



# Marin County Bicycle Share Feasibility Study

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## 1 Executive Summary

### What is Bike Sharing?

Bike sharing is an innovative approach to urban mobility, combining the convenience and flexibility of a bicycle with the accessibility of public transportation. Bike share systems consist of a fleet of bicycles provided at a network of stations located throughout a city or group of cities<sup>1</sup>. Bicycles are available on demand, providing fast and easy access for short trips, transit-linked trips, and tourist trips.



Bixi, Montreal

### Why do Bike Sharing?

Cities such as Montreal, Denver, Minneapolis, Washington D.C., Boston, Miami Beach, Toronto and over 300 other cities worldwide are investing in bike sharing as a relatively inexpensive and quick implementation urban transportation option. These cities have been transformed by the many benefits of bike sharing that include improved individual and community health, economic development through green jobs and improved access to businesses, environmental benefits such as reduced vehicle emissions, and the community benefits of providing another mobility option as an extension of the transit system.

California cities and jurisdictions currently planning bike share systems include Orange County, Monterrey County, Los Angeles, and Long Beach. In the Bay Area, the City of San Francisco in partnership with the Bay Area Air Quality Management District (Air District), Metropolitan Transportation Commission (MTC), and other cities along the Peninsula is expected to implement the first large-scale system in 2013 (1,000 bicycles) in downtown San Francisco and along the Caltrain corridor at high activity station areas from Redwood City to San Jose.

### What are the goals for Bike Sharing in Marin County?

The Transportation Authority of Marin (TAM) is responsible for managing a variety of transportation projects and programs in Marin County and working closely with all eleven cities and towns as well as the county. In conjunction with the Bike Sharing Advisory Working Group (BSAWG), an ad-hoc group formed to guide the direction and development of the Marin County Bike Share Feasibility Study, TAM has identified the following key goals for a successful potential program in Marin:

- Provide convenient mobility options for Marin residents, workers and visitors
- Reduce congestion and greenhouse gas emissions
- Serve transit-dependent communities
- Complement/support transit service and bicycle infrastructure
- Promote active and healthy lifestyles
- Encourage economic development
- Be financially sustainable

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<sup>1</sup> Emerging options also include lower-cost “station-less” systems that utilize independent locks and internet-enabled communications to reserve and track bicycles. While these systems are briefly reviewed in this report, the primary focus is the station-based model that is most often associated with modern bike share.

### Is there demand for Bike Sharing in Marin County?

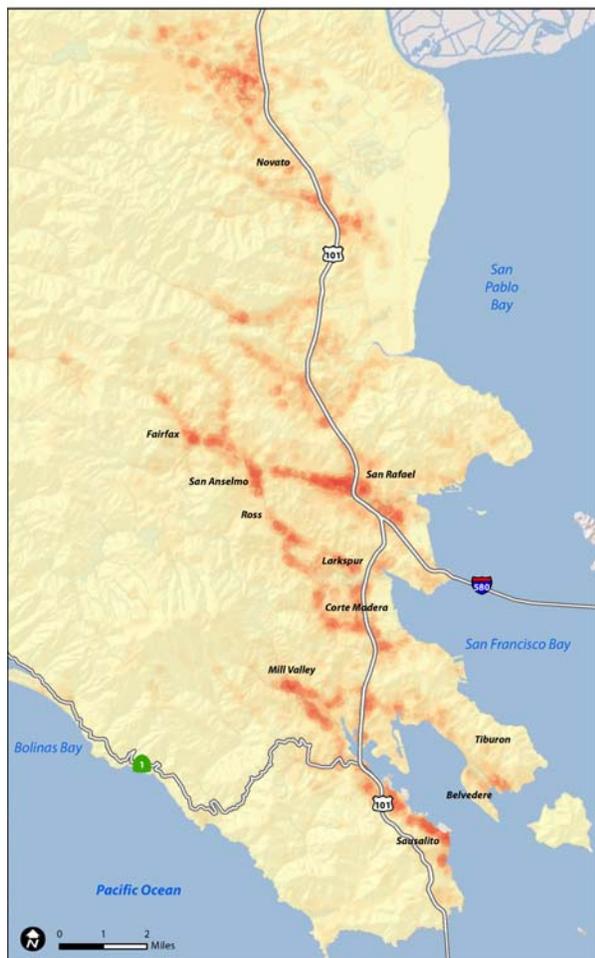


Figure 1. Bicycle share demand “heat map” for Marin County. Discussion of demand factors are provided in Section 7.3.

Marin County has several of the characteristics required to make bike sharing successful, including vibrant commercial centers, relatively extensive public transit, large numbers of visitors, a supportive culture of bicycling and active living, and a policy environment that prioritizes the growth of sustainable transportation options. There are also characteristics of Marin (and its various jurisdictions) that are less conducive to bicycle sharing demand: lower densities of housing and jobs; an older demographic with high car ownership; hilly topography; and limited bikeway infrastructure in potential high demand areas – such as along Highway 101 and the Sir Francis Drake Blvd/ Miracle Mile and Mill Valley-Corte Madera corridors.

How these factors ultimately affect the demand for and viability of bicycle share remains to be seen, but initial analysis indicates that a targeted system is feasible as an extension of ferry and core transit service, and as a larger inter-city travel option given the right conditions. Beyond requiring a steady stream of demand from visitors and other ‘casual’ users to generate revenue, it is anticipated that large employers will need to be early supporters of the system for commute-related, transit-linked trips and possibly for sponsorship. Marin’s concentration of older residents with high rates of car ownership will also have to exhibit a sustained interest in bicycle share as a means of conducting errands and discretionary trips for a large scale system to be successful. Continued interest and commitment from state and regional funding agencies will also be critical to support up-

front funding of capital equipment. Lastly, implementation of the San Francisco Bike Share pilot program and Sonoma-Marín Area Rapid Transit (SMART) commuter rail service are also forthcoming projects with potential positive impacts for bike sharing in Marin.

**What might the system look like and how much would it cost?**

This report provides analysis of several options for locating and implementing a station-based bicycle share program in the urbanized areas of Marin County, but stops short of recommending a “preferred” system. Additional study and coordination among jurisdictions is necessary to identify a lead agency (or agencies), confirm public support and funding availability, explore options to improve access for transit dependent “lifeline” communities, and select a business model among other factors. To assist these efforts, however, the study does identify 37 potential locations for bike share stations as well as potential phasing concepts. Potential phases range from a pilot effort of 30 bicycles and 4 stations to expanded systems of 100, 200, and 300 bicycles. For the up-front capital and initial launch costs, these phases would require anywhere from \$250,000 in grant or other one-time funding to approximately \$2.35 million for “full build out” of a 300 bicycle system.

**Will there be ongoing funding needs?**

Most bicycle share programs are different from transit systems in that they can often ‘pay their way’ without a public operating subsidy, which is essential to their appeal. In Marin, a substantial portion of ongoing operating costs are expected to be covered by user-generated revenues, although additional resources will be needed to ensure no ongoing commitment of public funding. Opportunities to leverage corporate or private sponsorships and Transportation Demand Management (TDM) programs/incentives will be critical to a self-sufficient operating budget, and may over time help lead to annual profits that could be reinvested back into the system.

**What are the next steps for developing a Marin Bike Share program?**

Bicycle sharing is an exciting - and feasible - opportunity for Marin, but there are many more steps needed to make a system a reality. Additional planning and exploration of funding options and local support is needed before confirming a program scope and timeframe for implementation. Next steps include confirming a preferred business and organizational model, conducting more detailed site location assessment and planning, obtaining necessary permits and agreements from local jurisdictions, and applying for/securing grant funding for the initial capital purchase of bicycles and to cover program launch.

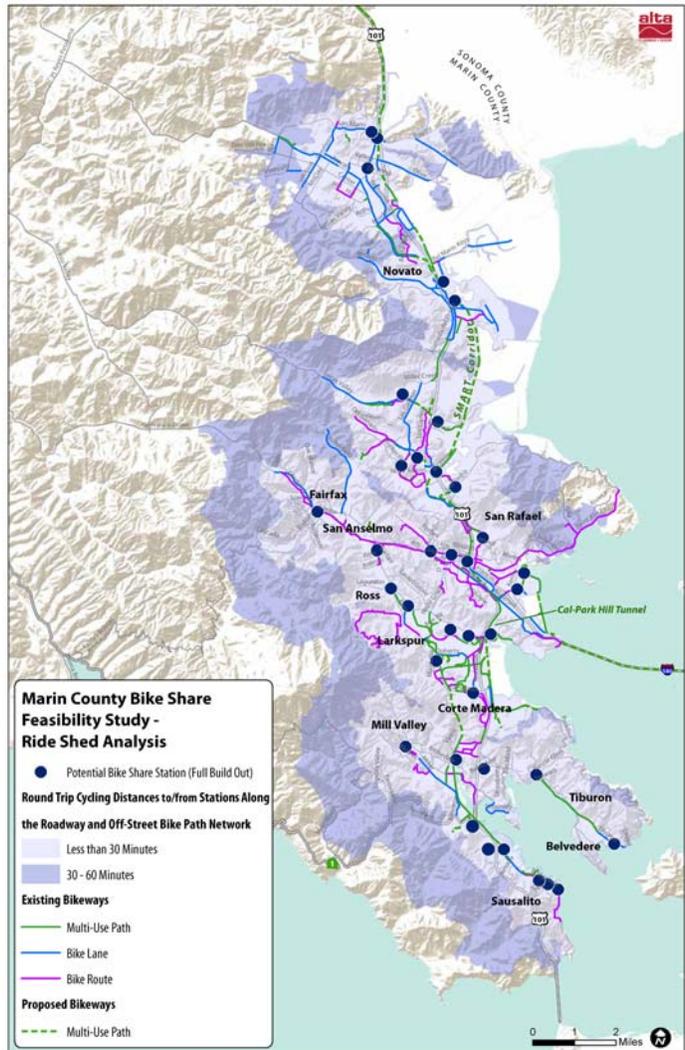


Figure 2. A total of 37 locations were identified in the urbanized area of Marin County as potential bicycle share stations. More analysis and significant outside funding (public and private) are needed to confirm the feasibility, size, and timing of system implementation.

