and communication equipment. Smart bike systems benefit from having lower capital costs, simplified station site planning and installation, and allow operators to more easily move equipment around. While smart bike systems are largely unproven in North America, over the next two years a number of systems using this technology are expected to launch, including Coast Bike Share in Tampa and a new system in Hoboken and Weehawken, New Jersey.

Figure 6-1: Example of a Typical Dock-Based System



Source: WNYC.com

Figure 6-2: Example of Smart Bike with Built In Locking Mechanism



Source: Social Bikes

A lower cost system for the Metro Hartford region would be preferable, as the system is not anticipated to generate the same intensity of use as seen in large cities. Given the lower capital costs, a smart bike based system is a strong possibility. However, as this technology has yet to be implemented in a large-scale urban setting, alternative capital cost projections have been developed for a dock based system. If smart bike systems, both those with no docks and those that are dock-lite, fail to perform well in other cities, a dock based system should be re-examined. Additionally, the selected bike share technology should feature the following:

- Durable design that is able to withstand urban usage and the region's climate;
- Robust locking mechanism;
- Built in primary or secondary locking mechanism to allow riders to lock bikes up during their journey, not just at stations;
- Ability to pair stations with a payment kiosk. All stations during the pilot phase will have a payment kiosk, however in later phases as little as 50% of stations will feature kiosks;
- Simple user interface at kiosks, on the web, and on smart phones; and
- Easily replaceable parts and components.

The above list simply helps set parameters for selecting bike share technology. Because of the rapid evolution in the marketplace, the system owner should be flexible in evaluating and selecting from a wide range of manufacturers and systems.

6.4 SYSTEM FUNDING

Bike share systems in North America typically rely on a wide range of revenue sources to support operations and capital. Few systems are completely self-supported by user revenue to cover operating costs. To make bike share a possibility in Metro Hartford, all possible revenue sources will need to be explored, including private sponsorships, advertising, charitable donations, and public funds. While the system will be operated by a public entity, the close cooperation of private partners will be vital.

User Revenue Structure

Most bike share systems in North America utilize a subscription model of pricing, where users purchase memberships that are valid for periods of time ranging from one day to a year. Once a membership is purchased, a user is afforded an unlimited number of trips at no extra cost as long as the trip is below a certain duration, typically 30 minutes. Once 30 minutes has passed, riders incur usage overage charges. The benefit of this model is that it encourages a quick turnover of bicycles. Quick turnover ensures that bikes are available for the largest number of users each day. This pricing structure also benefits regular users, as annual members become savvier and therefore less likely than short-term users to take lengthy trips that incur additional usage fees. On the other hand the short duration before additional charges begin can be off-putting to potential long-term members and even casual users.

Table 6-3: Pricing Structure of Sample North American Bike Share Systems

	Boston Hubway	Greenville B-Cycle	San Antonio B-Cycle	Columbus CoGo	Tampa Coast Bikeshare
Annual Membership	\$85	\$60	\$80	\$75	\$79
Short Term Memberships	\$6 for 24-hour membership	\$5 for 24-hour and \$15 weekly	\$10 for 24-hour and \$24 weekly	\$6 for 24-hour pass	\$5 per hour
Other Memberships	\$20 monthly				\$30 monthly
No-Fee Period	First 30 minutes of a trip	First 60 minutes of a trip	First 30 minutes of a trip	First 30 minutes of a trip	Members receive 60 minutes of free riding per day
Overage Fee Structure	Fees escalate each additional hour from \$1.50 to \$94.00	\$4 per each additional half hour	\$2 per each additional half hour	\$3 per each additional 30 minutes	\$2.50 per 30 minute

There are a number of new pricing innovations in bike share. One possible pricing structure is to charge users a price per trip instead of subscription. Another is to allow subscribers a certain allotted number of free riding minutes each day that can be spread over multiple trips, instead of allowing unlimited trips under a certain length; this can be especially attractive for smart bike technology where a user could lock the bike somewhere without a station while the “clock is still ticking.” Finally, to better moderate the distribution of bicycles throughout the system, variable pricing could be implemented to encourage riders to take trips against the peak flow or even uphill (Vélib in Paris gives a 15-minute time bonus when a user rides a bicycle from a lower to a higher elevation).

Because of the limited examples of bike share systems testing alternative pricing structures, this study assumes Hartford will utilize a subscription based model with trips over 30 minutes incurring a fee. This does not preclude the use of another model later, however the financial analysis in this business plan is based on this price structure.

There are two ways usage fees are typically structured. A number of bike share systems use an escalating fee structure. For example Hubway charges only \$1.50 for the first additional 30 minutes of riding, but that cost increases to \$94 per hour after a bike is out for six hours. Alternatively, systems like Columbus’s CoGo charge a flat fee for each additional half hour of service.

There are trade-offs between a flat and escalating fee structure. The majority of riders incurring overage fees will bicycle for less than 60 additional minutes, however a minority will take very long trips. With an escalating fee structure, long duration trips account for a large share of total revenue, allowing for reduced usage fees for short trips and slightly lower daily membership costs. Inversely, a flat fee structure will make the service slightly more expensive for short trips but more equitably spread over usage fees. Escalating fees have become less common among systems that opened over the last year because of the perception that they are complicated to understand and unfairly penalize new users unfamiliar with the pricing structure. Bay Area Bike Share and Divvy use a hybrid fee model, with a higher usage fee charged after the first hour.

Table 6-4 illustrates the fee structure necessary to bring in a similar revenue stream with an escalating, flat, and hybrid usage fee structure¹¹. At this time, no specific fee structure has been selected and the final structure will depend on what is considered more beneficial: providing users a lower up-front cost, or creating a simpler fee cost that does not penalize longer trips.

Table 6-4: Proposed Pricing Structures

	Escalating Fee Structure	Flat Usage Fee	Hybrid Structure
Annual Membership	\$75	\$75	\$75
24-Hour Membership	\$7.50	\$9.50	\$8.50
3-Day Membership	\$12	\$16	\$14
First 30 Minutes	Free	Free	Free
30-60	\$1.50	\$4.00	\$4.00
60+ minutes	First additional hour \$4.50, increasing by \$6 per hour until \$70.50 per hour by hour 7	\$4.00 / 30 minutes	\$7.00 / 30 minutes

¹¹ Financial model revenue estimates based on the escalating fee structure, however the other two fee structures have been calibrated to return approximately the same amount of user revenue.

Fees for Locking Bicycles Outside Stations

While smart bike technology would allow trips to end outside of pre-determined stations, doing so will add operations and usability challenges for a bike share system as large as the one proposed for the region. Instead, the pricing structure should prohibit ending a trip outside designated stations. Bicycles should be able to be locked up away from bike share stations during a rental, however the usage clock will continue to tick and users will not be allowed to end their journey outside of a station location.

Public Funding

City, state, and federal funds are all important sources of funding for bike share. Like all modes of public transportation, bike share usually relies on public support for operations and/or capital funds. Communities choose to subsidize bike share for various economic, mobility, and public health benefits.

