CITY OF ALAMEDA TRANSIT AND TDM PLANS

Bike Share Feasibility Memo

To: Gail Payne, City of Alameda
From: Bill Hurrell, Brian Soland, Camille Tsao, and Fabian Gallardo
Date: July 5, 2016

1. Introduction

Bike sharing provides a cost-effective and elegant mobility option for first-mile and last-mile trips. A bike share system consists of a network of bikes placed at key locations and is a relatively inexpensive extension of public transportation offerings. Bike sharing systems offer flexibility and can operate as automated bike rental services to encourage short, spontaneous trips through membership and usage fees. A bike can be picked up from one location and returned to other bike share locations within the system. Most systems operate using a network of docking stations throughout an area. However, new systems using "smart bikes" (with on-bike checkout capabilities) do not require docking stations and can be parked at typical bicycle parking locations. Regardless of new technology, implementing a bike share system remains a risky venture. Cities and regional governments operating with relatively limited funding sources must weigh whether implementing a bike share system will be more than or as effective as implementing other methods for increasing mobility and transportation options.

The City of Alameda is now seeking to determine whether a bike share system could benefit the community by introducing bicycling to new users, increasing bicycling, reducing solo auto trips, and further complementing the City's multimodal transportation goals. This study evaluates the potential for a successful public bike share program in the City of Alameda. The analysis provides an evaluation of current practices, factors for success, an analysis of local existing conditions, environmental and social impacts, recommended service area, phasing, risk, and estimated cost. The report includes the following sections:

1. Introduction
2. Local Planning Context
3. Local Market & Suitability Bike Share Analysis
4. Bike Share Service Area and Sizing
5. System Type, Operator, Costs and Financials
6. Conclusions and Recommendations

2. Local Planning Context

Cities across the Bay Area are investing in bike share as another urban transportation option, including San Jose, San Francisco, San Mateo, Palo Alto, and Mountain View. Further bike share deployments are expected to rollout in the fall of 2016 in Oakland, Berkeley and Emeryville.

The City of Alameda offers bicyclists a combination of features that are available in few other cities – mild weather, flat topography, scenic views, and slower vehicle speeds. The grid street network on the main island provides bicyclists with a range of options and direct routes to their destinations and the availability of both bike lanes and paths provide opportunities for riders of all skill levels. While bicycling was once

primarily seen as a recreational activity, it has emerged as an increasingly important part of the City's strategy to address its current and future transportation needs. Since the adoption of the 1999 Alameda Bicycle Master Plan, the City has continued to enhance its bicycle facilities, both in terms of building new infrastructure and in accommodating bicyclists into the City's development process, most recently through its Bicycle Plan 2010 Update and Transportation Element of the General Plan.

Reaching a level of preparedness for a city requires establishing goals and policies that support bike share programs. This section provides an overview of City of Alameda documents that support the development and implementation of bike share, including the City of Alameda's Bicycle Plan 1999 (2010 Update), the Alameda Point TDM Plan, and the General Plan's Transportation Element.

Bicycle Master Plan 2010 Update

The 2010 update of the Bicycle Master Plan is a guide to the development of bicycle facilities in Alameda. It accounts for changes to the City of Alameda transportation network since its original 1999 adoption and builds on the work that has been accomplished over the eleven-year difference to support policies in support of the revised Transportation Element of the General Plan and climate protection plan. The 2010 Update has a list of recommended projects and programs achievable within 10 years based on anticipated availability of resources as well as a table that outlines funding sources for potential bicycle projects.

The 2010 Bicycle Master Plan update seeks to improve connectivity within the City of Alameda and with neighboring cities. Within the City, there are recommendations to improve bike trail facilities and enhance biking facilities near major destinations, such as the City's commercial districts, transit facilities, schools, and popular recreation sites. Intercity connection improvements include bicycle facilities in the Posey Tube and the east-end bridges connecting to Oakland. Example goals from the 2010 Update are listed below:

- Establish and maintain bikeways to priority destination in Alameda, especially for travel to employment centers, commercial districts, transit stations and corridors, institutions, and recreational destinations.
- Provide additional end-of-trip facilities.

Alameda Point TDM Plan

The Alameda Point TDM Plan serves as a resource and guide for existing and future development on the former Alameda Naval Air Station, known as Alameda Point, that can be replicated in new development areas throughout the City of Alameda. In order to mitigate traffic issues and reduce environmental impacts, the plan identifies strategies to reduce single-occupancy vehicle trips generated by development in Alameda Point. The Plan's strategy incorporating the use of bike share is listed below:

- The Alameda Point Site A TDM Compliance Strategy includes a strategy for implementing bike share within Alameda Point, which includes providing 45 "loaner" bikes offered free of charge to residents and employees for use throughout Alameda. The document states that the initial size of the system will be 45 bikes, phased in at 15 bikes per development phase. The strategy acknowledges that there may be opportunities to collaborate with Bay Area Bike Share to explore expansion into Alameda and Alameda Point.

Alameda General Plan: Transportation Element

The Transportation Element of the General Plan serves as a guide for existing and future transportation land use decisions throughout the City of Alameda. The document provides a balance of goals seeking to keep traffic moving while providing a high quality of life for local residents. The plan identifies several circulation goals addressing issues of livability, congestion, and plan implementation. Example goals from the Transportation Element are listed below:

- Increasing the share of children who walk or bike to school by 10 percentage points by 2015 as compared to 2000.
- Maintain and implement the Bicycle Master Plan with regard to physical improvements as well as programs and policies relating to encouragement, education and enforcement.

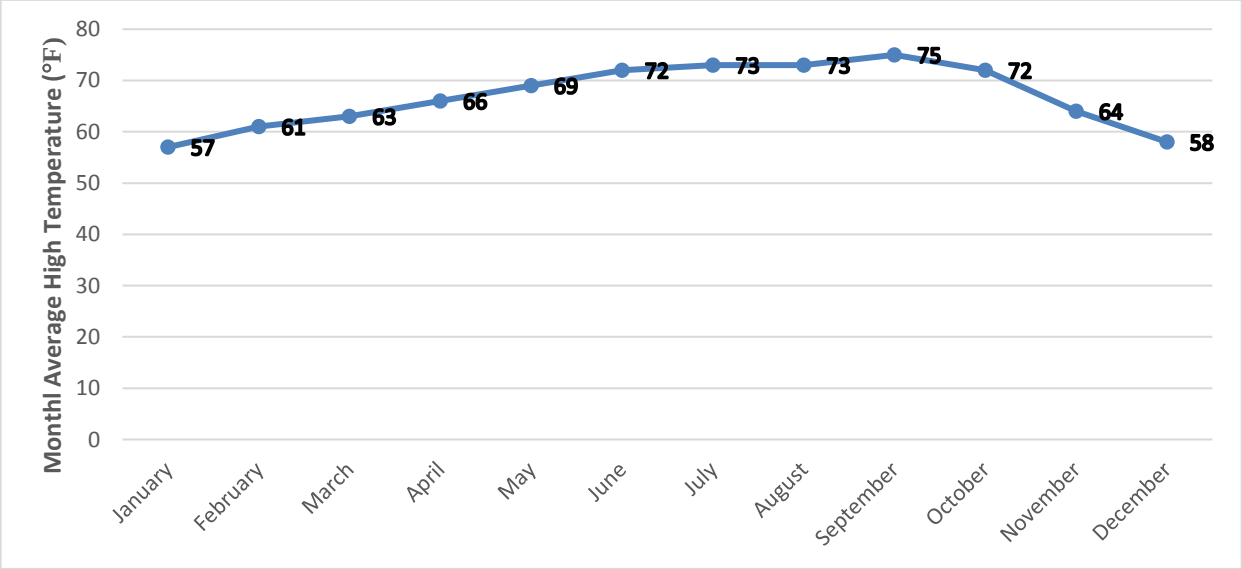
3. Local Market and Bike Share Suitability Analysis