SOURCE: Marin Maps, Alta Planning + Design



Figure 3. Estimated potential timeline for bicycle share planning and implementation (subject to change)

## 2 Report Contents

In early 2012, the Transportation Authority of Marin (TAM) hired Alta Planning + Design to study the feasibility and potential design of a bicycle share program in Marin County. Bicycle share programs consist of a fleet of publicly accessible bicycles typically used for short trips in urbanized areas, and often in combination with transit (unlike traditional rental bicycles).

To assist the development of the study, TAM organized an ad hoc Bicycle Share Advisory Working Group (BSAWG) with representatives from throughout Marin who are knowledgeable of local transportation issues, particularly bicycle travel. This Marin County Bike Share Feasibility Study combines content from two working papers and four BSAWG meetings to provide an overview of what a potential Marin County bicycle share system could look like, and key factors that should be considered when deciding whether or not to pursue implementation of a system.

The following **Section 3** of the Feasibility Study provides background context for bicycle sharing programs, including a brief history of the bike share technologies and a detailed listing of program elements and considerations.

**Section 4** outlines the benefits of a bicycle share program, while **Section 5** lists the various funding and business models that have been employed in North America.

**Section 6** lists the goals of a successful program in Marin as identified by BSAWG, and **Section 7** reviews the physical and demographic characteristics of Marin that are directly relevant to bicycle share feasibility.

The final sections (**Section 6-8**) provides the outline for a proposed system in Marin including demand analysis, station placement, funding strategy, and an identified timeline of next steps. Additional support information on case study programs and issues associated with helmet use are provided as appendices.

### 3 What is Bike Sharing?

#### 3.1 Overview & History

Bike sharing provides a cost-effective and elegant mobility option for trips too far to walk, but not long enough to justify waiting for transit or those too costly to make by taxi or private vehicle. A bike share system consists of a network of bikes placed at stations situated at key locations around a region and is a relatively inexpensive and quick implementation extension to a region’s public transportation offerings.

The international community has experimented with bike share programs for nearly 40 years. Until recently, these programs experienced low to moderate success because of theft and vandalism. In the last five years, innovations in technology to increase accountability have given rise to a new generation of technology-driven bike share programs.

Table 1: Historic Development of Bike Sharing Technology

Generation	Years	Features	Pros/Cons
1 <sup>st</sup> Generation	1960’s	Distinguishing looking bikes (i.e. certain paint color)	Subject to theft and poor organization
2 <sup>nd</sup> Generation	1990’s	Locking mechanism and check-out deposit	Minimal deposit not enough to significantly reduce theft
3 <sup>rd</sup> Generation	2005 onwards	Credit card transactions and radio-frequency identification chips	Allow user identification and a security deposit to ensure accountability against theft and vandalism
4 <sup>th</sup> Generation	2008 onwards	Solar power and wireless communication	Allows for modular systems that do not require excavation

First-generation bike share programs began in the 1960’s and included a fleet of bikes with a distinguishing feature (e.g., painted white) distributed around a city for free use. Theft and poor organization were the key reasons for program failure in many first-generation bicycle programs.

To add some accountability, second-generation systems introduced a locking mechanism and required a check-out deposit payable at pick-up and returned at drop-off. An example of this system is the Copenhagen Bycyklen, founded in 1995, which required a coin deposit to release the bicycle for use. However, the minimal deposit was not enough to significantly reduce theft<sup>2</sup>.

The primary problem with first and second generation bike sharing was a lack of accountability, resulting in the development of third-generation bike share systems, which are characterized by credit card transactions and RFID chips (radio-frequency identification). These crucial technology upgrades allow user identification and a security



Coin deposit systems do not always provide enough incentive for the user to return the bike.

<sup>2</sup> It was estimated that 300 bikes or about 15% of the fleet was lost to theft in Bycyklen in 1996.

deposit to ensure accountability against theft and vandalism. Third generation bike share generally kicked off with the launch of the system in Lyon, France in 2005 and was accelerated with the high profile launch of the Velib system in Paris in 2007.

The so-called “fourth-generation” was coined to characterize modular systems that do not require excavation because they use solar power and wireless communication, as opposed to hardwired installation. In this way, the stations can be moved, relocated, expanded, or reduced to meet demand. Even with this technology available, some cities, such as London, have chosen to utilize a hardwired system. Recent high-profile bike share installations including those in Denver, Minneapolis, Miami Beach, Washington D.C., and Boston utilize fourth-generation technology.

### **Bay Area Bike Share Planning**

In 2012, the Bay Area Air Quality Management District (BAAQMD), in partnership with the City and County of San Francisco, San Mateo County Transit District, City of Redwood City, County of San Mateo, and Santa Clara Valley Transportation Authority (VTA), issued a request for proposals to design, build, operate, maintain, manage and publicize a network of publicly available bicycles in downtown San Francisco and along the Caltrain corridor. The pilot project identified a 4<sup>th</sup> generation system as the preferred operating model, and includes funding for 1,000 bicycles and 100 stations and operations for at least one year. The results of the pilot will in large part determine the future of the 4<sup>th</sup> generation system throughout the Bay Area.<sup>3</sup>

## **3.2 Bike Share Demand Characteristics**

The expected users of the system and the geographic spread of regional attractions bring forth a diversity of potential trip types including:

- Short distance trips around built-up areas and downtown centers.
- Short distance trips to and from transit stops.
- Recreational rides or longer trips between major destinations.

A key early decision will be to determine which trip types should be served by the bike share system and which should be left to other transportation options. Traditionally, bike sharing has targeted shorter duration and distance trips, leaving longer trips to transit, private biking, bike rental, and other modes. A similar structure could be adopted in Marin with a focus on access to/from key transit hubs and travel within downtown centers, and satellite systems in outlying activity centers connected by transit or other modes. An example of this might be travel within downtown San Rafael from the Bettini Transit Center that serves regional transit (and will one day be adjacent to SMART commuter rail). Other transit hubs in Marin County that could be supported by bike share stations include the Larkspur and Sausalito ferries, and the future Novato SMART stations.

Bike share systems in North America are diverse and include different generations of technology and varying fee structures and loaning periods to cater for the local environment. However, sophisticated tracking and transaction technology, web-based applications to track real-time availability of bicycles, and fully modular station technology with solar power and wireless communications has broadened the appeal of fourth generation bike sharing. Several case studies relevant to Marin County are presented in an appendix in terms

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<sup>3</sup> Alta Bicycle Share has been selected to operate the Bay Area Bicycle Share pilot program. At the time of this feasibility study, the program is expected to be launched in mid to late 2013.

of the size and extent of each system, the system's effectiveness in generating ridership, the ownership / administrative / operating (business) model chosen, and the funding strategy used for capital and operating costs. The case studies were chosen to represent the experience of smaller markets in Boulder and Chattanooga; to highlight different ownership / operations models (including public private partnership and non-profit models); and to share details of the regional San Francisco and Boston systems in terms of expansion under a regional (multi-jurisdictional) scenario.

### 3.3 System Elements

The components of a fourth-generation bike share system include a network of stations, a fleet of bicycles, a software back-end and maintenance/redistribution teams that operate the system. These elements are described in further detail below.

#### **Bicycles**

Bicycle share fleets typically consist of upright bicycles, with step through frames and adjustable seats to allow use by persons of any height. Most models feature a chainguard and 3-speed internal hub gearing, which protects the most vulnerable mechanical parts of the bicycle from exterior wear. Bicycles can be equipped with additional gears if steep topography is a consideration (a 7-speed internal hub is increasingly common). Most bicycles also feature built in safety features such as pedal-powered lights, thick tires, a bell, and reflectors. Some models also include a rack for holding small items, while GPS units can be included to track bicycle locations for system monitoring (operations) as well as planning. The numerous accessories and rugged construction for durability makes the bicycles heavier than most consumer models, often weighing 40-50 pounds. The weight and upright riding position of the bicycles encourages users to travel at moderate speeds. Bicycles are appropriate for intended use of the bicycle transportation network on existing roadways, bike lanes, and multi-use paths.

Although electric-assist bicycles have been explored as part of several bike share systems, the higher capital and maintenance costs typically exclude such bikes from being feasible for financially-constrained systems.

#### **Stations**

Bicycle share stations have two main elements: the kiosk provides the interface where users initiate a transaction to rent a bicycle, and a number of docks that securely hold bicycles waiting to be checked out and accept returns. A typical bicycle share station consists of a single kiosk and anywhere from 5-10 to several dozen docks, depending on local demand and available space. Minimum station size by number of docks varies among equipment vendors.

#### **Kiosks**

The kiosk provides the interface where users complete a transaction to rent a bicycle, which can include purchasing a temporary (for visitors) or annual system membership (for residents or employees). A credit card or system membership card is usually required to complete the transaction. Fourth-generation bicycle share kiosks are solar-powered, which differs from third-generation systems that are hard-wired to local utilities.

#### **Docks**

Once a transaction at the station kiosk is complete, the kiosk will direct the user to a dock where the user can unlock a bike, typically through use of a temporary PIN code or membership card swipe. When the user has completed their trip, they can return the bicycle to any empty dock at a station to complete their rental. The dock that accepts the turn will then lock the bike in place until it is needed for another rental. Fourth

generation bicycle share docks are modular, coming in plates of several docks each, allowing station size to be expanded or reduced adjusted if required by demand.