Because of limitations on using federal funds for ongoing operations, state and local funding is more commonly used to cover operating expenses than federal funding. Federal funding for bike share typically comes from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) and is used to cover capital expenses; many systems have relied on Congestion Mitigation and Air Quality (CMAQ) funding. Different restrictions apply depending on where federal agency funds are sourced. For example, FTA funds may only be used for docks and other equipment but not for the bicycles themselves. Moreover bike share projects are only eligible for FTA funds if they have a *de-facto* relationship to transit within three miles. FHWA funds have fewer restrictions and grant revenue can be used to purchase bicycles as well as other equipment.¹²

When utilizing federal funds additional restrictions may apply. FHWA and FTA funds are subject to Buy-America rules. Capital equipment funded through FHWA must be produced with at least 90% domestically made steel or iron content. FTA restrictions go even further to require each end product and its components be assembled in the United States.

In procuring state and federal grants, the bike share owner should explore partnering with other bike share operators in Connecticut in a state-wide grant proposal. There are a number of existing bike share programs in Connecticut, several of which will continue to operate separate from the Hartford system. Hartford Bike Share could spearhead a statewide consortium of bike share operations, apply jointly for funds through Connecticut DOT, and disburse funds proportionally. Doing so would alleviate any potential for competition for limited funds and help to foster statewide support for bicycling and bike share.

Private Funding

Private funds can include a range of sources such as advertising, sponsorship agreements, and charitable donations. Sponsorship agreements have the potential to be a major funding component for the Hartford region. As bike share is a relatively new mode of transportation, no best practice has been established for valuing and securing sponsorships. To date, every system has developed a distinctive sponsorship strategy,

¹² *Frequently asked Questions and Answers concerning Bike Sharing Relative to the United States Department of Transportation* available online at: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/faq_bikeshare.cfm, as of May 13, 2014.

from large commercial title sponsorship agreements to funding arrangements with non-profit partners. To meet the program's fundraising targets, the Metro Hartford Region's bike share program will have to explore a mix of sponsorship strategies, from engaging the region's non-profit institutions to bringing in corporate sponsors to help fund the system in exchange for branding rights.

During the development of this study, a focus group was conducted with organizations in the Metro Hartford Region to better understand local fundraising opportunities. Participants saw bike share as aligning with corporate health and wellness goals and felt that the system could benefit employees by providing a new option for physical activity. They expressed the view that bike share would also serve a mobility need in central Hartford, allowing downtown employees to bike to lunch, make a cross-town meeting, or reach parking.

The Metro Hartford Region is fortunate to have a number of major corporate and institutional partners based locally, and these organizations have a history of supporting local initiatives and investing in community development. Participants of the focus group felt that bike share would have to rely on a multi-faceted fundraising strategy that would rely on multiple partners and fundraising opportunities. Similar to the bike share consortium proposed for public funding, the same consortium could be successful in applying for grants from community and family foundations and local corporations. While joint applications would not be an effective strategy for sponsorship, they may find success in applying for local grants specifically geared to public health and wellness.

Title Sponsorship

An exclusive title sponsor will likely be the most valuable kind of sponsorship the program can receive. The sponsorship contract should last for multiple years, capturing the full value of brand exposure at program launch and over time. A title sponsor will likely require a certain degree of branding exclusivity, with stations and bikes featuring a company logo or color scheme.

A title sponsor may agree to a limited shared title sponsorship. In New York City though Citibank is the system sponsor, MasterCard also contributes sponsorship funds to be the official payment partner, and station payment consoles all feature the MasterCard logo. In Salt Lake City, Select Health is the title sponsor for GREENBike but Rio Tinto has naming rights for the bike baskets.

Title sponsorships can be challenging to achieve and may require partnering with an outside firm with expertise in procuring sponsorships. Philadelphia is currently pursuing sponsorships for its system through a deal with Front Row, a marketing services company. Comparable public transit sponsorship deals often involve partnerships with outdoor advertising firms like Clear Channel or Titan.

Participants in the sponsorship focus group saw a major title sponsorship as a philanthropic investment in bike share and not as a marketing and brand-building opportunity. Many local corporations do not see Hartford as a key advertising market and may not be interested in a title sponsorship as a marketing tool. A potential title sponsor could be local institutions with locally-focused advertising budget, like a major hospital, or a national brand looking to expand its presence in the Hartford market.

Figure 6-3: CitiBank Sponsors New York’s CitiBike System



Source: brandingbook.blogspot.com

In developing a title sponsorship strategy Hartford should look to emphasize not just the positive local impact bike share will have on the region, but also the marketing benefit of participating in a title sponsorship. Focus group participants voiced a need for measurable benefits to sponsoring bike share. Data on market demographics, the potential user base of bike share, and quantification of on street brand visibility will help build the case for supporting bike share.

As **Table 6-5** illustrates, title sponsorships can be very lucrative when the full marketing opportunity of the sponsorship is leveraged. Early bike share sponsorship agreements, like New Balance’s agreement with Boston’s Hubway, were approached as philanthropic investments, resulting in potentially undervalued sponsorships.

Station or Bicycle Sponsorship

Station sponsorships are another very common type of sponsorship agreement. With a station sponsorship an organization may agree to fund the capital costs and/or operating costs of a new bike share location. Station sponsorships should have standardized locations for sponsor branding; this is typically limited to somewhere on the map panel of the station so not to clash with the title sponsor branding. Some systems, instead of providing station sponsorships, allow organizations to sponsor bicycles.

Focus group participants responded positively to the concept of equipment sponsorship. Many saw a market for sponsoring on-site stations in return for member benefits like reduced cost passes. The major challenge for the Hartford bike share system will be to procure sponsorships that include an ongoing commitment for operating funds. Over time, operating costs are anticipated to be a greater fundraising need, but as one participant noted, most companies are hesitant to make multi-year financial commitment as budgets are re-assessed on an annual basis.

Table 6-5: Comparison of Different Sponsorship Types

Organization	Value	Notes
Bikeshare Systems		
Greenville B-Cycle & Greenville Health System (Greenville, SC)	\$60,000 per year	6 stations
Hubway & New Balance (Boston)	\$600,000 per year for 3 years	126 stations
CitiBike & CitiBank (New York)	\$41 million total over 5 years	330 stations
Divvy & Blue Cross Blue Shield of Illinois (Chicago)	\$12.5 million total over 5 years	300 stations
Denver B-Cycle (Multiple Partners)	\$20,000 to \$30,000 per agreement for a total of \$603,000 in 2012	82 stations in system. Sponsorship for bicycles
Transit Sponsors		
SEPTA AT&T Station (Philadelphia)	\$5 million over 5 years	Serves the city's three major league stadiums
CTA North/Clybourne Street Station (Chicago)	\$3.9 million over 10 years	Exclusive advertising deal with Apple Inc.
Sport Sponsorships		
XL Center (Hartford)	Undisclosed 6-year agreement in the seven figures ¹³	Home to the Hartford Wolf Pack and some UConn Huskies games
PPL Park (Chester, PA)	\$11 million over 10 years	MLS Stadium

Figure 6-4: Austin Bike Share Bicycle Sponsorships



¹³Peters, Marks *Civic's Out: Now It's the XL Center* The Courant. December 18 2007

Figure 6-5: Harvard Sponsored Hubway Station



Source: news.harvard.edu

Advertising

Advertising revenue varies greatly depending on the community. Outdoor advertisers typically price advertising space based on a number of factors such as traffic counts, the visibility of the location, and the demographic profile of the surrounding community. The greatest advertising opportunities are on the bike share stations themselves. The value of ad space on a bike share station is expected to be similar to the market rates for similar size spaces on bus shelters.