This section examines a variety of factors can help a bike share system flourish into a strong mobility option or hinder its growth. A suitability analysis focuses on the examination of physical characteristics and attributes of Alameda that impact ridership, including weather patterns and topography. Market share analysis examines important demographic factors like population, age, employment, income, and important area facilities that directly affect how well a new bike share program can be.

Weather

Weather is a factor in demand for bike share. **Figure 1** shows the average monthly high temperature in Alameda. The city generally experiences mild to warm temperatures during the summer months, with highs in the low 70s, and moderately cool winters, with daily highs in the high 50s. The city averages 24.1 inches of rain annually, with wet fall and winter seasons and dry summers; 70% of yearly precipitation typically falls between December and March.

Figure 1: Average Monthly High's City of Alameda



The highest demand months for bike share programs are typically in the summer, from May to September. While the city of Alameda does not attract a large number of tourists, the period from

Memorial Day to Labor Day represents the peak tourism season for larger bike share cities when many visitors purchase day memberships to experience a city by bicycle.

In bike share cities with severe winter weather, such as Boston, systems often shut down during winter months due to snowfall and icy conditions. Extreme weather during summer months can also suppress demand for bike share – daily ridership of the Capital Bike share system in Washington DC has been shown to decline on days with high humidity. Due to Alameda's moderate climate, seasonal closure of a potential bike share system will not be necessary.

Topography

The City of Alameda has a flat topography with 25 mph speed limits across most of the island. There are limited barriers to bicycling throughout the area, with wide roadways and low speeds along many parts of the island. The most significant barriers exist at island connection points. The Estuary crossings are a major barrier for bicyclists. The Webster/Posey Tube provides limited access for bicyclists in a highly daunting configuration, and crossing points like the Park Street Bridge provide limited bicycle facilities along busy roadways. The bicycle/pedestrian drawbridge adjacent to the Bay Farm Island Bridge is the one exception, as it provides a good estuary crossing for bicyclists and pedestrians.

Population

With a population of 77,660 people, Alameda is smaller than most North American cities with the bike share systems (see **Table 1**). However, it would not be the first to be part of a region with bike share. Cities such as Boston, Minneapolis and Washington D.C., have received much of the attention around bike share for having large systems of dozens of stations and hundreds of bikes, but both Boston and Washington D.C. have regional systems. The Boston system also serves smaller cities like Cambridge (population 100,000) and Brookline (population 50,000). Similarly, in Washington D.C., Capital Bike Share now serves Alexandria (population 140,000). Smaller cities like Miami Beach, FL (population just under 90,000) have launched or their own bike share systems, and are comparable in size to Alameda.

Density, however, is a more significant factor in bike share suitability than overall population. At approximately 7,000 persons per square mile, Alameda has a population density below large bike share cities.

Table 1: Comparison of Alameda Population and Density with other Bike Share Cities

City	Population	Land Area (Sq. Mi.)	Density (Persons/Sq. Mi.)
Boston, MA	655,884	48	12,793
Minneapolis, MN	407,207	54	7,088
San Francisco, CA	852,469	47	17,179
Alameda, CA	**77,660**	**11**	**6,956**

Source: U.S. Census American Community Survey: 5-year Annual Estimate of the Resident Population.

Age

User surveys in successful bike share cities, like Washington D.C. and Minneapolis, have shown that certain populations are over-represented as bike share users. The 'early adopters' include the 25-34 age cohort, who represent the largest group of bike share users at between 39 percent and 49 percent of the bike share member population, despite only making up about 21 percent of the general population (**see Table 2**). In Alameda, 13.5% of the population is aged 25-34, which is slightly lower than California

statewide percentage of 14.3%. This group, in conjunction with 7% of the population aged 18-24 years, creates a base of 20% of potential city residents who could be considered "early adopter" members of a bike share system.

At 40.7 years, the median age of the Alameda population is slightly higher than San Francisco (38.5). This slightly older user base in Alameda suggests that different types of outreach may be desirable to recruit interest in bike share membership.

Table 2: Comparison of Alameda Age Demographics with other Cities that have Bike Share

City	Under 18 Years	18 to 24	25 to 34	35 to 54	55 or Over
Boston, MA	16.7%	17.5%	22.0%	23.8%	20.0%
Minneapolis, MN	20.1%	14.2%	21.6%	25.4%	18.8%
San Francisco, CA	13.4%	8.5%	21.8%	30.1%	26.2%
Alameda, CA	**20.6%**	**7.0%**	**13.5%**	**31.9%**	**27.0%**

Source: *ACS 2014 5-Year Estimates*

Employment & Income

Generally, higher income brackets are more likely to use the bike share system than low-income populations. A 2014 Capital Bike share survey (Washington D.C.) found that 50% of respondents reported having incomes of $100,000 or more per year,[1] which may be related to a higher proportion of high-income residents living and working in the system service area. Throughout the City of Alameda, an estimated 37.6% of employed residents have an income of $100,000 or higher, and an additional 13.7% have an income below $100,000 but greater than $75,000 (see **Table 3**). The relative size of these income groups is significantly greater than in the east coast and comparable to cities in the Bay Area with bike share.

Table 3: Comparison of Alameda Income Levels with other Bike Share Cities

City	Median Income	Households Earning $75,000-$99,999	Workers Earning $100,000+
Boston, MA	$54,485	10.6%	27.8%
Minneapolis, MN	$50,767	11.5%	22.9%
San Francisco, CA	$78,378	10.6%	40.9%
Alameda, CA	**$76,439**	**13.7%**	**37.6%**

Source: ACS 2014 5-Year Estimates

Table 4 lists the ten major employers in Alameda; including Telecare Corp, Wind River Systems, the Alameda Unified School District, VF Outdoor, and the City of Alameda. These large employers represent the technology, education, management, and government industry sectors of the Alameda economy, which together constitute about one in three jobs within the city. Major employers can help assist the City when developing possible station locations and provide the City with potential stakeholders to reach out to during the bike share implementation process.