### Flexible Station Placement

A key advantage of fourth-generation bicycle share technology over hard-wired systems is the ability to relocate stations as necessary to serve demand. This can include relocating stations if they are underperforming at current locations, or adjusting station size or availability based on its seasonal demand profile. In the latter scenario, for example, a highly seasonal station that requires active management for balancing may not be worth the cost to operate over the winter when demand is lower. By removing and storing the station for several months, the program may help limit unnecessary operating costs. 4<sup>th</sup> generation station designs thus help limit risk associated with choosing either the ‘wrong’ station location or a highly seasonal location. Such limited impacts to existing infrastructure may also limit the need for and cost associated with detailed environmental review.

### Operations

Operating costs include those required for operating and maintaining the system and include hiring employees for operational tasks such as maintaining the stations, bikes, and other infrastructure, rebalancing the system, providing customer service, etc. Generally, the operating parameters of the system are agreed upon during contract negotiations and documented in a ‘Service Level Agreement’. These represent the contractual obligation of the operator and balance user experience and cost to provide the service.

In 2010 “our total costs for theft and vandalism were only about \$5,000.”

Bill Dossett, Executive Director of Nice Ride Minnesota, a fourth generation bike share system

### Rebalancing

For larger systems, a dispatch center will work to alleviate usage pressures on the system, including the following considerations:

- **Full stations:** The highest priority goal of operators is to empty full stations as soon as possible, as this is the top frustration from members.
- **Empty stations:** A close secondary goal is to supply empty stations with bicycles.
- **Station clusters:** Stations located near each other may be analyzed to determine the level of urgency of redistributing bikes. For example, if locations closest to a problematic station are empty or full when that station is empty or full, it may be less urgent to attend to that station, because users can easily access a different station within one or two minutes.
- **Predictive modeling tools:** For the first two to four months of operation, staff will rely on best estimates for optimal bike numbers for each station at any given period, especially peak periods. Predictive model mapping allows operators to “right size” bicycle fleets at all stations during critical demand periods, especially at those stations with extreme high/low demands at specific times and for special events.

### Data Tracking

Back-end software and computer hardware provide on-the-ground operators with tools for real-time management of the Docking System in order to facilitate maintenance, repair, and redistribution. The System allows monitoring of the following conditions:

- Number of empty docking points and bicycles available at any site

## Marin County Bicycle Share Feasibility Study

- Functional status of bicycles
- Traffic and usage patterns of docking stations and bicycles
- Real-time locating of any bicycle at any docking station in the system

Other usage data that the Back-end Software and Computer Hardware generates includes:

- Bicycle miles travelled (from GPS or estimates of average trip length)
- Number of trips and their duration
- Number of subscribers with each type of subscription
- Number of uses
- Number of uses per subscriber per day, week or month
- Average number of miles biked per subscriber (based on average trip length estimates)

### **Maintenance**

Most bike share programs have established maintenance programs for system components, including bicycles, docks, and terminals. Utilizing wireless technology, bike share stations are able to be monitored remotely in real time, so they do not require regular on-street checking. Any issues that cannot be addressed remotely are addressed by station technicians in the field.

Bike share bicycles and stations are regularly inspected and serviced to ensure proper safety, functionality, and cleanliness. Broken bicycles can be reported with the push of a button on the dock, which allows the control centre to “lock” that bike and prevent it from being taken out by another user.

### **Marketing & Customer Service**

#### *Call Center*

The call center represents an important interface with the customer to deal with enquiries ranging from membership, fee structure, billing and payment, incident or breakdown reporting, full or empty station reports, troubleshooting, complaints, etc. The call centre can be established locally, or batched to an existing system, although an intimate knowledge of the technology and the specifics of the system are critical. Call volumes tend to be high during the first few months of operations and during peak visitor seasons.

#### *Promotions*

For the most part, existing bike share systems have operated with small marketing budgets relying on word-of-mouth and visibility of the bikes themselves for promotion of the system. That said, targeted campaigns particularly using social media are effective in targeting early adopters and high-use demographics. Bike sharing should be rolled into existing bicycling media such as facility maps, etc.

Promotional events also help to increase the profile of the system. Examples from other cities include: system launch party, photo and mileage contests, “cycling season” promotions, targeted marketing of annual memberships around the holiday season, and membership offers through discount services such as Groupon, Living Social, bicycle safety and learn-to-ride classes using bike share bikes, etc.

#### *Safety Outreach & Information*

In the several years since large-scale, fourth generation bicycle share systems began operating in North America, few crashes involving bicycle share users have been reported. In February 2012, Capital Bikeshare in Washington, DC reported that 17 crashes involving bicycle share users had occurred in the first 1.6 million rentals, a rate of approximately 1 in 100,000. Along with this safety record, North American bicycle share

programs commonly distribute bicycle safety information online to promote safe travel. Typical bicycle share program website safety information includes:

- instructions on how to operate the bicycle;
- local traffic laws pertaining to bicycles;
- links to local government agencies and bicycle advocacy websites;
- links to local bicycle safety education classes;
- bicycle helmet purchase information.

Additionally, many bicycle share programs include safety information when mailing membership materials to new annual members. Members are often encouraged or required to review this information during the membership sign up process (see **Figure 4**).

#### *Website and Mobile Applications*

Engaging and interactive websites (and increasingly, applications for mobile devices) are essential to attract and serve bike share members, and for reporting on system functionality and other data. The latter can include real-time display of full/empty stations, special event locations, and personalized summaries of trips taken, distance traveled, calories burned, and other measures.

## 4th generation BICYCLE SHARE

### Bicycles

A fleet of bicycles - specially designed for short trips and constructed of customized components to limit their appeal to theft and vandalism.



### Stations

A network of stations spread across a broad area to provide convenient access to bikes. Each station includes a terminal where transactions are made and docking points where the bicycles are secured when not in use. Recent technologies have introduced modular station platforms that can be relocated, expanded, and have solar power and wireless communications.



### Maintenance

Maintenance: staff and programs to rebalance bikes amongst the stations and maintain the system infrastructure.



### Software & Customer Service

A software back-end that keeps track of transactions and ridership information and can be linked to real-time website and mobile device applications and user profiles that report the number of trips, distance travelled, calories burned, etc.



Figure 4. Elements of a 4th Generation Bike Share System.

## Emerging Models and Other Considerations

### Station-less Systems

As a constantly evolving field, there are emerging concepts and strategies that may offer an alternative to (or options within) the station-based “4 generation” systems that have come to represent modern bicycle sharing in North America. One such example is the station-less bicycle share model, which attempts to utilize improved technology and communications to solve issues that plagued older “2<sup>nd</sup> generation” systems.



Image of a station-less bike share bicycle, with independent locking mechanism (Source: The Social Bicycle Company)

Similar to 4<sup>th</sup> generation systems, station-less models can employ sophisticated locking solutions and Global Positioning System (GPS) tracking to deter theft and vandalism, and generally improve accountability.

Instead of formal custom stations with kiosks, however, each bicycle has its own independent locking “unit” and bicycles can be parked anywhere within a certain designated zone or zones. The point of sale interface is handled via computer or smart phone, which is also how users are able to locate and reserve bicycles in advance.

Although less capital intensive (and thus less expensive), there are several potential drawbacks to the station-less model. First, the system is less visible and accessible to the public, which inhibits demand particularly for spontaneous trips. Second, the reliance on individual smart phones and computers can be a barrier to entry for many lower income communities. Third, station-less systems have been utilized mainly for college or private campus circulation and (as of 2012) have not been tested at a large scale in an urban environment. This means, among other issues, that detailed maintenance data is not available to compare life cycle costs. More information on two examples of station-less systems can be found at [www.socialbicycles.com](http://www.socialbicycles.com) and [www.viacycle.com](http://www.viacycle.com).<sup>4</sup>

### Subsidized/Sponsored Memberships

Although generally affordable and accessible to the public, 4<sup>th</sup> generation bicycle share systems have had a mixed track record on serving lower-income neighborhoods and communities of color. Factors that may be dampening demand from these potential users include required access to a credit card and the up-front cost of memberships. Additional non-economic factors may include access to stations, which in many cases have been located in more affluent business districts and tourism areas, and the lack of targeted marketing.

Bicycle share programs are increasingly working to address these social equity issues in a number of ways. In Washington D.C., the program has teamed with local banks to offer discounted memberships, payment installment plans, and access to membership without the need for a credit card or bank account. In other

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<sup>4</sup>Web-based, informal bicycle sharing models are also emerging in several cities. A recent summary of such efforts can be found here: <http://www.nytimes.com/2012/08/19/nyregion/spinlister-and-social-bicycles-develop-bike-sharing-alternatives.html>

communities, banks are sponsoring members' security deposits while grants are helping purchase bulk memberships for distribution in needy areas. Lastly, most systems are now including (or planning to include) more aggressive outreach and marketing to help improve ridership among minority and transit-dependent populations.<sup>5</sup>



In Melbourne, a City that has a bicycle helmet requirement for all riders, inexpensive helmets are available at larger stations and promoted heavily to existing and potential members.

### Helmet Use

Depending on the community in which a bicycle share program operates, the provision and promotion of helmet wearing can be a major consideration. Where there is a requirement to wear a bicycle helmet, demand can be significantly impacted – particularly for attracting casual members who spontaneously want to ride.

In California, bicyclists under the age of 18 are required to wear a helmet. Since most North American bicycle share systems require members to be 18 years of age or older, this provision should not have a significant impact on bicycle share demand. More information on bicycle helmet encouragement strategies are provided in **Appendix B**.

## 4 Benefits of Bike Sharing

This section provides a summary of some of the financial, health, environmental, and transportation / mobility benefits of bike sharing.