Based on feedback from the focus group, a potential group of advertisers may be local institutions with an active advertising presence. Local hospitals, museums, and to a lesser degree universities, spend nearly all of their advertising dollars in the Metro Hartford Region.

6.5 FINANCIAL PROJECTIONS

The following section presents detailed financial projections for the Metro Hartford Region bike share system. Like all projections, these figures are based on assumptions and actual rates may vary depending on a number of factors. Bike share costs can be divided into a capital and operating budget. The capital budget covers any expenses for equipment, parts, site planning, installation, and launch costs. The operating budget includes all day-to-day expenses, including administration, marketing, and operating fees paid to the vendor or vendors. The financial figures here represent year of expenditure dollars with a 3% rate of inflation is assumed.

Assumptions:

Capital Cost Assumptions

The capital costs in this budget were developed assuming a smart bike system with a dock-less or simplified dock-lite technology. During the pilot phase all stations will be paired with a solar powered payment kiosk, however in later phases only 50% of stations will feature a payment kiosk. The capital costs per bike for all equipment is estimated to vary from approximately \$3,300 in the Pilot phase to \$2,900 in later phases.¹⁴ These costs differ substantially from typical dock-based systems. If Hartford chooses a dock based bike share system, the cost is expected to be approximately \$6,000 per bike. In addition to these costs, the model allocates money to purchase upfront spare parts for equipment and bicycles.

Capital costs also assume that every station will incur installation and site planning fees. Ten percent of stations are projected to require the construction of a concrete pad or incur additional siting fees to obtain private easements.

The system will require start-up costs, including the procurement of equipment, vehicles, warehouse space, and other miscellaneous start-up expenses. The plan estimates that start-up expenses will cost \$725 per bike and will be incurred in the 12 months preceding a particular phase.

Finally, the cash flow model takes into account long-term state of good repair (SGR) costs. Bicycles will need to be replaced every five years while all other equipment will need replacement ten years from its installation. State of Good Repair costs are not incorporated into the annual operating or capital cost projections, and are treated as a stand-alone cost.

Operating Cost Assumptions

Operating costs are based on an assumed cost of \$150 per bike per month. These costs are in line with other medium-size bike share systems and generally are below the per-unit operating cost of larger bike share systems with higher intensity of use. In addition to operating costs, the model assumes administrative costs of approximately \$56,000 per year in the pilot phase, \$85,000 by the end of Phase 1, \$110,000 in Phase 2, and an additional \$24,000 to serve Phase 3¹⁵. Administrative costs include \$3,000 per year in general supplies, such as printing. Marketing costs are fixed at \$250 per bicycle per year. Operating costs are assumed to be the same between smart-bike and dock-based bike share equipment. This assumption may change based on the experience of upcoming smart-bike systems.

Operating Revenue Assumptions:

The ridership and thus user-fee based operating revenue is projected by a dynamic model based on estimated ridership rates by phase, time of year, and membership type (24-hour or annual, although other

¹⁴ Assumes \$200 for miscellaneous station hardware; \$12,500 for payment kiosk and solar array; \$1,000 for signage and map panel; and \$1,200 per Smart Bike.

¹⁵ These costs are in FY2014 dollars. Actual year of expenditure admin costs will be higher because of inflation. The Pilot costs represent 0.5 FTE of labor plus \$3,000 in supplies (assumes \$75,000 salary plus 50% benefits). This increases to 0.75 FTE's for the full Phase 1 and 1 FTE for Phase 1 and 2. Phase 3 will require an additional 0.25 FTE at an assumed lower annual salary (\$60,000).

short-term membership options will likely be offered). Data on ridership rates and user split were derived from available peer system data (for some examples, see **Table 6-6**). Daily trips per bike are projected to average approximately 0.55 and will vary by phase and year¹⁶. The user-fee model is based on the membership fee structure described earlier, and average fees assumed in this model are based on the distribution of trips by duration observed in Capital Bikeshare, Hubway, and Nice Ride. The revenue model accounts for the suppressed ridership rate per bike during year one due to the need to ramp up memberships, and an additional year-over-year ridership gain of 5% over the first six years of operations is expected.

Finally, the model assumes advertising revenue of \$1,000 per station per year.

Table 6-6: Examples of Comparable Trip Rates and User Splits

System	Trips per Bike per Day	Annual / Short-Term Membership Split
Capital Bikeshare (South Arlington Only)	0.70 (peak months) and 0.45 (winter)	60/40
Columbus Bikeshare	0.80	30/70
San Antonio B-Cycle	0.35	10/90
Greenville B-Cycle	0.40	20/80

Capital Revenue Assumptions

No capital revenue has been identified yet for the program. Capital revenue through private and public sources will have to be identified.

Capital Costs

Assuming the use of smart bike technology, implementing all phases of the bike share system as outlined in Section 5 will require \$1.56 million in capital funding. **Table 6-7** shows in more detail the cost of new capital in each phase. The majority of capital costs are associated with purchasing new equipment but additional costs apply due to site planning, installation, purchasing of parts, and start-up. As nearly half of all stations are in Phase 1B, the most substantial costs will be incurred during this phase.

Table 6-7: System Expansion Capital Costs by Phase (Smart Bike System)

	Pilot Phase (1A)	Phase 1B	Phase 2	Phase 3	Total
Stations	10	24	14	7	55
Bikes	75	132	77	38	322
Equipment	\$247,000	\$403,000	\$251,000	\$112,000	\$1,013,000
Site Planning & Installation	\$43,000	\$107,000	\$67,000	\$30,000	\$247,000
Start-Up and Parts	\$66,000	\$125,000	\$78,000	\$35,000	\$303,000
Total	\$356,000	\$635,000	\$395,000	\$177,000	\$1,563,000

¹⁶ Peak month ridership rates by phase: Pilot – 0.75; Phase 1B, 2A, 2C – 0.5; Phase 2B: 0.25. Ridership rates decline by 50% during winter months. Represent rates observed in mid-size and small city peers.

As smart bike systems are untested in major urban deployment at the date of publishing, an alternative cost estimate were developed for a dock based system. Dock based systems are anticipated to increase capital costs by \$1.1 million, as shown in **Table 6-8**.

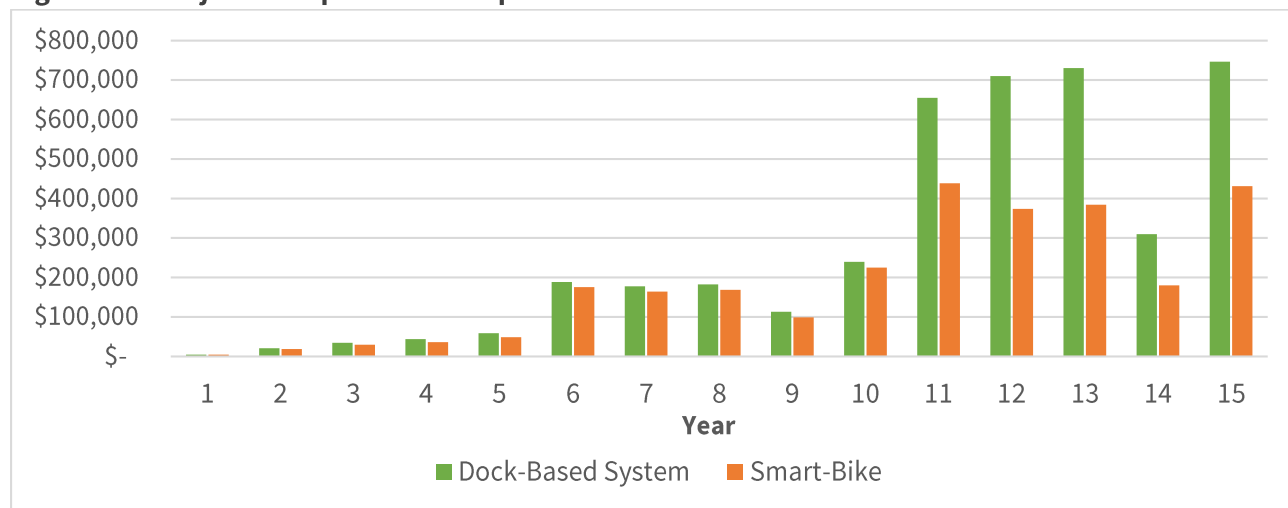
Table 6-8: System Expansion Capital Costs by Phase (Dock Based)