Table 5 provides a list of major industry sectors in Alameda and their share of employment. A wide base of smaller health care and food services make up the largest industry sectors in Alameda, 12.2% of jobs

[1] http://www.capitalbike sharebike share.com/assets/pdf/cabi-2014surveyreport.pdf

are in accommodation and food services, and 12% are in the healthcare and social assistance industry sector. More than 11% of jobs are in educational services and 10.6% are in professional industry.

Table 4: Principal Employers of the City of Alameda

Employer	Address	Employees
Telecare Corp	1080 Marina Village Parkway #100	2100
Wind River Systems Inc	500 Wind River Way	1800
Alameda Unified School District	2060 Challenge Drive	863
VF Outdoor	2701 Harbor Bay Parkway	600
City of Alameda	2263 Santa Clara Avenue #320	500
Alameda Hospital	2070 Clinton Avenue	492
Celera Corp	1401 Harbor Bay Parkway	490
A G Ferrari Foods	2000 N Loop Road	275
ATPA	1640 S Loop Road	250
Bay Ship & Yacht Co	2900 Main Street	250

Source: City of Alameda Comprehensive Annual Financial Report 2014

Table 5: Major Industry Sector Employment in Alameda

NAICS Industry Sector	Share of Employment
Accommodation and Food Services	12.2%
Health Care and Social Assistance	12.0%
Educational Services	11.1%
Professional, Scientific, and Technical Services	9.2%
Public Administration	8.7%
Retail Trade	8.2%
Manufacturing	7.2%
Administration & Support, Waste Management and Remediation	6.1%
Management of Companies and Enterprises	5.3%

Source: US Census Longitudinal Employer-Household Dynamic, On the Map Report, 2014

Colleges/Universities

Early adopters of bike share are also likely to be students at college campuses.[2] The Capital Bike share survey, the most in-depth survey of any bike share system conducted on Washington D.C.'s Capital Bike share program, found that college students responded strongly to outreach efforts about bike share and continued to sign up for bike share memberships at high rates more than a year after the launch of the original Capital Bike share program.

The College of Alameda has a significant presence in the city, with student enrollment at approximately 6,600. The College of Alameda could be a key part of a success bike share system because of the demographics and existing transit connectivity. For example, multiple AC Transit lines and local public and private shuttles already service the College of Alameda. The College of Alameda offers all students with a minimum of nine enrolled units an EasyPass-free transit access aboard AC Transit bus lines throughout the East Bay. Implementing a bike share system that includes the College of Alameda would benefit students, as well as teachers and staff, by further increasing access and mobility options to the college and around the island. The college is served by four AC Transit local and Transbay routes and is within one

[2] http://www.capitalbikesharebikeshare.com/assets/pdf/cabi-2014surveyreport.pdf

mile of the Main Street Ferry Terminal. The high connectivity means that college students, staff, and faculty are likely to increase bike share demand in Alameda, as experienced in other cities.

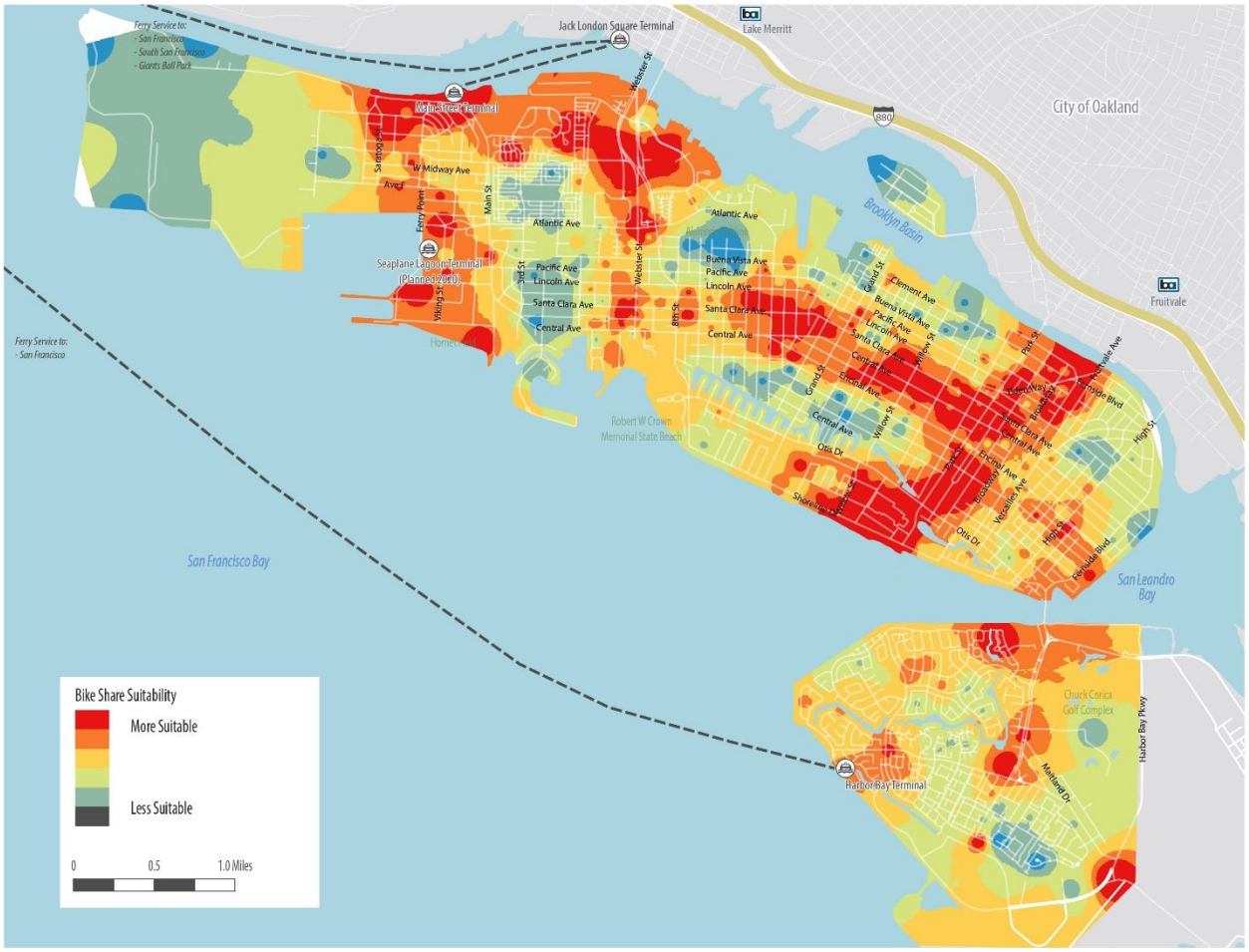
Suitability Analysis

Areas with potential demand for bike share were identified through an analysis of existing and planned commercial areas expected to draw visitors, concentration of employment, population densities, existing and planned transit access, and the location of bicycle facilities. The report analysis considered five factors:

- Where people work;
- Where people live;
- Where people shop and other destinations;
- Where people access transit; and
- Where there are bicycle facilities.