### 4.1 Financial Benefits

Bike sharing is a relatively inexpensive and quick to implement urban transportation option compared to other transportation modes. For example, the initial 1,100 bike launch of Capital Bikeshare in Washington DC cost approximately \$6.2 million, several orders of magnitude less than the cost of constructing a mile of urban freeway and was rolled out in a matter of months.

Data from Capital Bikeshare and other systems suggests that a bike share system is able to support operating costs with user-generated revenues, such that ongoing public subsidies may not be needed. Whether these revenues literally provide full “farebox recovery” or simply cover a majority of operating cost, this is a major difference from traditional rail and bus transit systems, which typically operate with farebox recovery ratios of between 25% and 50%. Full farebox recovery may or may not be possible in Marin County; however where user fees do not cover the cost of operating the system, other cities have been able to pick up the shortfalls without using local public funding.

Bike sharing systems can also:

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<sup>5</sup> For more discussion of bike sharing and social equity, see: <http://dc.streetsblog.org/2012/10/03/why-isnt-bike-share-reaching-more-low-income-people/>

- Be high-profile additions to a city or region that in themselves become an attraction for visitors and tourists and generate positive national and international media exposure that would otherwise be difficult or costly to generate.
- Create “green” jobs with on-going positions for managing and operating the system.
- Provide existing businesses an additional way to get customers to their front door or to provide employees with an inexpensive transportation option for commuting to work and running errands during the day (bike sharing could form part of a business’ Travel Demand Management toolbox).
- Provide businesses of all sizes an opportunity for brand development through station and/or bike sponsorship. Bike sharing also represents a positive “community amenity” contribution for many companies and property developers.
- Help household budgets. Bike sharing can reduce transportation costs, and in some cases – often coupled with transit – could eliminate the need for an extra vehicle.

Bicycling, and in particular bike sharing, is an affordable form of transportation. Transportation is second to housing as a percentage of household budgets, and it is a top expense for many low income families. The cost of using a bike share bicycle for a year can be as low as the annual membership fee, typically between \$50 and \$100 per year, compared to \$7,800 for operating a car over the same time period.<sup>6</sup> Increasingly, bicycling will become an even more attractive transportation option as gas prices continue to rise.<sup>7</sup>

Table 2. Transportation Costs by Mode:<sup>8</sup>

Car	\$0.59/mile
Transit	\$0.24/mile
Private Bike	\$0.05/mile
Walking	\$0.0/mile

## 4.2 Health Benefits

The health benefits of bicycling are well recognized and include the potential to reduce obesity, heart disease, and other sedentary lifestyle diseases. The potential synergies between bike sharing programs and health have attracted considerable interest from the health care industry, with several examples (Minneapolis and Denver) where health care providers have become major sponsors of bike sharing systems.

Healthy, active lifestyles are well-promoted and represented within Marin County. According to a 2009 California Community Health Survey, less than 16% of adults are obese – considerably less than the national average (the target goal for 2020 is 30% nationally). For children and teens under 18 years of age, regular physical activity is also well promoted through the Safe Routes to School program, which includes pedestrian and bicycle education woven into teacher and physical education curriculum. Marin County has also

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<sup>6</sup> Pedestrian and Bicycle Information Center. (2010). *Economic Benefits: Money Facts*. (<http://bit.ly/h35uvG>)

<sup>7</sup> King, Neil. (2/27/2008). *The Wall Street Journal*. Another Peek at the Plateau.

<sup>8</sup> Rails to Trails Conservancy. (2008). *Active Transportation for America*, pg. 39.

promoted the many health benefits of bicycling through its involvement with the federally-funded Non-Motorized Transportation Planning Program.

### 4.3 Environmental Benefits

Bike sharing is practically carbon neutral. The stations are solar powered and environmentally friendly facilities and equipment can be chosen for operations (such as cargo bikes or electric vehicles) for bicycle redistribution.

North American cities with bike sharing report that approximately 25% of trips replace a vehicle trip, reducing emissions, fuel use, and the need for hard space taken up by automobile parking.

Bike sharing reduces the environmental footprint of a region’s transportation system in many ways. Some bike sharing trips directly replace vehicle trips, directly reducing vehicle miles traveled (VMT) and vehicle emissions. When bike share stations are located at transit stops, bike sharing can also increase the feasibility and accessibility of transit, indirectly increasing the likelihood of replacing vehicle trips in the region with bike-transit trips. Bike sharing also indirectly increases the number of people in the community riding private bicycles by introducing new users to bicycling without the upfront expense of purchasing a bicycle. Many North American bike sharing systems have found that a common reason for discontinued memberships is that the member had recently purchased a private bicycle.

### 4.4 Mobility Benefits

Bike sharing provides an additional mobility option for short urban trips for residents and visitors. **Figure 5** illustrates how bike sharing fills an existing gap between trips too long to walk, but not long enough to justify waiting for transit. Bike sharing can also:

- Extend the reach of transit by providing a first- and last-mile transportation solution or providing service to under-served areas or areas that do not justify the cost of other transit options. Complement to transit service
- Reduce reliance on the private automobile. Initial experience in North American cities has shown that approximately 25% of bike share trips replace a vehicle trip.
- Encourage more bicycling. In Paris, for example, consumers have bought more than 2 million bicycles since the city launched its Velib bike share program<sup>9</sup>. Approximately 66% of surveyed users in Minneapolis (2010) stated that they bicycle more since subscribing to Nice Ride.
- Introduce people to cycling that do not typically ride. The 2010 user survey in Minneapolis showed that

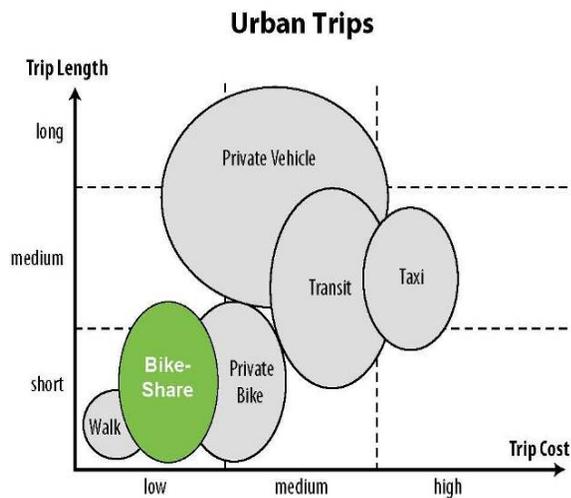


Figure 5. Urban Transportation Spectrum

<sup>9</sup> [http://www.ecf.com/4575\\_1](http://www.ecf.com/4575_1)

approximately one-third of system users cycled less than once per month.

- Reduces barriers to cycling as there is no need to own or store a private bicycle or to worry about locking your bike and having it stolen.

#### 4.5 Safety Benefits

Bike share systems have to date observed a solid safety record. In North American systems, few serious injuries or fatalities have been reported, and in Washington DC a total of 14 crashes were reported in the first year of operation, of which one was serious in nature. Approximately one million trips were made during this same period – an injury crash rate of 0.83 injuries per million miles (the average trip length was approximately 1.2 miles per trip), which is lower than the injury rate of 7.3 injuries per million miles ridden for private bicycling.<sup>10</sup>

Some of the factors contributing to this safety record could include:

- “Rider caution” as bike share riders are less familiar with bike routes, and therefore more attentive to surroundings and safe biking
- Increased driver awareness due to increased media, increased numbers of cyclists on the street, and because many drivers now use the bike share system or own a bicycle. A similar phenomenon is observed in bicycling in many cities including Portland, Oregon that has seen an increase in bicycling associated with a reduction in bicycle crash rates.
- The safe design of the bicycle as a visible, slow-speed, upright bicycle fitted with internal safety features such as lights and bells. Further, the bikes are regularly inspected to ensure that all safety features are in proper working order.

## 5 Organizational and Funding Models

### 5.1 Business Models

North American bike share systems operate under many different business models. In fact, each existing system (and those in planning) has identified a governance and organizational structure that fits the needs of the local market, the municipal and/or regional procurement offices, and the funding environment. A summary of North American bike share business models is included in **Table 3**.

Table 3. North American Bike Share Business Models

Name	Stations / Bikes	Operations	Ownership of Capital Infrastructure
Boston New Balance Hubway	61 / 610	Public – private partnership; operator direct contract with the City of Boston, other municipalities to contract directly with operator (RFP issued by regional planning agency).	City of Boston (government agency)

<sup>10</sup> <http://bicycleuniverse.info/transpo/almanac-safety.html>

## Marin County Bicycle Share Feasibility Study

Name	Stations / Bikes	Operations	Ownership of Capital Infrastructure
Capital Bikeshare	179 / 1,560	Operator direct contract with both Washington DC and Arlington County.	DDOT and Arlington County (government agencies)
Capital Bixi (Ottawa / Gatineau)	10 / 100	NCC funding of \$785,000 for equipment and launch. Operated by PBSC.	National Capital Commission (government agency)
Chattanooga Bike Share (2012 launch)	30 / 300	Public – private partnership; operator direct contract with local transit agency (which received federal funding).	Outdoor Chattanooga (government agency)
Chicago B-Cycle	6 / 100	Completely private system, privately owned and operated, concession agreement only.	Bike N Roll (private company)
Denver B-Cycle	50 / 500	Non-profit set up by city.	Denver Bike Sharing (non-profit)
Des Moines B-Cycle	4 / 18	Already existing local non-profit (Des Moines Bicycle Collective).	Des Moines Bicycle Collective (non-profit)
Ecobici, Mexico City	85 / 1,000	Private advertising-funded system.	Clear Channel Communications (private company)
Miami Beach DecoBike	100 / 1,000	Completely private system, privately owned and operated, concession agreement only.	DecoBike (private company)
Montreal	405 / 5,050	Owned and operated by Public Bike System Company (PBSC), a non-profit organization.	PBSC (non-profit)
New York City Bike Share (2012 launch)	600 / 10,000	Completely private system; privately owned and operated.	Alta Bicycle Share (private company)
Nice Ride Minnesota	116 / 1,200	Non-profit set up by city.	Nice Ride Minnesota (non-profit)
San Antonio B-Cycle	14 / 140	Governed by non-profit set up by city – operated by bike rental company through tender.	San Antonio B-Cycle (non-profit)
Toronto Bixi	80 / 1,000	Program owned and operated by PBSC. City of Toronto provided a \$4.8 million loan guarantee.	PBSC (non-profit)

Based on **Table 3** and other examples globally, the core business models include:

- Operating non-profit (either pre-existing or established specifically) owns and operates the system.
- Administrative non-profit (either pre-existing or established specifically) owns and administers the system; operated by a private contractor.
- Privately owned and operated.
- Publicly owned; operated by a private contractor.
- Publicly owned and operated (no North American examples).
- Owned and operated as part of a street-furniture advertising contract.
- Transit agency owned and operated (no North American examples).