	Pilot Phase (1A)	Phase 1B	Phase 2	Phase 3	Total
Stations	10	24	14	7	55
Bikes	75	132	77	38	322
Equipment	\$391,000	\$866,000	\$539,000	\$242,000	\$2,037,000
Site Planning & Installation	\$43,000	\$107,000	\$67,000	\$30,000	\$247,000
Start-Up and Parts	\$70,000	\$135,000	\$84,000	\$38,000	\$327,000
Total	\$504,000	\$1,108,000	\$690,000	\$309,000	\$2,611,000

Lifecycle / State of Good Repair Costs

In addition to the cost of new capital, the system should prepare for future equipment and state of good repair costs. The model assumes replacement and maintenance costs will fluctuate based on the average fleet age. Bicycles are expected to last five years with proper maintenance, leading to a significant increase in replacement capital needs in year six. In addition, payment kiosks and other station infrastructure will need replacement every 10 years. A dock based system would have a significant impact on long-term state of good repair costs

Figure 6-6: Projected Replacement Capital Needs over 15 Years



As bike share is such a new mode, there is limited experience among operators in State of Good Repair management. Only a handful of systems have equipment that is five years or older. Most systems choose to

deal with replacement costs incrementally as they arise. The downside of this strategy is that bike share operators are not actively preparing to keep pace with equipment replacement costs.

On an annualized basis, replacement costs are approximately \$3,700 per station, assuming the funds are invested in an interest bearing account before being obligated. Actual State of Good Repair costs may vary depending on the actual equipment lifespan. The average state of good repair cost per station would increase from \$3,700 with a smart bike system to \$5,500 per year for a dock system.

Operating Costs and Ridership

Operating costs will start one-year before the launch to account for the pre-launch administrative costs of setting up the program. Two sets of ridership and operating cost projections were developed. The first includes the Pilot, Phase 1, and Phase 2. Phase 3 is included in a separate projection as the timing for this phase may vary. In its first year, the system is expected to recover 27% of its operating costs from advertising and user revenue; the cost recovery ratio is anticipated to increase by year 3 to 34%. The launch of Phase 2 is expected to reduce the cost recovery ratio slightly and by year six the cost recovery ratio for a combined Phase 1 and 2 should stabilize at 34%. The cost model assumes that the operating costs and revenues will be the same for both smart bike and dock-based systems.

Phase 3 is expected to achieve a lower cost recovery ratio due to lower estimated ridership. The financial model estimates that the Waterbury portion of the system will include some separate administrative costs equivalent to a quarter of a full-time employee (FTE) plus supplies. The cost recovery ratio of Phase 3 is expected to grow from 20% in year 1 of that phase to 26% by year 6; year 1 of Phase 3 is not the same as year 1 of the Pilot.

Table 6-9 and **Table 6-10** show a detailed breakdown of anticipated operating costs.

Table 6-9: Projected Operating Costs for Phase 1 and 2

Fiscal Year	Pre-Launch	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
System Size							
Stations		10	22	34	38	48	48
Bicycles		75	141	207	229	284	284
Ridership							
By Registered Users		5,800	11,700	16,800	19,600	24,700	26,200
By Casual Members		8,000	16,200	23,200	26,200	31,200	33,100
Total Ridership	-	13,800	27,900	40,000	45,800	55,900	59,300
Memberships							
Registered Memberships		80	170	240	280	350	370
Casual Memberships		3,190	6,460	9,290	10,490	12,480	13,230
Revenue							
Registered Memberships		\$6,000	\$13,000	\$20,000	\$23,000	\$29,000	\$31,000
Casual Memberships		\$24,000	\$48,000	\$76,000	\$86,000	\$102,000	\$108,000
Registered User Usage Fees		\$1,000	\$1,000	\$2,000	\$2,000	\$3,000	\$3,000
Casual User Usage Fees		\$18,000	\$36,000	\$57,000	\$64,000	\$77,000	\$81,000
Advertising		\$10,000	\$23,000	\$37,000	\$43,000	\$53,000	\$56,000
Total Revenue	-	\$59,000	\$121,000	\$192,000	\$218,000	\$264,000	\$279,000
Operating Costs							
Daily Operations		\$139,000	\$269,000	\$407,000	\$464,000	\$587,000	\$610,000
Administration	\$56,000	\$58,000	\$59,000	\$93,000	\$124,000	\$128,000	\$131,000
Marketing		\$19,000	\$37,000	\$57,000	\$64,000	\$82,000	\$85,000
Total Operating Costs	\$56,000	\$216,000	\$365,000	\$557,000	\$652,000	\$797,000	\$826,000
Funding Gap							
Cost Recovery Ratio	N/A	27%	33%	34%	33%	33%	34%
Operating Deficit/Surplus	-\$56,000	-\$157,000	-\$244,000	-\$365,000	-\$434,000	-\$533,000	-\$547,000

Table 6-10: Projected Operating Costs for Phase 3 (Waterbury)

Fiscal Year	Pre-Launch	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
System Size							
Stations		7	7	7	7	7	7
Bicycles		39	39	39	39	39	39
Ridership							
By Registered Users		1,800	2,300	2,400	2,500	2,600	2,800
By Casual Members		2,500	3,100	3,300	3,500	3,600	3,800
Total Ridership		4,300	5,400	5,700	6,000	6,200	6,600
Memberships							
Registered Members		30	30	30	40	40	40
Casual Members		980	1,250	1,320	1,380	1,450	1,520
Revenue							
Registered Memberships		\$2,000	\$2,000	\$3,000	\$3,000	\$3,000	\$3,000
Casual Memberships		\$7,000	\$9,000	\$11,000	\$11,000	\$12,000	\$12,000
Registered User Usage Fees		<\$1,000	<\$1,000	<\$1,000	<\$1,000	<\$1,000	<\$1,000
Casual User Usage Fees		\$6,000	\$7,000	\$8,000	\$9,000	\$9,000	\$9,000
Advertising		\$7,000	\$7,000	\$8,000	\$8,000	\$8,000	\$8,000
Total Revenue		\$22,000	\$25,000	\$30,000	\$31,000	\$32,000	\$32,000
Operating Costs							
Daily Operations		\$76,000	\$78,000	\$80,000	\$83,000	\$85,000	\$88,000
Admin	\$24,000	\$26,000	\$27,000	\$28,000	\$29,000	\$30,000	\$30,000
Marketing		\$11,000	\$11,000	\$11,000	\$11,000	\$12,000	\$12,000
Total Operating Costs	\$24,000	\$113,000	\$116,000	\$119,000	\$123,000	\$127,000	\$130,000
Funding Gap							
Cost Recovery Ratio	N/A	20%	23%	25%	25%	25%	26%
Operating Deficit/Surplus	-\$24,000	-\$91,000	-\$91,000	-\$89,000	-\$92,000	-\$95,000	-\$98,000