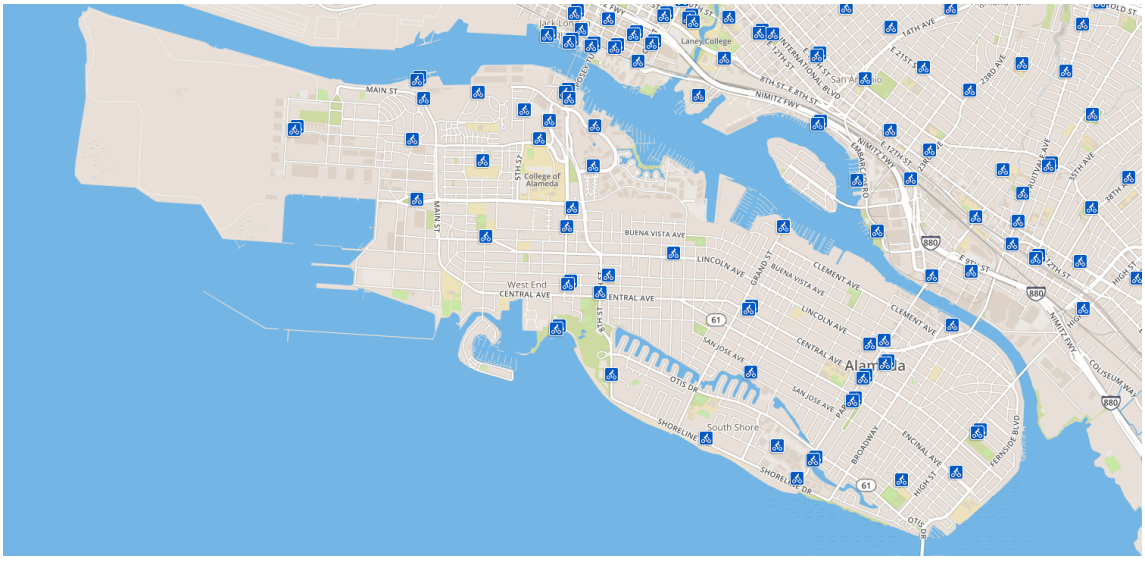
Future developments and transit infrastructure were incorporated into the analysis including the future approved/entitled developments, the future Alameda Point Ferry Terminal and the new AC transit line coming to the Northern Waterfront in late 2016. **Figure 2** shows a heat map based on the five suitability factors. Bike share potential is indicated to be more suitable in West Alameda and Downtown. The West Alameda area is located near Webster Street and extends west to Alameda Point, the Main Street Ferry Terminal, and the College of Alameda. The Downtown area includes locations along Santa Clara Avenue and the South Shore Shopping Center.

Figure 2: Bike Share Suitability



Another factor to consider is the bike share location requests submitted to Bay Area Bike Share over the last 9 months (see **Figure 3**). Requests are located throughout the city, but there are clusters along the Webster and Park Street corridors.

Figure 3: Bike Share Location Requests



Source: http://suggest.bayareabike share.com/

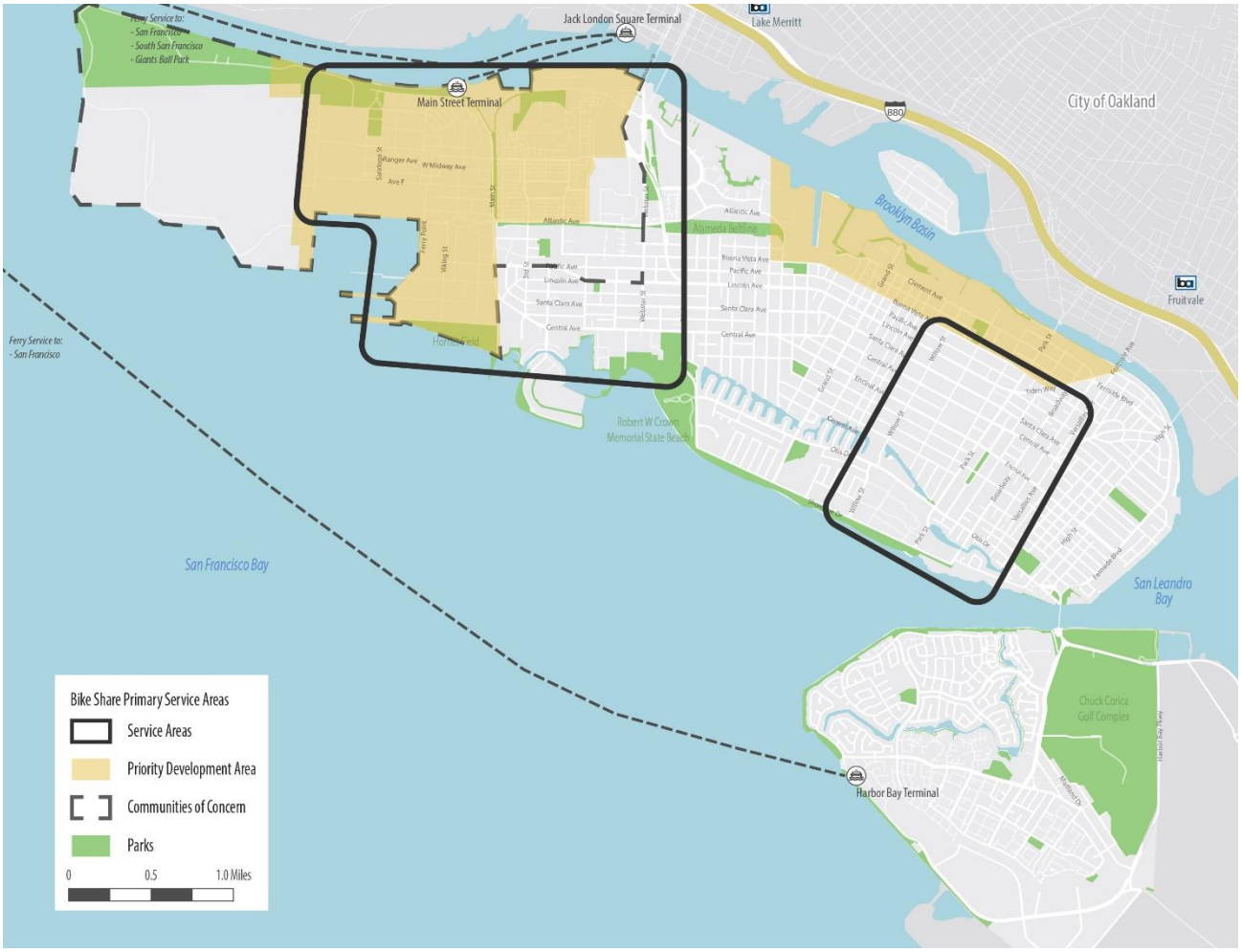
4. Bike Share Service Area and Sizing

Based on the analysis of demographics, geography, and suitability, Alameda is well suited for a medium-sized bike share program of about 100 bikes. The greatest opportunity in Alameda is to connect major transit nodes with locations that have a high number of employees, residents or students to provide a first-mile/last-mile connection for commuters. Connection to shopping destinations would be another important piece of an initial bike share system in Alameda. This section will describe the recommended service area for bike share, system sizing, station locations, and phasing.