More detailed descriptions of common models and liability considerations are provided below.

### **Operating Non-Profit**

Similar to Nice Ride Minnesota and Denver Bikesharing, this model assumes a Non-Profit Organization (NPO) is formed whose mission is to create a bike sharing system. The NPO undertakes all aspects of creating the system, including funding it, establishing regional guidelines, procuring and establishing the equipment, procuring operations facilities, and providing expertise for operations. In other cities where an operating NPO has been established, there has not been an operating contract between the jurisdiction(s) and the NPO to define required service levels, reporting and other operational metrics, giving less control to the jurisdictions.

### **Administrative Non-Profit with Private Operating Contractor**

Under this model, which is currently being deployed in King County, WA, an NPO is formed whose mission is to create a bike sharing system. The non-profit undertakes funding the system, establishing regional guidelines, procuring the equipment, and choosing an operator. In this scenario the NPO hires a private contractor to implement and operate the system, acting as the client to the contractor. The non-profit could also undertake marketing functions for the system or outsource these services to a third party.

### **Privately Owned and Operated**

Similar to Miami Beach DecoBike, Chicago B-Cycle, Los Angeles Bike Nation, and the proposed system for New York City, municipalities contract with an operator for street space only using a concession agreement. The operator provides all funding for equipment and operations. Although this structure requires no public funding for capital or operations (a positive for the municipalities), it gives less control and transparency to the contracting jurisdictions, and there could be significant risk that such systems might fail due to the unknown long-term feasibility of completely privately funded and supported systems.

### **Direct Contract with Operator**

Similar to Capital Bikeshare (Washington D.C.) and Hubway (Boston), municipalities within the same region contract directly with the operator using the overarching umbrella of a regional planning organization to establish similar standards across jurisdictions. There is no official board of directors, although there is typically an ad hoc committee that forms consensus, and each jurisdiction acts as a separate client to the operator. Each jurisdiction can have a different source of funding and different revenue sharing arrangements with the operator. The jurisdiction(s) assume responsibility for initial and ongoing funding for the system.

### **Liability/Insurance**

In nearly all cases, the contractor obtains an insurance policy that covers almost all liability (e.g. general liability, workers compensation, auto, etc.) except theft and vandalism of the bikes, which is covered by a replacement fund (note: insurance can be obtained for coverage of bikes while they are in stations or in storage). The contractor typically indemnifies related agencies, private property owners who host a station, and other stakeholders. Although this has not yet been mandated by cities, insurance that protects against force majeure is strongly recommended.

In terms of personal risk, similar to car rental and other common rental transactions, any risk involved with operating a bike share bike is assumed by the customer. Bicycle share customers are required to consent to this arrangement by signing a user agreement that specifies the terms of bicycle share membership.

## **5.2 Funding**

Most U.S. systems have launched using a combination of public and private funding but have used limited local public funding (versus federal or state public funding) beyond in-kind services such as staff time, right-

## Marin County Bicycle Share Feasibility Study

of-way use, lost on-street parking revenues, etc. **Table 4** details the various funding sources used in selected North American bike share systems.

Public funding could also potentially come from local “steady stream” sources such as parking revenues, bus bike rack advertising, special taxes, distribution of license plate fees, etc. Promotion and marketing of the system could also be funded and/or coordinated through established public agency departments as part of their financial contribution to the system.

More information on potential local funding sources is provided in **Section 8.5**

Table 4. North American Bike Share Systems Using Public Capital Funding Sources

System	Bikes	Stations	Approximate Service Area	Population	Launch Date	Total Capital Funding	Public Funding Amount	Private Funding Amount
Boston	610	61	8 sq. mi.	620,000	2011	\$4 million	\$3 million (75%, CDC Communities Putting Prevention to Work, CMAQ, FTA Bus Facilities Livability Initiative Program, State grants).	\$1 million (25%, multiple local sponsors and a naming sponsor).
Capital Bikeshare – Washington D.C. (Phase 1)	1,110 (bikes circulate between both Washington DC and Arlington)	91 (105 total)	8 sq. mi.	600,000	September 2010	\$5 million	\$5 million (83% CMAQ, 17% District funding)	\$0
Capital Bikeshare – Arlington (Phase 2/current)		14 (105 total)	1 sq. mi.	210,000	September 2010	\$500,000	\$200,000 (40%, state grants)	\$300,000 (60%, local BID sponsorship)
Capital Bikeshare – Washington D.C. (Phase 2)	1,560 (400 new; bikes circulate between both Washington DC and Arlington)	138 (179 total)	12 sq. mi.	600,000	2011	\$1 million	\$1 million (74%, CMAQ).	\$350,000 (26%, revenues from system).
Capital Bikeshare – Arlington (Phase 2/current)		41 (179 total)	4 sq. mi.	210,000	2011	\$1.5 million	Undisclosed.	Undisclosed.
Chattanooga	300	30	3 sq. mi.	170,000	2011	\$2 million	\$2 million (100%, CMAQ)	\$0 (future sponsorship may be sought)
Denver Bike Sharing	500	50	5 sq. mi.	600,000	April 2010	\$1.5 million	\$210,000 (16%, ARRA federal Energy Efficiency and Conservation Block Grant program).	\$1.3 million (84%, Kaiser Permanente as “presenting sponsor”, Denver 2008 DNC Host Committee, several foundations, multiple station sponsors).
Fort Lauderdale	200	20	25 sq. mi.	170,000	2011	\$1.1 million	\$300,000 (27%, Florida DOT funds)	\$800,000 (63%, sponsorship / advertising)
Montreal	5,050	405	24 sq. mi.	1,650,000	2008	\$33 million	\$33 million (City funds) to develop and market technology and plan the initial system.	Subsequent stages funded by sponsorship, advertising, and user fees.
Nice Ride Minnesota (Phase 1)	700	73	12 sq. mi.	380,000 (Minneapolis)	June 2010	\$3.0 million	\$1.75 million (58%, Bike Walk Twin Cities / FHWA). \$250,000 (8%, City Convention Center Fund).	\$1 million (33%, Blue Cross Blue Shield tobacco settlement funds).
Nice Ride Minnesota (Phase 2/current)	1,200 (500 new)	116 (63 new)	30 sq. mi.	670,000 (Minneapolis & St. Paul combined)	2011	\$2.3 million	\$1.0 million (43%, Bike Walk Twin Cities / FHWA). \$200,000 (9%, ARRA US Department of Health and Human Services). \$150,000 (6%, University of Minnesota).	\$700,000 (30%, Blue Cross Blue Shield). \$250,000 (11%, Central Corridor Light Rail Funders Collaborative). \$30,000 (1%, Macalester College).
San Antonio	140	14	3 sq. mi.	1,330,000	2011	\$840,000	\$840,000 (100%, U.S. Dept of Energy’s Energy Efficiency and Conservation Block Grant (EECBG) program, CDC)	\$0

Note: All numbers in this table are round numbers from various publicly available sources, as well as other sources.

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## 6 Goals of Marin Bike Share Program

To consider establishing a feasible bicycle share system with specific station locations and service areas, it is essential to understand the goals of the program. After discussion and revision at several Bicycle Share Advisory Working Group meetings, these seven goals have been identified for a bicycle share program in Marin:

### **Goal 1: Provide convenient mobility options**

For various reasons, a bicycle share program may provide a more convenient travel option for people than other modes, including personal bicycles. Consider these potential scenarios:

- A transit rider who wants to complete the last part of a trip by bicycle
- People who normally walk but are in a hurry
- People who normally drive (e.g. for lunch) but don't want to re-park their automobile
- Bicycle owners who do not want to ride both ends of a trip
- Bicycle owners who do not want to leave a bike locked up outside for an extended period of time

In Washington, DC's bike share system, nearly two-thirds of members said they made a new trip that otherwise would have been too far to walk, while 30% of users also indicated they own a personal bicycle. These are indications that bike share trips can be more convenient than either walking or conventional bicycle trips in many situations.

### **Goal 2: Reduce congestion and greenhouse gas (GHG) emissions**

As a zero-emission transportation mode, bicycle share reduces GHG whenever a bicycle trip (or bicycle share trip chained with transit) replaces a motorized vehicle trip. Previous experience with bicycle share user behavior shows that up to 25% of bike share trips can replace trips that were formerly made by personal automobile.

### **Goal 3: Serve transit-dependent communities**

As a low-cost and healthy transportation alternative, bike-sharing is one strategy to improve transportation access and options for transit-dependent populations – i.e., low-income and/or low-vehicle ownership households.