6.6 ROLE OF IN-KIND CONTRIBUTIONS

Capital and operating cost estimates were developed based on the assumption that all costs would be directly incurred by the bike share system. In-kind contributions by local partners could have a major impact on lower capital and operating costs, and increase the effectiveness of the program. Peer systems have been supported through in-kind contributions that lower start-up, site planning, administrative, and marketing costs. Utilizing existing resources at program partners will be critical for the Metro Hartford Bike Share system as the program will have limited administrative capacity and rely on partners for expertise and support.

Administrative Support

The system owner and its partners can provide any available staff capacity to handle certain program administrative functions. Major costs like start-up planning and public outreach can be conducted through partners like the City of Hartford to reduce operating costs in the pre-launch year. Once the system is on the ground, staff could help absorb certain administrative costs.

For example, in Phases 1 and 2, if half a FTE in administrative costs were absorbed by the owning agency or another organization, cost recovery would improve by four percentage points. If an entire FTE of administrative costs could be absorbed by existing staff, the cost recovery ratio would increase by six percentage points (40% by year six).

Phase 3 administrative costs are anticipated to be only a quarter of an FTE or less. If an existing organization is able to absorb those administrative costs, the cost recovery ratio for the phase will improve from 27% to 34% by year six.

Fundraising Support

As the system will depend extensively on private contributions, fundraising will be a major administrative function of the program. It is recommended that the system partner with organizations that have existing relationships with potential funders to assist in fundraising or require that local fundraising expertise be part of the bike share vendor's team. Community non-profits have existing fundraising expertise that will be critical for the system. Many peer bike share systems are started up with close cooperation between community non-profits and public partners.

Marketing Support

Marketing is critical for the success of any bike share system. While the operating projections include a marketing budget, experience from other cities shows that intensive and targeted marketing is necessary to build ridership, especially among user groups that underutilize bike share such as low-income households, minorities, and people over 50 years of age. In many cases the best kind of marketing is direct outreach to these groups through community organizations, non-profits, and agencies that have an existing relationship with potential riders.

Some bike share systems do almost no direct marketing but instead rely on partner agencies to market the program. At Capital Bikeshare, the GoDCGo and Bike Arlington transportation demand management (TDM) programs provide marketing support. In Connecticut programs like CT Rides could contribute or take-over marketing on bike share if suitable capacities do not exist at the system owner level.

Start Up and Site Planning

In-kind contributions can also lower the capital costs associated with a bike share program. Greenville B-Cycle is an excellent example of a lean bike-share operator that relies on partners to keep capital costs low. During start-up, partners helped to greatly reduce costs through in-kind contributions. The system did not need to procure warehouse space as temporary storage was donated and maintenance is contracted by a local bike shop with their own existing facilities. Local government partners assist with site planning and preparation, further lowering the costs of installing new stations.

7 Implementation Plan

7.1 IMPLEMENTATION TIMELINE AND STEPS

Getting a bike share system from concept to reality will require extensive work by the system owner and its partner agencies. Launching a bike share system is a multi-step process (see **Figure 7-1**). The actual time frame for launching a bike share system will depend on the ability to establish a formalized governance structure and system owner, the success of fundraising efforts, and the procurement schedule. A bike share pilot could launch likely no sooner than 12 to 24 months after the completion of this plan. Given Hartford’s climate it is recommended to launch the system in March or April so that the system can take advantage of a full warm season during its first year, however procurement and installation issues may require the launch date to be in the summer or fall.

Figure 7-1: Implementation Steps



Steps to Program Launch

Step 1: Program Development

During the early stages of implementation the focus should be on establishing formal governance for the system and identifying key partners that can shepherd the program to launch. During this stage, the system owner will be selected and the primary staff who will be needed to carry along the implementation process identified. Along with the system owner, the governance structure will define the relationship between the system owner and local partners. While the system will be owned formally by a regional entity, local partners will play a critical role in system planning and oversight. In this program development stage, fundraising efforts should commence. Government funding commitments are especially important to receive in this stage, as private funding will likely come after public sector support is identified. Finally, public outreach and involvement must begin at this stage; early public outreach should focus on building public awareness and support for the program, and fundraising efforts will rely on the momentum created through public outreach.

Step 2: Procurement and Planning

In this second step of bike share implementation, the focus will be on implementing key items in the bike share business plan so that the system can move on to final planning and installation. During this phase, the owner will commence and complete procurement of an equipment vendor and operations vendor(s). During this stage the system will also have to finalize its main funding sources. Detailed system planning can begin at this stage as refined funding and cost projections will be available upon acceptance of a vendor(s). Public outreach in this stage should transition to feedback on system design and station locations. Public feedback may impact greatly the service concept presented in this plan depending on where the greatest support is for bike share stations.

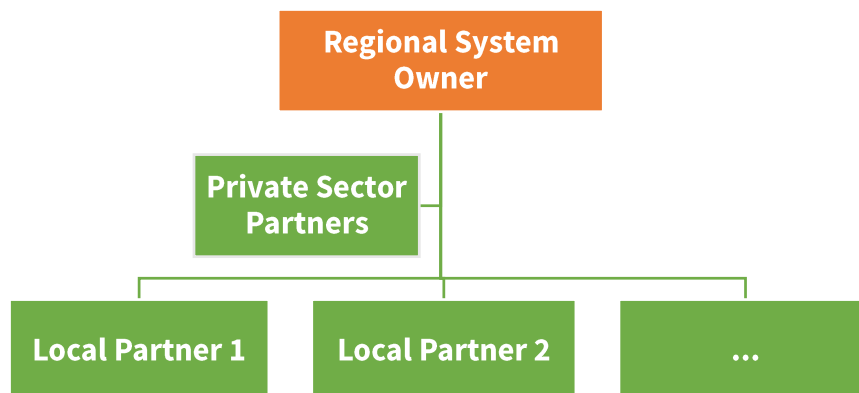
Step 3: Implementation

The final step needed to get to the launch of the system is program implementation. During this phase project partners will finalize station siting and permitting. The system vendor(s) can conduct necessary back-end startup such as developing a website and getting any necessary operating facilities up and running. During this phase, marketing efforts should also continue to further build-up public awareness and anticipation. Public outreach during this final stage is focused on consulting the public on final station locations and siting. Equipment is usually deployed right before launch as actual installation does not require an extensive amount of time. Once equipment installation begins, the system can begin selling memberships to ensure there will be an established member base on day one of the system opening.

7.2 GOVERNANCE STRUCTURE

Metro Hartford Region's bike share program will require cooperation across multiple public agencies and non-governmental organizations. Leading the program will be the system owner (see **Figure 7-2**). The system owner will be the final recipient of funding and be responsible for overseeing contracts with the program's various vendors. In many ways, the term "owner" is a misnomer, as the program relies on the support of local partners. Individual jurisdictions will be responsible for supporting the program by advocating for, assisting to administer (through planning and permitting), and likely helping fund the system. Private sector partners will also be critical in overseeing the program and should be incorporated in some way to the system governance.