Recommended Service Area

There are two primary areas where the bike share system would be the most suitable in Alameda. **Figure 4** shows that one is along the Park Street Corridor and the other is in West Alameda. Ideally, both areas could operate and trips could be made among and between them. West Alameda includes the Main Street Ferry Terminal, a planned ferry terminal at Seaplane Lagoon near Alameda Point, the College of Alameda, moderate job and population density, and shopping destinations. Additionally, the Alameda Point TDM program has a small amount of funding allocated for bike share, which potentially could be used for capital and operating expenses.

Figure 4: Primary Service Areas



System Sizing

Station Density

Bike station density is a function of the coverage area and the spacing of stations. Bike stations are the pick-up and drop-off points for most typical bike share systems and are usually located near major transit, employment, and tourist centers. Bike share systems in larger North American cities have station densities that are typically spaced between 1,000 feet to 1,300 feet apart. Research has shown that people will not walk further than about 1,000 feet, or five minutes, to use a bike.[3] Since Alameda does not have the density of residential, commercial and visitor destinations to make 1,300 feet spacing financially viable, a targeted bike share program will be necessary with short bike station distances. Bike stations will be located at key destinations such as transit stations, employment sites, and commercial areas. This is the model seen in other cities, but with varying degrees of success.

A few considerations when considering a smaller-scaled system include:

- A key factor that influences use are the number of stations located within a relatively short 10 to 15-minute ride along a route that is comfortable for biking.
- Each station should have a station nearby to provide as alternative to return a bike if the destination station is full.
- Maintain low distances between stations and adjust station size to accommodate different neighborhoods.[4]

Bike station density mostly effects bike share systems that rely on docking stations for checking out and checking in bicycles. However, new "smart bike" systems do not require a kiosk to check out bikes. These systems (described further in Section 6) are not restricted to docking station locations because touch screen and GPS devices allow bikes to be rented or returned from anywhere in a service area. Bike station density in these situations can be better because bikes can be returned at non-station bike racks, which increases bike share service area. However, effective redistribution of bikes is necessary to ensure bikes are available in high demand locations.

Number of Bikes, Docks and Stations

The number of bicycle docks and stations is dependent on the number of bikes in the system.[5] Dock-to-bike ratios typically range from 1.5 docks per bike to 2.0 docks per bike. There is typically one station for every 10 bikes in a system. A bike share system with 50 bikes would have 75 to 100 docks and five stations.

The recommended dock-to-bike ratio for Alameda is 1.75. The recommended bike to station ratio is ten bikes for each station. If the City chooses to move forward with a bike share system than utilizes "smart bikes", the ratios could be lowered with fewer stations needed.

Station Locations

Preliminary recommendations for bike share locations were made based on the suitability analysis, Bay Area Bike Share community input, and major employment and transit destinations. Final station locations

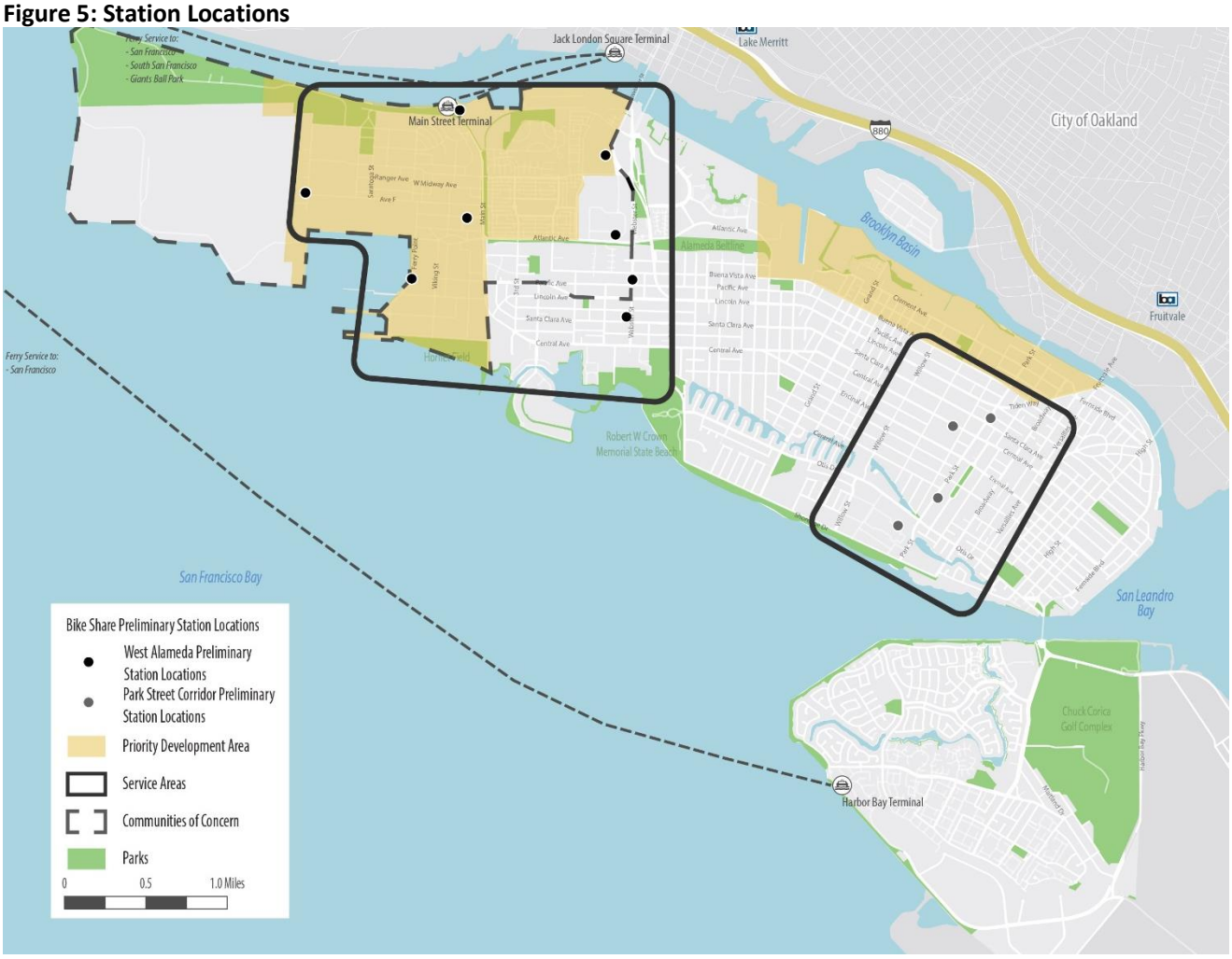
[3] http://nacto.org/wp-content/uploads/2015/09/NACTO_Walkable-Station-Spacing-Is-Key-For-Bike-Share_Sc.pdf
[4] http://nacto.org/wp-content/uploads/2015/09/NACTO_Walkable-Station-Spacing-Is-Key-For-Bike-Share_Sc.pdf
[5] A dock is the final parking location for a single bicycle at a bike station.