The Canal neighborhood and northern parts of San Rafael east of Highway 101, Marin City and adjacent segments of Mill Valley, and downtown Novato stand out in this analysis for Marin County. These areas should be prioritized for potential bike share station locations, and would be good candidate areas for targeted outreach and education, and sponsored memberships.

### **Goal 4: Complement and support transit and bicycle facility Investments**

Bicycle sharing and transit are complementary modes of travel, and the existence of each can support the use of the other. Bicycle sharing can increase demand for transit by extending the reach of transit to destinations that were previously too far to walk from a transit stop, and may also serve to broaden the base of public use of and support for bicycle facilities.

### **Goal 5: Promote active and healthy lifestyles**

Bicycle share systems create a new, visible presence of bicycling throughout the service area and can help build the social brand of a region. By raising the visual profile of bicycles and introducing new people to bicycling, bicycle share can build public support and enthusiasm for the construction of new bicycle facilities.

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User surveys in North American cities with existing bicycle share systems indicate that many members choose to purchase a personal bicycle because they've found bicycling to be enjoyable and practical after using the bicycle share system.

### **Goal 6: Encourage economic development**

Reports from cities with existing bike share systems indicate that bike share facilitates new trips that a person wouldn't have taken if bike share weren't available as a transportation option. In Washington, DC, 44% of Capital Bikeshare members reported making an induced trip, and 64% of this group reported making the trip by bike share when the destination was beyond walking distance. These induced trips were often noted to be social/entertainment trips, likely accompanied by retail spending. In this way, bike share may help stimulate commercial activity within the service area while also providing additional mobility options and benefits mentioned above.

### **Goal 7: Be financially sustainable**

Economic sustainability is important to the success of a Marin bike share program. In these times of reduced funding for transportation, new programs must produce cost-effective results and show long-term viability to be successful. A Marin bicycle share system should be financially prudent by pursuing grant opportunities to fund infrastructure, implementing a fee structure to support ongoing costs, and targeting mutually beneficial public-private partnerships to contribute to operations and capital expansion.

## 7 Local Context Analysis

### 7.1 Physical Characteristics

Marin County is located on the northwest of the San Francisco Bay, north of San Francisco and the Golden Gate Bridge. The majority of terrain within the county consists of coastal hills along the Pacific Ocean, including Mount Tamalpais State Park and the Golden Gate National Recreation Area. The county's main population centers are located along the San Francisco Bay.



The recently rebuilt Cal Park Tunnel shortened trip distances for bicyclists traveling to and from downtown San Rafael, and has resulted in a fourfold increase in bicycle activity along the corridor.

Source: WalkBikeMarin.

Land use in West Marin consists mainly of parks, open space and agriculture. In the county's population centers, most cities and towns follow a development pattern based on one or several main streets where most commercial development is clustered (see **Figure 6**. Current land uses in Marin County)Error! Reference source not found.. A substantial portion of the county's residential population is located beyond walking distance of these activity centers. To achieve the highest level of use, bike share stations are typically located in mixed-use and commercial areas, so many of Marin County's single-use residential neighborhoods may be located outside of the bike share service area.

Although most city centers are relatively flat, coastal hills create consistent divisions between areas that can create obstacles for bicyclists. One example is Cal Park Hill, where a refurbished rail tunnel (shared with the SMART rail alignment) bypasses what used to be a steep climb south of downtown San Rafael. Topography inside each of Marin County's cities should provide few challenges to short bike share trips, but may discourage some bike share users from attempting to travel over the hills between cities. The map in **Figure 7** includes shaded-relief of the County's topography, which highlights the change in elevation across the region.

Land use in West Marin consists mainly of parks, open space and agriculture. In the county's

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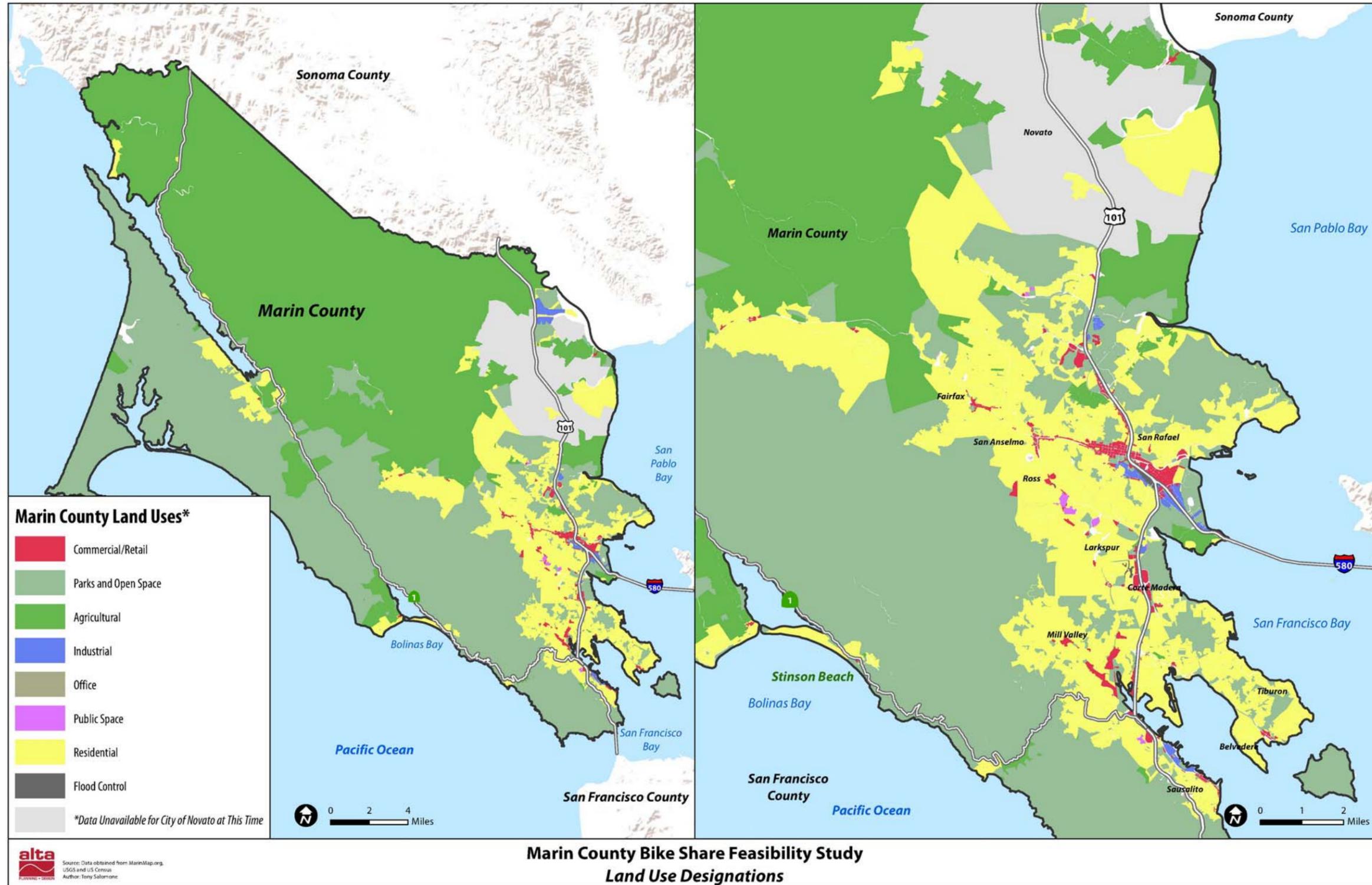