Figure 7-2: General Governance Structure



The final governance structure will include a number of components, including:

Oversight Committee

Early on in the implementation process an oversight committee should be established. Oversight committee members may include private funding partners, public agencies, and local government. The committee should be closely involved with any major decision making. The operating vendor(s) should be involved with the committee (but may be excluded in instances where their presence poses a conflict of interest), as close coordination with the vendor(s) will be a necessary component for program success. Once operations commence, the committee should meet frequently and regularly.

Funding Agreement

Local partners and the system owner will have to finalize a funding agreement that defines the financial responsibilities of each partner and the system owner. The agreement may also identify the program's payer of last resort. If jurisdictions provide operating funds, the financial agreement should define the operating revenue obligations of each jurisdiction. In other systems, local jurisdictions are responsible for paying a share of operating expenses based on the jurisdiction's system size and amount of bike share revenue generated locally. Locally generated revenue includes: sponsorships, advertising, and user revenue.

Some regional systems like Capital Bikeshare allocate user revenue based on a subscriber's jurisdiction of residence. For subscribers residing outside the service area, revenue is split proportionally among jurisdictions. In the Metro Hartford Region this model may not be appropriate, as a large market segment will be employees using bike share near their place of work, not their place of residency. For example, if an employee lives in New Britain yet exclusively uses the system in Hartford, all the revenue generated by them would, under the traditional revenue split model, be credited toward New Britain's operating revenue. Allocating revenue by home address may underfund parts of the system like downtown Hartford. A more appropriate model may be to sub-divide revenue based on the amount of trips generated from stations in each jurisdiction.

System Expansion Agreement

The program should establish a protocol for allowing additional towns and cities to join the program, including Connecticut jurisdictions outside the Metro Hartford region. System expansion in some cases may be accomplished through a rider clause which allows other jurisdictions to independently procure bike share under the same vendor contract(s). If new jurisdictions do join the system, their funding requirements should reflect not just the additional vendor costs but also administrative and marketing needs.

7.3 ADMINISTRATIVE NEEDS

The Metro Hartford Region bike share system will require a dedicated staff to administer the new system. Administrative staff will be responsible for overseeing the bike share vendor’s implementation and operations of the system, as well as any future systems planning. Administrative staff will be responsible for the overall management of the system, public relations, financial planning and reporting, initial station planning, and performance analysis.

Because of the small size of the system, the Metro Hartford bike share system will rely on a lean staffing structure to keep administrative costs to a minimum. As **Table 7-1** shows, the system will function with approximately 1.25 staff persons (50 hours of labor a week). As staff will have a variety of responsibilities, staff hours may be spread among a number of individuals.

Table 7-1: Total Full-Time Equivalent (FTE) Staff by Phase

Phase	Administrative Staff
Launch	0.5 FTEs
Pilot	0.5 FTEs
Pilot and ½ of Phase 1B	0.75 FTEs
Phase 1 & 2	1.0 FTEs
Phase 1, 2 & 3	1.25 FTEs

Administrative staff will have to serve a number of functions, including:

Program Launch

- Lead efforts to secure funding
- Oversee procurement of equipment and operating vendor
- Oversee public outreach initiatives
- Lead initial system planning efforts

General Program Management Functions

- Contract management and oversight
- Public relations: serve as spokesperson for the system
- Maintain and report on system performance data
- Develop an Annual Report and other analytical and reporting activities as needed
- Facilitate communication with partners and stakeholders

Budgeting and Grant Management Functions

- Maintain financial records for the system, including the annual budget
- Identify and apply for federal, state, and local grants
- Complete all grant reporting requirements

Private Fundraising

- Develop a donor base for program
- Identify and explore new fundraising opportunities

- Implement advertising contract

Planning

- Plan initial station locations and obtain permits and other necessary approvals for installation of stations, in coordination with the bike share vendor(s)
- Work with the public through a variety of public outreach activities to further define growth areas and identify specific station locations

Marketing

- Work with non-profits and other appropriate agencies to ensure access to bike share by low-income and/or unbanked individuals
- Disseminate materials to help grow awareness and usage of the stations, e.g., working with hotel concierges, employers, and retailers

To fulfill all of these activities, the system will rely on the administrative support of its partners. Donor-base development is a major effort and the system will need to build a volunteer base to assist in these activities. Community non-profits may be effective at supporting these functions as they have existing relationships with potential sponsors and donors. Site planning and public outreach is also most effectively accomplished at the local level. Bike share will not be feasible without close planning coordination and support by participating jurisdictions.

7.4 VENDOR CONTRACT REQUIREMENTS

In procuring a vendor, the system owner must strike a balance in the request for proposals (RFP) stage between providing lengthy requirements and allowing vendors the flexibility to propose innovations that may ultimately lower costs and streamline operations. The bike share industry today is quickly evolving and as companies continue to innovate, RFP guidelines written today could become out of date in the near future. The following are some guidelines for the procurement process. This list is not intended to be an exhaustive inventory of what an RFP should include but instead highlights some key areas.

Vendor Responsibilities

In procuring vendor services, an RFP must require vendors to propose in detail what services they intend to provide, along with relevant qualifications. Some of the necessary functions a vendor will need to offer include:

- All functions associated with daily operations, such as field inspections, rebalancing of bicycles, performance tracking, and crisis management
- Maintenance and support for all equipment
- Management of back-end systems such as IT and payment platform
- Development and maintenance of a website
- Customer support call-center
- Liability insurance coverage for program
- Equipment installation

- Design and printing of maps, brochures, and marketing material
- The region may request that the vendor include on its team someone with sponsorship development capability

The RFP should permit vendors to suggest additional services beyond the ones listed above. Vendors should also be free to subcontract specific functions. Peers recommend to use the RFP process to push the technical envelope and explore unique solutions for the metro region; once a vendor is selected, the owner will have less leverage to negotiate new technical solutions or features.

Contract Length

Peer systems prefer short-term vendor contracts, usually lasting 12 months, with options for renewal. Short-term contracts are preferred because they encourage vendors to be responsive to the owner's needs. If the contracting structure turns out to be ineffective, the owner has the ability to rewrite the contract with additional requirements after the initial contract expires. Many contracts feature limits on year-over-year cost increases if renewal options are executed.

Bike Share Equipment Contracting

Today most bike share systems are closed proprietary systems that provide little flexibility to incorporate bikes, IT systems or other equipment from third-party vendors. While proprietary systems are unavoidable to some degree in the bike share marketplace, Metro Hartford should encourage in the RFP process bike share technology that allows for future compatibility with third-party equipment. For example the docking systems could be designed to be potentially compatible with another company's bicycles, or the IT systems could be flexible enough to allow a replacement back-end software to be installed. The fewer equipment restrictions and proprietary systems used, the less reliance Metro Hartford will have on a single vendor.

The contract should also decouple vendor operations from bike share equipment vendors. While equipment and vendor services may be procured together under one contract, Metro Hartford should avoid any bike share equipment vendor that has exclusive operating or distribution agreements with a single operating vendor. In the case an operating vendor proves to be performing unsatisfactory, Metro Hartford should have the maximum flexibility to select a new company to operate the system without impacting equipment procurement, maintenance, or operations.