should be determined with public input and site analysis, and are also dependent on the type of bike share system selected. The initial phase is recommended to include 120 bikes, 210 docks, and 12 stations (see **Table 7**). Eight would be located in West Alameda and four would be located in Downtown (see **Figure 5**). Central Alameda, Northern Waterfront, and Harbor Bay are possible future expansions of the program. With a "smart bike" system (described in **Section 5**), service areas are more flexible and can be expanded into less dense areas and areas with fewer major destinations.

Table 7: Bikes, Docks and Stations

	West Alameda	Downtown	Total
Bikes	80	40	120
Docks	140	70	210
Stations	8	4	12

Figure 5: Station Locations



Projected Environmental and Transportation Equity Benefits

Carbon Dioxide (CO2) Reduction

Bike share systems contribute to reductions in CO2 emissions based on fewer vehicle miles traveled of those choosing to use bike share instead of driving. The industry average is that approximately one in four bike share trips (25%) replace a vehicle trip. According to data collected in studies by the University of

British Columbia (UBC)[6] and the Mineta Transportation Institute[7], CO2 reduction is more pronounced in more suburban and less dense cities, where there is more likely a shift from driving alone to taking bike share. The UBC study found a range in CO2 reduction for the City of Vancouver between 0.07% and 0.14%. On the other hand, people using bike share programs in denser cities are typically substituting a bike share trip for a public transit trip rather than for a car trip. **Table 6** shows the amount of CO2 reductions that might be expected from a bike share system in Alameda. This analysis assumes the bike share trips in Alameda will follow the industry average. Average trip distances are estimated at 1.8 miles per trip based on station spacing and averages identified from other bike share systems.

Table 6: Estimated Annual Bike Share CO2 Reductions for Alameda

Annual trips (1.5 trips per bike per day)	66,000
Bike share trips replacing vehicle trips	25%
Average trip distance	1.8
Vehicle trips reduced	16,500
Vehicle miles traveled reduced	29,700
CO2 emissions prevented (lb)	**24,122**

Equity: Bike Share Access for Communities of Concern

One of MTC's requirements on participating Bike Share cities is access for low-income and minority communities (communities of concern). These communities within Alameda include census tracts in West Alameda and 6 of the 12 proposed bike share stations are located within a "community of concern." The primary service area and recommended bike stations are located in areas that will provide access communities of concern. **Figures 4** & **5** provide an overlay that displays areas affected.

Risks and Challenges

There are risks associated with implementing any new mobility system, including bike share. At the system-wide level, a new network must be robust enough to provide bike share stations at enough locations for it to be a useful and convenient alternative. Funding sources, for both initial implementation to establish those locations and continuing service to maintain then, are a financial liability. Acquiring the funding necessary to establish service is only the beginning. Typically, bike share systems are not economically self-sustaining. Operating costs are usually greater than system revenues.[8] Therefore, if membership and ridership are not significant enough to cover costs, funding sources to provide adequate operation and maintenance services need to be determined before implementation of service. General outside funding sources include private donations, sponsorships, and advertising. Day-to-day operation costs of a bike share system are not eligible for federal funding.[9]

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[6] University of British Columbia. *Modelling Reductions of Carbon Emissions under Various Scenarios of a Public Bicycle Share System within Vancouver, BC*.
https://circle.ubc.ca/bitstream/handle/2429/42455/Modelling_Reductions_Carbon_Bicycle_Share_Vancouver_UBC.ENVR400_Report.pdf?sequence=1

[7] Mineta Transportation Institute. *Public Bike sharing in North America: Early Operator and User Understanding*.
http://transweb.sjsu.edu/PDFs/research/1029-public-bike sharing-understanding-early-operators-users.pdf

[8] https://www.wilmingtonde.gov/docs/2748/CoW_WilmingtonBike shareFeasibilityStudy_risks_and_benefits_of_bike_share.pdf

[9] https://www.wilmingtonde.gov/docs/2748/CoW_WilmingtonBike shareFeasibilityStudy_risks_and_benefits_of_bike_share.pdf

A concern faced by new potential system operators is attracting enough ridership to the system. While it is nearly impossible to calculate the exact number of expected riders a system will attract, the many factors examined in this report help determine suitable locations to implement a bike share service. The already high existing rate of multi-modal use by Alameda residents and desire for bike share locations (see **Figure 3**) shows potential for a bike share system that will be moderately used if implemented. Even so, a strong education and outreach campaign would be necessary to accompany any bike share launch, regardless of scale.

While there are segments of Alameda that are more suitable for bike share than others, the City as a whole has two characteristics that potentially negatively affect its ability to have a strong bike share program. Alameda has a lower population density than most successful cities and a smaller tourism industry than most other cities running successful bike share programs. However, these characteristics do not rule out the possibility of a successful bike share program, but the City must keep these attributes in mind when planning for Bike Share.

5. System Type, Operator, Costs and Financials

System Type

There are several types of bike sharing systems that may be implemented in Alameda, each with advantages and disadvantages. The most common model, Bay Area Bike Share, utilized throughout the Bay Area is one with bike share stations located throughout an area with "smart docks." Bikes are located at stations with docks and payment kiosks, can be checked out with credit payment for an allotted amount of time, and must be returned to a dock as form of "checking out." An alternative to the "smart dock" system is the "smart bike" system where bikes have a screen with rental and payment capabilities via a smart phone. These "smart bike" systems, which are gaining in popularity with systems already in place in Bishop Ranch and San Mateo (Social Bikes), are a viable alternative to the Bay Area Bike Share system. In any system, bikes are redistributed throughout the day to ensure a good supply at various locations. The Bay Area Bike Share, San Mateo Bike Share and Bishop Ranch Bike Share programs are described below to provide examples of potential system types for Alameda.