Figure 6. Current land uses in Marin County

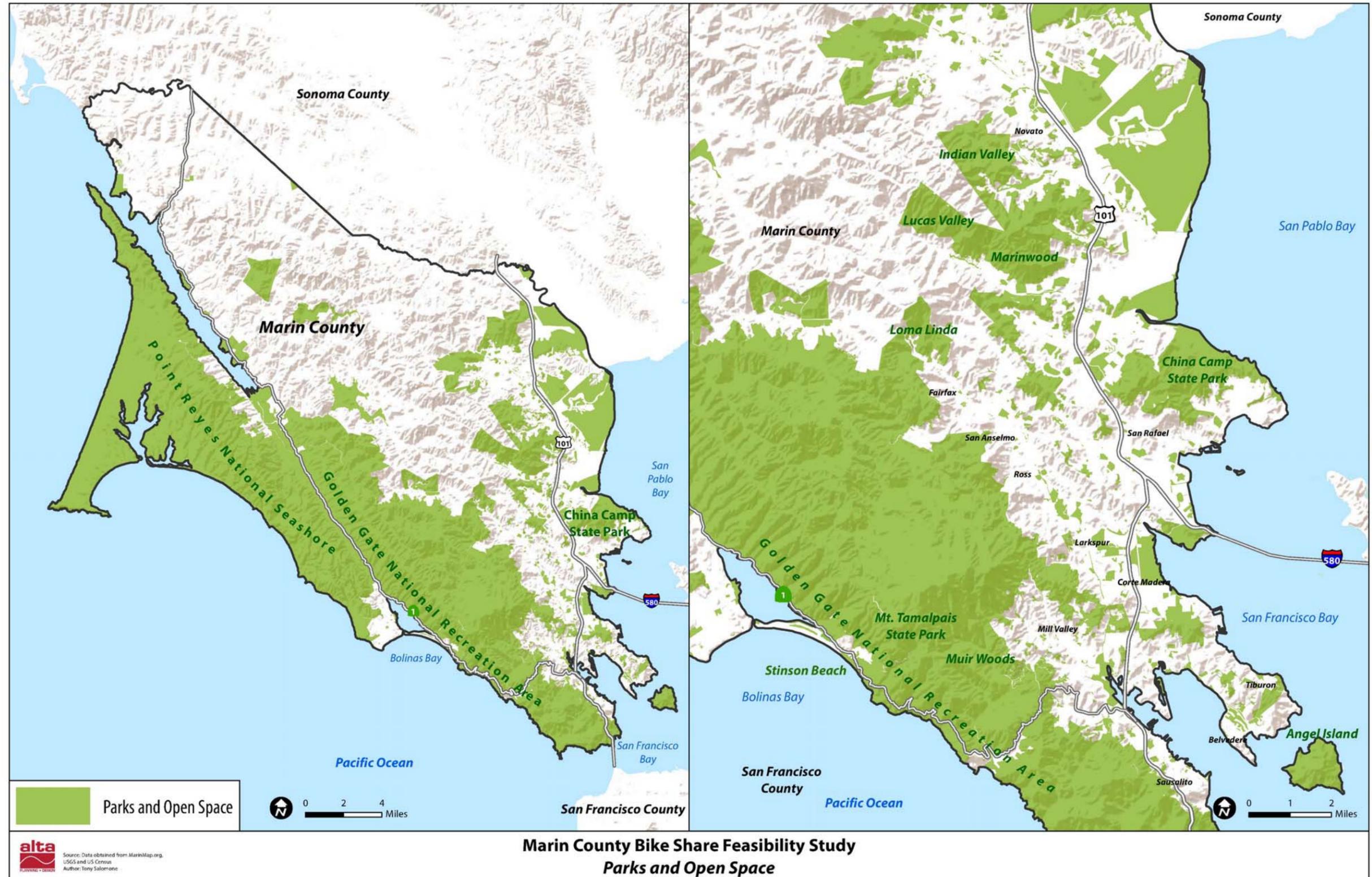


Figure 7. Parks, Open Space and Topography in Marin County.

**Transit**

Marin Transit contracts with Golden Gate Transit to transport over 9,000 riders per day to destinations throughout Marin County in addition to connections to regional transit systems. Services provided include local routes, community shuttles, and the West Marin Stagecoach. In FY 2007/2008, Marin Transit facilitated nearly 3.5 million passenger trips<sup>11</sup>. Marin Transit also serves Golden Gate Transit transfer points and connections to the Sausalito, Larkspur and Tiburon ferries. **Table 5** shows ridership averages and totals for the Larkspur and Sausalito ferries for the last five years.

College students and high-income young professionals are strongly represented among new Marin Transit users, indicating a potential synergy with bike sharing.

Table 5 Golden Gate Transit Ferry Ridership

Year	Annual Ridership			Average Weekday Ridership			Average Weekend/ Holiday Ridership
	Larkspur	Sausalito	Total	Larkspur	Sausalito	Total	Total
FY 2011	1,432,039	599,180	2,031,000	5,007	1,550	6,557	3,385
FY 2010	1,342,382	579,713	1,922,095	4,615	1,442	6,057	3,552
FY 2009	1,370,400	578,635	1,949,035	4,640	1,521	6,161	3,047
FY 2008	1,413,283	566,560	1,979,843	5,564	2,231	7,795	3,390
FY 2007	1,477,762	547,173	2,024,935	5,144	1,447	6,590	3,280

Source: [www.goldengateferry.org](http://www.goldengateferry.org)

The Marin Transit *2008 Systemwide Onboard Survey* found that approximately 75% of passengers walk to access transit and that a similar number also walk to continue to their final destination after disembarking. Bike share service has the potential to increase ridership and extend the geographic coverage of local transit by making it feasible to access transit over longer distances from transit stops. Bike share can also improve the convenience of transit, sometimes providing passengers with the option of riding a longer distance to access a bus stop in order to avoid waiting for a transfer. Current ridership on Marin Transit is heavily weighted towards younger people with lower incomes and people traveling for work and school trips. Bike share service could help improve convenience for existing users, while providing an entry point for higher income bike share users to consider utilizing Marin’s public transportation services. Recent trends among Marin Transit ridership indicate that college students and high-income young professionals are strongly represented among new users; bike share early adopters typically come from similar demographic group, suggesting possible synergies between bike share and transit.

Planned to open in 2016, SMART (Sonoma-Marín Area Rail Transit) passenger rail service will add a new dimension to transportation in Marin County. The first phase of the rail corridor will reach 37 miles between Santa Rosa and downtown San Rafael, with a future phase planned to extend the corridor to 70 miles between Cloverdale and Larkspur Landing Ferry Terminal to include a 70 mile long Multi-Use Pathway (MUP). With a high percentage of Marin County residents working in Sonoma County (and vice versa), SMART has the potential to attract a large number of the region’s commute trips. As with bus transit, SMART stations (see

<sup>11</sup> Marin Transit’s Short Range Transit Plan, FY 2008/09 - FY 2017/18.

## Marin County Bicycle Share Feasibility Study

**Figure 8)** will be ideal candidates for bike share stations, daily commuters will be seeking an affordable and convenient way to connect to their final destinations. SMART ridership forecasts, shown in Table 3 **Table 6**, estimate over 6,200 trips per day generated by riders traveling to and from SMART stations in Marin County.

Table 6. 2035 AM ridership estimates at Marin County SMART stations.

Station	Activity	Walk/Bike	Drive/Drop/ Carpool	Transit
North Novato	501 boardings	3%	77%	20%
	487 alightings	73%		27%
South Novato/Hamilton	541 boardings	41%	57%	2%
	541 alightings	93%		7%
Marin Civic Center	693 boardings	34%	52%	14%
	706 alightings	71%		29%
San Rafael Downtown	1175 boardings	4%	35%	61%
	1150 alightings	43%		57%
Larkspur	202 boardings	4%	19%	77%
	213 alightings	37%		63%

Source: SMART 2011 ridership forecast

As described in the Environmental Impact Report (EIR) and SMART White Paper #9, plans for station access include free shuttles to complement local transit service. In Marin, seven routes have been studied to serve the following key destinations outside of the stations:

- San Quentin Prison
- Marin General Hospital
- College of Marin
- E/W Francisco Blvd Business Strip
- Northgate Mall Shopping Center
- Marin Technology Center
- Light industry along Professional Center Parkway,
- Redwood Highway, Fair Isaacs
- Bel Marin Keys business complex
- Historic Downtown / City Offices
- Fireman's Fund
- Redwood Boulevard / Auto Row
- Vintage Oaks Shopping Center
- Sutter North Community Hospital



Figure 8. Future SMART stations will become multi-modal hubs, and will be connected to regional trails and bikeways, providing obvious potential co-location opportunities for a bike share program.

At the time this feasibility study was in development, funding for the SMART station shuttles has not been identified. As a potential strategy to complement local shuttles, or as a low-cost alternative to such services, bicycle sharing should be considered when revising station access plans and/or seeking additional dedicated funding.

Bicycle share may be a low cost alternative or complement to local shuttles serving SMART stations, which are currently planned (but unfunded) as part of the commuter rail project.

### **Bike Network**

Marin County has made substantial recent investments in its bikeway network, and continues to improve and expand the network with many miles of new bike facilities in various stages of planning and design. The 2008 *Marin County Unincorporated Area Bicycle and Pedestrian Master Plan* calls for the construction of 164 new miles of bicycle facilities including:

- 18 miles of Class I bikeways (shared-use paths)
- 20 miles of Class II bikeways (bicycle lanes)
- 126 miles of Class III bikeways (shoulder bikeways)

Additionally, nine local bike plans for jurisdictions in Marin have been completed since 2008, each of which includes local recommendations for new bicycle facilities. The Marin County Non-Motorized Transportation Pilot Program (NTPP) has funded many of the region’s priority bicycle projects, with dozens of new facilities opening across the region (**Figure 9**).

There is limited information to suggest whether a dense network of bicycle infrastructure is required in order for bike sharing to be successful. There are cities such as Lyon, France where successful bike share systems have been introduced with small bikeway networks. For North American systems, although there is little data to conclude the impact, it is noted that these systems have acted as a catalyst for increased investment in bicycle infrastructure and to date have recorded no fatal crashes and very few injury-causing crashes.