Service Metrics

Vendor contracts should include service metrics that contractors are responsible for maintaining. Metrics allow the bike share administrator to ensure vendors are providing the necessary level of service. Common service guidelines include:

- **Rebalancing requirements:** Rebalancing of bicycles to ensure no station is full or empty is one of the largest day to day operating expenses for a bike share system. For example, Capital Bikeshare sets a service standard that no station may remain full or empty for more than 3 hours between 6am and midnight. Staff may fill or empty stations late at night in anticipation of rush hour demand.

Other systems set less strict standards such as 12 hours. Less stringent rebalancing standards may lower the cost of operations.

- **Fleet Deployment:** A percentage of the system's fleet will be out of service at any one time. Deployment standards provide guidelines for what proportion of the fleet must be in active operations. Requirements may be reduced in the winter due to lower demand and fleet management strategies.
- **Inspection and Maintenance:** Contracts should stipulate how often bicycles are inspected. Operators should have standards for how often a station is visited each month by field inspectors, as well as how often bicycles are inspected and maintained. Capital Bikeshare requires that bicycles be inspected and maintained at least every 30 days. Maintenance schedules may vary depending on the intensity of use in the program.
- **Customer Service Standards:** Contracts should stipulate quality of service standards including wait times over the phone and customer service satisfaction ratings. Standards may stipulate that telephone operators are available in more than one language.

Reporting Requirements

Any contract with the system operator needs to stipulate what data will be provided to the bike share system management on a monthly basis. The contractor should provide the data both in a raw format as a database and in a formatted report that includes graphs and tables showing both monthly and annual (when applicable) performance.

The types of data that must be reported should cover *at a minimum* the following topics:

- Membership
 - Annual Members (New, Expired, and Renewed)
 - Casual Members
 - Member residency information
- Ridership and Usage
 - Daily ridership (by member type)
 - System-wide or total ridership (by member type)
 - Station-level ridership (origin and termination) (by member type)
 - Ridership by day (preferably with average daily temperatures reported)
 - Trips per bicycle
- Operations and Maintenance
 - Rebalancing activity
 - Instances (and length of time) of full and empty stations
 - Any service disruptions or suspensions
 - Number of bicycles in fleet and in service
 - Crash summary
 - Bicycle and station repairs
 - Theft and vandalism

Within these data topics, the vendor may propose or the bike share administrative staff can dictate a number of more specific desired measures. This raw data can be used by the system's administrative staff to run a number of more complex analyses to be included in a system evaluation or similar analysis to help inform decision making. Some of this data may also be made available to the public for their use through the use of an online dashboard as other bike share systems have done.

7.5 SYSTEM TRANSPARENCY

Maintaining accurate system and financial data will be an integral part of ensuring that the Metro Hartford Region's bike share system functions well and is financially sustainable. Accurate data collection and reporting is needed both to inform the system's administrators how the system is performing and to comply with accepted accounting and transit financial planning practices.

Performance Tracking

Tracking performance measures will allow the system to ensure it meets its objectives and goals. Draft performance measures are provided in Section 3.2. Many of the proposed performance measures can be implemented with data provided directly by a vendor, and these are included in the Reporting Requirements list above. An annual system ridership survey is also needed to capture information such as member demographics and socio-economic profiles, trip purpose, frequency of use, economic impacts of use, and the impact of bike share upon reducing the use of car travel. Geographic Information Systems (GIS) analyses and financial data maintained by the system administrator will also be required to report on some of the proposed performance measures. All of this analysis is useful for measuring system performance and helping to determine the most strategic approach for system growth and modification over time.

Financial Data

Monthly financial statements on the performance of the Metro Hartford Region bike share system should be prepared for internal use, with a publicly available annual financial performance summary each year. Financial data for the bike share system should be maintained in accordance with **generally accepted accounting principles** (GAAP) as defined by the American Institute of Certified Public Accountants (AICPA). Annual audits of the bike share system, compliant with the principles of the **generally accepted government auditing standards** (GAGAS).¹⁷ By ensuring that the financial elements of the bike share system are transparent and follow sound business practices, the system will be in a better position to obtain future public funds.

The financial data reported needs to clearly communicate the full expenses and revenues of the bike share system. The operating costs of the system should be broken down to include both the costs incurred by the operator or vendor of the bike share system and administrative costs (such as staff time for contract oversight). Capital expenses incurred can be reported at a summary level, but records maintained need to capture the date and type of expense, and reference the purchase order or receipt documenting the purchase made.

¹⁷ Government Auditing Standards (December 2011). The Government Auditing Standards are also known as "The Yellow Book," published by the U.S. Government Accountability Office (GAO).

Revenues should be reported by source, including federal, state, and local grants, private grants, station and/or system sponsorships, advertising, membership fees, usage fee, and other sources. The financial documentation maintained by the Metro Hartford Region bike share system should allow administrators to quickly understand system expenses funded by each individual revenue source.

In addition to a complete reporting of operating and capital expenses and revenues of the Metro Hartford Region bike share system, there are several measures of financial performance that need to be included in both the monthly and annual financial statements. The **cost recovery ratio**, a typical measure of financial performance used in transit, measures the percentage of operating costs covered by fares, or user fees. In a bike share system the user fees include both the membership (annual and short-term) and usage fees. The financial models in this plan incorporate advertising revenue into the cost recovery ratio as well, however some operators choose to report cost-recovery as purely user recovered revenue. It is important to include the entire operating costs (the system operator's fees *and* the administrative expenses) when calculating the cost recovery so as not to overstate this measure. The **average cost per trip per user** and the **operating cost per trip** should also both be derived from the data provided on a monthly basis.

7.6 MARKETING AND OUTREACH

Marketing and outreach are vital for the success of a bike share system yet are oftentimes functions that are underfunded by peer bike share systems. Agencies with limited resources are forced to rely on marketing the system through word of mouth, on-street visibility, and media coverage. The lack of extensive marketing partially reflects the skewed demographics of bike share users; bike share riders tend to be young, technologically savvy, and well educated. Riders are introduced to the service through media, buzz, and their existing social network. The challenge for bike share therefore is to create marketing strategies that break through barriers to reach the people not using bike share, including: low-income households, minorities, ethnic communities, and people over 50 years of age. The following are some potential strategies for marketing.