Bay Area Bike Share

Bay Area Bike Share was developed as a pilot bike share program in 2013. It operates 700 bikes in multiple cities in the Bay Area, including San Francisco, Mountain View, San Jose, Palo Alto, and Redwood City. Operations are planned to greatly expand starting in 2016 to 7000 bikes, and include the addition of Oakland, Berkeley and Emeryville, and the elimination of the smaller Peninsula cities. This expansion will include bikes throughout uptown and downtown Oakland and one station at the Jack London Square Ferry Terminal. Future phases would include bike share stations around the Fruitvale BART Station.

Since January 1, 2016, the Metropolitan Transportation Commission (MTC) has been in charge of overseeing the Bay Area Bike Share program with Motivate as the operator. While Motivate will cover all costs for the expansion of the program to 7000 bikes, using sponsorship and advertising revenue, the contract between Motivate and MTC outlines specific terms for other Bay Area communities interested in Bay Area Bike Share participation to join in the program, at pre-determined rates, after the East Bay expansion is completed.

San Mateo Bike Share

San Mateo launched its three-year bike share pilot program, Bay Bikes, in May 2016. It will operate 50 bikes at 11 stations located throughout San Mateo.[10] The system, which cost the city $350,000 and is operated by Social Bikes (SoBi), has some minor differences when compared to the Bay Area Bike Share. One of the most significant differences is that there are no requirements for parking bikes at docking stations. Bay Bikes allows users to park their bikes at any bike rack in the City. If the bike is not parked at or near a bike station, a $3 fee is charged. The City of San Mateo plans to study the pilot and expects to expand services after the initial three-year pilot program, with hopes for achieving interoperability with Bay Area Bike Share in the near future.

Bishop Ranch Bike Share

The Bishop Ranch Business Park launched its bike share system in December 2014. The system utilizes 100 bikes located throughout the 585-acre business park. To access the bikes, employees of nearby businesses must first pay a $50 a year membership fee.[11] Members can then use the bikes free for the first hour and $5 for the second hour. Some employers do offer membership subsidies to help cover cost. The system, which cost Bishop Ranch $150,000 and is operated by Social Bikes (SoBi), has some minor differences when compared to the well-known Bay Area Bike Share Program. One of the most significant differences, which it shares with San Mateo Bike Share, is that there are no requirements for parking bikes at docking stations. Bishop Ranch Bike Share allows users to park their bikes anywhere on the 585-acre business park.

System Vendor/Operator

There are a multitude of vendors and operators offering bike share bicycles and operations. As a basis for this feasibility study it is assumed that the operation of the system would be done by an outside nonprofit organization with coordination with the City; this is the standard for the majority of bike share systems. Three different vendor/operators, all already operating in the Bay Area, are considered, including Motivate (Bay Area Bike Share), SoBi, and Zagster.

Motivate (Bay Area Bike Share)

Motivate operates the Bay Area Bike Share program, which currently includes San Francisco, Mountain View, San Jose, Palo Alto, and Redwood City. Operations are planned to expand to Oakland, Berkeley and Emeryville. The system operates using “smart dock” bicycle stations that require users to pick-up and drop-off their bikes at individual docking stations.

SocialBikes (SoBi)

SoBi provides service at Bishop Ranch in San Ramon and the City of San Mateo. This system has two models, one with docking stations similar to Motivate and one where docking stations are not required and participants can return a bike to any bike rack within a designated area. The main difference between SoBi and Bay Area Bike Share is that the SoBi bikes are equipped with reservation and locking technologies on the bicycles themselves, rather than being provided at the station kiosk . This “smart bike” technology makes for a more versatile system where bikes do not always need to be returned to docking stations and participants can use their mobile phone or computer to locate bikes. The system

[10] http://ww2.kqed.org/news/2016/05/12/san-mateo-launches-a-bike-share-system-on-bike-to-work-day
[11] http://www.mercurynews.com/business/ci_27053632/new-bike-share-program-debuts-bishop-ranch-san

does provide some docking stations (at a much lower rate than Bay Area Bike Share), for users seeking a more traditional check-in and checkout process, but the flexibility to pick-up or return a bike outside of the docking station area is always available.

SoBi's technology has also made it a leader in bike share deployment for medium sized cities like Alameda for its cost savings and flexibility. There can be savings due to reductions in docking stations. Docking stations have an impact on cost and a system that does not solely rely on these stations provides savings. Non-reliance on physical docking stations also makes scalability of the program easier. There is no need for permitting or research into best locations for a new docking station and new bikes can be added into the system. The SoBi technology can also take advantage of the 119 city bike racks already located throughout Alameda. Current and future bike racks would continue to serve local residents who use their own bikes, but also provide usable parking for bike share users. Redistribution of bikes throughout the day ensures bikes are available at known and well-visited locations.

Zagster

Zagster provides bike share services for communities, businesses, and institutions across the country. Most of its existing operations in the Bay Area are focused on corporate and university campuses. Zagster operates the Santa Clara University bike share system, as well as the bike share systems at Workday, Inc. in Hayward, and Samsung's bike share program at their Mountain View campus. Zagster services are typically more small-scale than SoBi or Motivate, and are a good fit for more neighborhood or campus focused bike share programs. If a system were to only serve Alameda Point, for example, Zagster would be a viable option. Zagster operates a bike docking station platform, similar to Motivate, which requires the use of bicycle station kiosks to checkout and return bikes.

Cost Estimate

Cost Comparison: SocialBikes, Motivate, and Zagster

All three bike share systems provide increased mobility and travel options for local residents and visitors to the area. Motivate bike share operates a more "traditional" bike share system that is most like other systems already operating in nearby Oakland and San Francisco and might be something local residents are most use to. Zagster follow a similar approach, with experience in much more small-scale environments-like university campuses and large office parks. SoBi's "smart bike" technology increases flexibility and is less expensive to implement and maintain compared to Motivate (see **Table 8**). Beyond up-front savings, attributed heavily to lower docking station requirements and kiosks, SoBi provides the most system flexibility for expansion and greatest potential for accumulating outside advertisement dollars. Motivate, on the other hand, does not share advertisement revenue with local jurisdictions as stated in their agreement with MTC. It is unknown if Zagster provides any advertisement revenue sharing with its partners.

Table 8: SocialBikes, Motivate, and Zagster Cost Comparison

	Social Bikes (SoBi)	**Motivate**	**Zagster**
Initial Capital Cost [1]	$465,000	$720,000	N/A [3]
Initial Annual Operating Cost [2]	$225,000	$350,000	$100,000 [4]
Program Details	125 Smart bikes 225 Docking Points 1 Kiosk	120 Bikes 210 Docks 12 Stations/Kiosks	45 Bikes N/A Docks 0 Kiosks

	5 Kiosk "Lite" Number of docking points are suggested and can be reduced to provide additional reductions in initial capital expenditures.	Number of docks is fixed to a predetermined ratio of docks to bikes. 1.75.	
Number of Bay Area Clients	2	5	2
Pay Kiosks	Optional. Use of smart-phone app for checkout and check-in limit the number of required kiosks. Effectively lowering costs. Kiosks "Lite" are an available option that provide physical pay stations through partnerships with local business owners.	Yes. Existing system requires the use of kiosks to checkout bikes. Smart-phone app is available, but does not yet allow bike reservation or checkout.	Limited. Smart-phone replaces the functions of traditional pay kiosk.
Docking Stations	Optional. Bikes can be locked to regular bike racks within certain vicinity of docking station location.	Required. Bikes are required to be locked into docking station when not checked out.	Required. Bikes are required to be locked into docking station when not checked out.
Self-locking Bikes	Yes. Unlock code is sent to user via smart-phone. Can be locked or dropped off anywhere.	No. Bike requires a docking station to lock.	Yes. Locking device on bike is controlled via smart-phone app. Bike is required to be returned to docking station for final check-in.
Platform Scalability	Flexible. System is easy to modify; bicycles are added and removed from system, with little effect on existing capital improvements. Use existing infrastructure.	Less Flexible. Requires certain numbers of docking station per bicycles in system. Will require docking stations with pay kiosks located throughout service area and additional permitting.	Flexible. While the system does not need pay kiosks at each bike share location, it does require a set number of docking stations per bike rate in the system.
Advertisement Revenue Available	Yes. Can also be used to negotiate lower monthly operations bill.	No. Motivate controls sponsorship and advertisement revenue.	Unknown

[1] Include: Bikes, station components, testing equipment, membership cards, implementing service, component shipping
[2] Include: Bike, dock and station maintenance, technical support, management & administration field labor, accounting, marketing, legal, support, insurance, customer assistance. Does not include City staff time. Annual operating costs expected to increase at rate of inflation.
[3] All equipment used is leased and never owned by the client
[4] Informal phone conversations estimate an approximate cost of $100,000 for every 45 bicycles

Funding

Funding for Bike Share in Alameda is likely to come from a variety of sources. One primary committed source is the Alameda Point TDM program, which has programed funds for 45 Bikes. These funds will be allocated toward start-up costs and operations as a percentage of the total bike share system. **Table 9** provides a breakdown of potential funding sources using Motivate bike share cost figures as an example. There are several different sources the city may target for funding, including system wide sponsors through SoBi that may cover significant operating costs. Fare box recovery is expected to contribute to overall revenue and should be between 30-60%.[12]

Table 9: Potential Funding Sources by Year

	Year 1	Year 2	Year 3	Year 4
Capital Expenses	$720,000			
Grant Funding [1]	*$673,000*			

[12] According to Social Bikes, farebox recovery ratios range between 30 and 60 percent.

Alameda Point TDM	*$22,000*			
Local Funds	*$25,000*			
Operating Expenses [2]	$350,000	$357,000	$365,000	$372,000
Alameda Point TDM	*$1,000*	*$2,200*	*$3,300*	*$3,300*
Grant or Local Funds	*$349,000*	*$354,800*	*$361,700*	*$368,700*
Total	**$1,070,000**	**$357,000**	**$365,000**	**$372,000**

[1] Potential grant funding sources include, but are not limited to: MTC Bike Share Capital Program, County transportation sales tax or vehicle license fee, fuel tax, TDA-3, BTA, TMAs, Advertisement (SoBi), OBAG 2, and other local funding
[2] Operating expense estimates are conservative estimates and may be reduced when more people use the bike share system. Operating expense discounts are applied as described in the *Capital and Operating Costs* section.

Advertisement Funding

Motivate, operator of the Bay Area Bike Share system, controls advertisement for the bike share system. Advertisement revenues for the City of Alameda through a Motivate operated bike share system would be limited. Advertisement funding through SoBi, as addressed earlier, is possible and could potentially provide a funding source for the longevity of the program. SoBi representatives also expressed the possibility of a regional sponsor coming aboard, which could secure future funding sources for some time. It is currently unknown if Zagster provides advertisement revenue sharing like SoBi.

Phasing

The preferred method for implementation of a bike share program is all at once, with all stations and bicycles being active from the beginning of the program. This allows users to get from destination to destination with the least amount of gaps in service. Making movement as easy as possible through the bike share network will increase the likelihood a user uses the service the following time they need to make a trip. However, given the cost of implementing the service and that some areas are not as prepared for bike share as others, the service can be implemented through multiple phases.

Phase 1

The initial bike share system should be implemented in the West Alameda portion of the proposed service area. Bike stations should be located near the WETA Main Street Terminal, the College of Alameda (along Webster St.), along Ferry Point, and East of Main Street. With greater key destinations than the Park Street area, West Alameda will provide a better pilot study area than Park Street.

Phase 2

Implementation of the bike share system should then be implemented along Park Street's business district. Following implementation in all of the proposed service area, the network should seek to provide station access that meets recommended NACTO design standards. This calls for in-fill station implementation that connects both areas and provides station access of 1,000 feet or less within the total area.

Phase 3

After implementing Phase 1 and 2, and after establishing in-fill bike share stations between the primary service areas, bike share expansion to the Northern Waterfront, along Shoreline Drive, Bay Farm Island, and Central Alameda should be explored and aggressively pursued.

6. Conclusion and Recommendations

The City of Alameda has the geography, climate, and pockets of density to make a successful bike share program possible. The City also has some characteristics that may inhibit the success of bike share, including lower job and population density and fewer tourists and visitors compared to other successful cities with bike share cities. Moving forward, the City should seek to implement a robust and flexible system that does not rely as heavily on density and tourism as more traditional systems do. The greatest opportunity in Alameda is to connect major transit nodes with locations that have a high number of employees, residents or students to provide a first-mile/last-mile connection for commuters. Connection to shopping destinations would be another important piece of an initial bike share system in Alameda. The City should determine implementation and operation funding sources that will allow for continuation of the program with low to moderate ridership numbers, outside funding beyond revenue from ridership will likely be necessary.

Based on the analysis conducted in this report there are two options described below for potential implementation of bike share in Alameda.

- Option 1: Implement the SoBi system in the specified service area. The flexibility the system provides to park anywhere with “smart bikes” and overall lower costs make it the best candidate. The system is scalable and can be implemented at or below the recommended number of bicycles. Additional city-owned and maintained bicycle parking may need to be installed in or around the service area, but at a much lower cost compared to the docking systems used by Motivate. Initial cost to purchase the number of recommended bicycles will require outside grant-funding, including the MTC Bike Share Capital Program.

- Option 2: Implement a SoBi or Zagster system as a smaller pilot in the West Alameda service area. Begin with 30-50 bicycles and expand the service to the recommend study area over a three-year period, or as funding allows. Initial funding sources will be local and state, including Measure B/BB funds, ACTC, ATP, TDA-3, private matching, and local TDM funds.