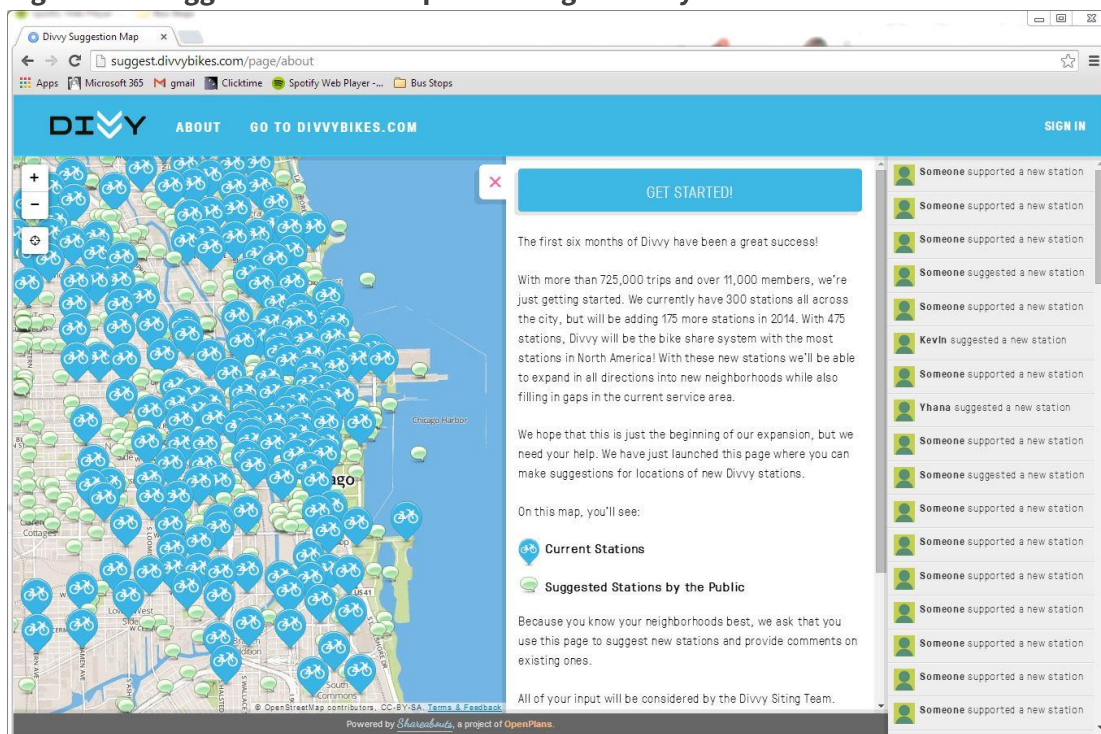
Generate Buzz through Exposure in the Press and Social Media

The “buzz” generated by launching a bike share system is one of the most valuable promotional tools available to build user awareness. Before opening day, a bike share system should actively engage the press, bloggers and advocacy groups to generate exposure in print, web, and TV media. Social media plays an important role in this strategy as increasingly potential users rely on Facebook, Twitter, Instagram and local blogs to get their news. Promotional campaigns on social media can be especially productive in building awareness; to build Facebook followers, the system could release a certain number of free memberships to people who “like” the program’s Facebook page.

Utilize the Visibility of Bike Share Stations

Bike share stations themselves are great promotional assets as stations are located in high visibility locations. Stations should utilize clear branding and feature basic information on how the system works. A pedestrian walking past a bike share station should be able to figure out quickly what bike share is and how it works.

Figure 7-3: Suggest a Station Map for Chicago's Divvy Bike Share



Website and Crowdsourcing

The program's website will be a key resource for users. A website should be available well ahead of system launch. A number of programs have used crowdsourcing (see **Figure 7-3**), such as suggest a station maps, to build awareness and garner feedback from the public.

Work Closely with Partners

A highly effective strategy to build awareness about bike share is to reach potential users through partners. Employers are a natural partner for promoting bike share. Hartford's system will initially focus extensively on Downtown. Information on bike share services can be distributed through employers to build awareness.

Another key type of partner are community based organizations (CBOs) such as churches, community groups, associations, and clubs. Here, bike share can learn from the outreach efforts underway at many transit agencies. Transit agencies today are implementing strong partnerships with CBOs as part of their public participation and Title VI compliance strategies. CBOs have existing relationships with targeted populations, such as older adults, non-English speakers, and minority groups. Reaching out to CBOs will allow the bike share system to reach an audience that typically would be difficult to engage through traditional marketing channels.

Finally, the bike share system should partner with local advocacy organizations to help market bike share. Bicycle advocacy groups like Bike Walk CT have extensive expertise in building cycling awareness. The same general advocacy strategies used by these groups could be leveraged to promote bike share.

Reach People Directly

Direct outreach may be time consuming but is very valuable. The bike share program can organize pop-up events at major shopping centers, transit hubs, and employment sites. During these events, staff will be able to answer questions and show participants how bike share works. Pop-up events are especially effective when tied in with partners like a radio station to attract people to the area. Giveaways, such as a free one-day membership or branded bicycling accessories are also useful tools.

Train the Trainer

The train the trainer model has been successfully used to promote cycling safety across the country, including at Simsbury Free Bike. Bike share staff could work with partners such as schools or employers to train a limited number of representatives on how bike share works. These representatives can then go out to train additional users. One of the greatest barriers to bike share use is lack of familiarity. People may be unsure of how the system works or feel reluctant to try out a new mode of transportation. By building a network of trainers in the community, the bike share partners can familiarize potential users with how the system works.

7.7 SYSTEM EQUITY

As a mode of public transportation, the Metro Hartford Region’s bike share system has a commitment to ensuring equitable access and use of the system. Bike share in Hartford will extensively serve low income and minority communities. To ensure widespread use, the system must work to reduce barriers of entry to the system. One of the primary barriers to use is the requirement that users have a credit or debit card. Many low-income households are unbanked, meaning that they do not have access to a bank account, credit cards or debit cards. According to the FDIC, 23,000 households in the Metro Hartford region area are unbanked.¹⁸

Bike share systems have worked to overcome the barrier presented by credit card requirements. In Washington DC, Capital Bikeshare partners with Bank On DC, an organization that provides access to financial services for unbanked individuals, in order to get bike share riders a bank account and discounted bike share membership. The City of Philadelphia has proposed waiving the credit card requirement for some users; community organizations and private fundraising would be leveraged to “sponsor” unbanked users.

The City of Hartford has a sizeable Spanish-speaking population. The bike share system should work to provide culturally appropriate materials and advertising in Spanish as well as English to attract Hispanic users to the system. Based on additional community language access needs, the system may want to provide services in additional languages as well.

¹⁸ 2011 FDIC National Survey of Unbanked and Underbanked Households, Appendices H and I, September 2012, https://www.fdic.gov/householdsurvey/2012_unbankedreport_app_h-i.pdf

8 Conclusion

This plan outlines a truly regional bike share system. If implemented, the Metro Hartford Region's bike share system would be a pioneer; few systems today have a regional scope as ambitious as what is proposed for Metro Hartford. The plan promises to strengthen the region's transit network and expand mobility options for tens of thousands of residents. In developing this system the region will have to work to overcome critical obstacles to the system's success, including barriers to use for low-income riders, an important user group identified by the advisory committee. Bicycle infrastructure and cycling connections will need to improve, especially links between the region's towns and connections to CTfastrak stations. Finally, marketing and education will be critical components in bike share's success; within the region, bicycling is still not perceived by many as a means of transportation, and outreach, along with infrastructure improvements, will be necessary to promote biking as a safe transportation alternative.

The Advisory Committee believes it is worthwhile to work through these challenges to create a regional bike share system. Bike share could be transformative for the Hartford region. It provides a community amenity that will help make the region more attractive to young and highly-mobile talent. It promises to improve mobility, expanding transportation options and making the region less car dependent. Bike share is poised to benefit a wide range of users, from downtown office workers trying to make a cross-town appointment, to neighborhood residents trying to access employment, retail, services and recreation. For those who cannot or do not drive, bike share opens up new way access the economy and fills critical gaps in the existing transit system. Bike share, like the region's other major transit investments, will help create a more sustainable and livable Metro Hartford Region.