# Marin County Bicycle Share Feasibility Study

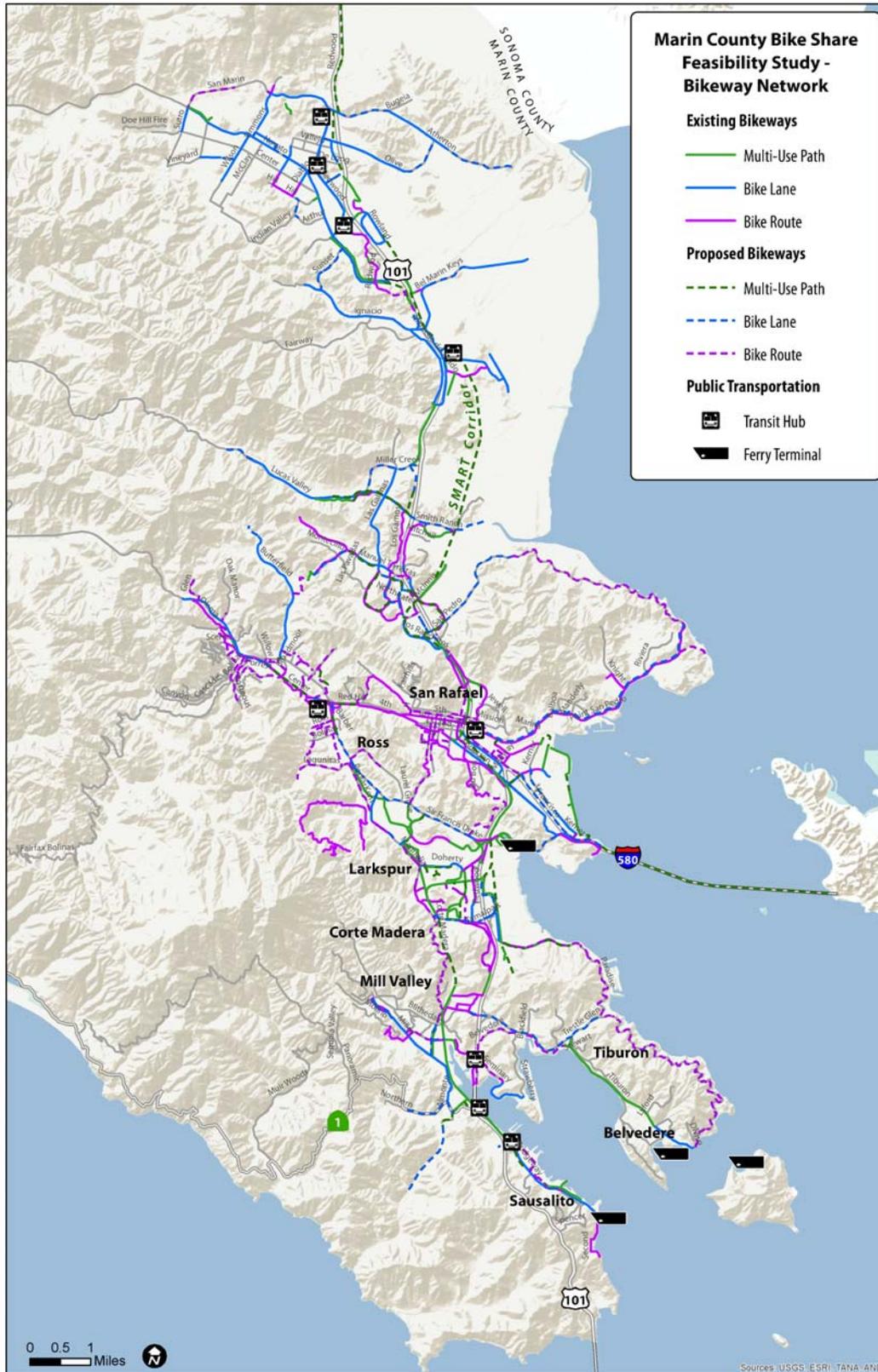


Figure 9. The Existing and Planned Marin County’s bikeway network. (Source: Marin Maps 2012)

**Weather**

Weather can influence bike share demand. **Figure 10** shows average monthly temperature in Marin County over the last 30 years. In general, the region experiences moderately warm temperatures during summer months with limited precipitation events from May to October. The winters have increased incidence of precipitation with mild temperatures. The average annual precipitation is 32.2 inches.<sup>12</sup>

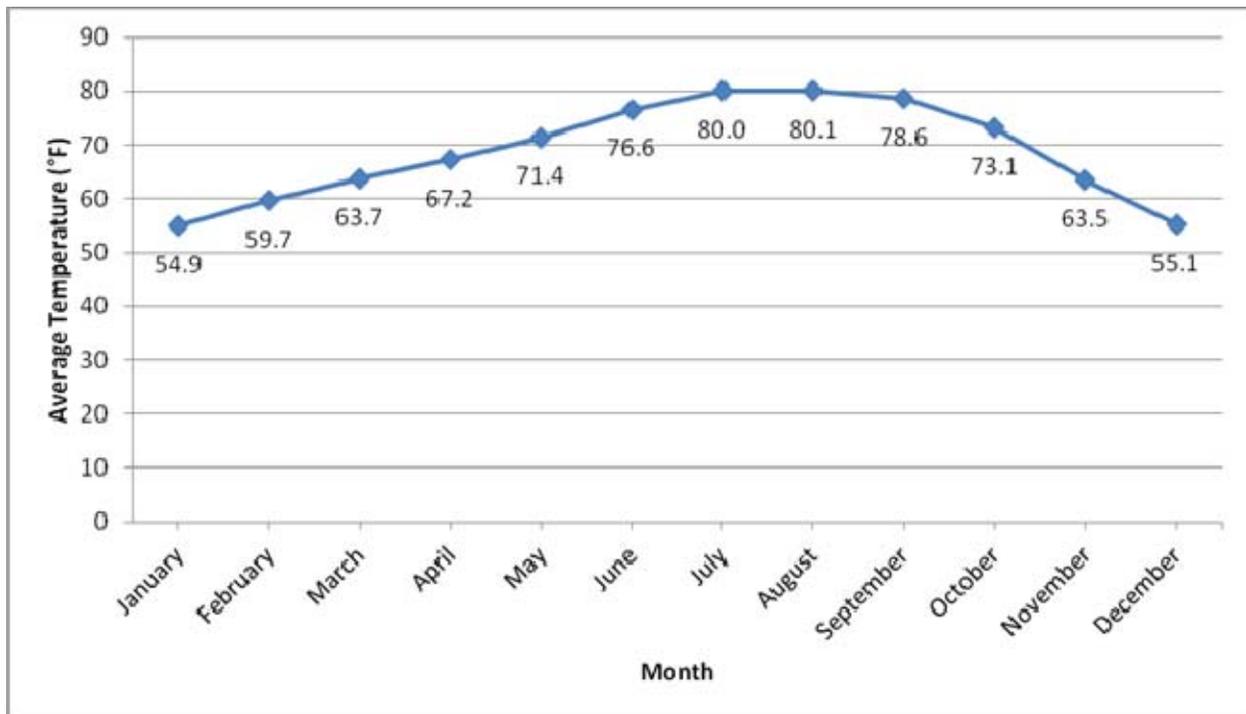


Figure 10. Average monthly high temperature in Marin County from 1981 to 2010. Source: National Oceanic and Atmospheric Administration, National Weather Service Forecast Office

The highest demand months will occur during the peak tourism season from May to September (Memorial Day to Labor Day). Bike share demand will likely decrease but remain constant during off-season months due to the appeal of spring and fall weather and the relatively mild winters. Several bike share systems, including Hubway in Boston and Nice Ride in Minneapolis, shut down during winter months due to snowfall and icy conditions. Marin County’s climate will allow a bike share program to operate year-long without the need for a seasonal closure.

**7.2 Demographics**

Bike share systems are most successful where there is a mix of land uses and trip-making throughout the day to attract users. In Marin County users would include local residents and commuters living or working in the bike share service area, students of college campuses, residents travelling to local city centers for shopping, recreation, entertainment, or other purposes, and visitors and tourists. The system may cater to tourists and visitors as well as residents and provide a mobility option for:

- Visitors and tourists accessing entertainment and cultural attractions.

<sup>12</sup> National Oceanic and Atmospheric Administration. National Weather Service Forecast Office.

## Marin County Bicycle Share Feasibility Study

- Residents who live, work, or recreate in the area covered by the bike share program.
- A “last mile” option for existing transit services, including the Golden Gate Ferry.
- Extending the reach of transit into areas that are currently underserved.

Factors considered important to the success of bike sharing are reviewed below. Where possible, comparisons have been made to other U.S. cities that have operating bike share systems. Under-performance in any one of these areas does not exclude the feasibility of a bike share system but each factor influences the potential success of the system. A summary on the preparedness of the community is provided at the end of this section along with a discussion of some of the potential issues that may pose as barriers to success.

### Population

With a population of approximately 250,000 people, Marin County is notably smaller than most North American regions with significant bike share systems. However, bike share systems are beginning to expand into smaller markets; Chattanooga, TN has a population of 170,000 and is scheduled to launch a bike share system later this year. At just under 210,000 people, Arlington County, VA has a smaller population than Marin County and currently hosts over 30 bike share stations as part of the Washington, DC Capital Bikeshare system.

Population density in Marin County is also lower than other communities with established bike share systems. Countywide population density is 300 persons/square mile, due to more than two thirds of the county being open space or farmland. However, the main population centers of the county are still less dense than potential peer bike share communities. San Rafael and Novato have population densities of roughly 3,000 persons/square mile, while Washington DC has an average density of 10,000 persons/square mile and Minneapolis averages 7,000 persons/square mile. Despite this, the trend of bike share moving into smaller markets supports the feasibility of a bike share system in Marin. Population density in Jackson, which is considering bike sharing, has a residential density of approximately 3,500 persons/square mile (similar to typical San Rafael neighborhoods with densities of approximately 3,000 persons/square mile) and Chattanooga has a density of approximately 1,200 persons/square mile, much lower than most Marin County cities. Density in Marin County is expected to stay steady with recent population growth in Marin County being stable, increasing only 2% between 2000 and 2010.

### Age

Comparisons of user surveys and general age distributions in Washington DC and Minneapolis are shown in **Table 7** along with the age distribution of the general population in Marin County. User surveys in other cities have shown that certain populations are overrepresented as bike share users. These ‘early adopters’ aged 25 – 34 years old represent the largest group of bike share users - at between 39 percent and 49 percent - although this cohort only represents 18 to 22 percent of the general population. This age group makes up only 10% of Marin County’s total population; about half the share of Washington DC and Minneapolis. The 35 – 54 year old age range also makes up a significant portion of users with over a third of Nice Ride and Capital Bikeshare users being in this age range compared to 28 percent of the general population.

Nearly two-thirds of Marin residents are older than 35 years of age, which should be a key factor in the demand (and marketing) for a bicycle share program.

The 35 – 54 age group in Marin is slightly overrepresented compared to these cities, with a share of 32% of the overall population. Persons over 55 in age are almost as large a cohort, representing 31% of Marin residents. That these two groups represent almost two-thirds of Marin residents will be an interesting factor to consider in designing and marketing a potential bicycle share program.

Table 7. Age Distribution of Users from other Bike Share Systems and of the General Population (in parentheses).

Age Range	Nice Ride (Minneapolis Population)	Capital Bikeshare (Washington DC Population)	(Marin County Population)
< 18 years	0% (23%)	0% (23%)	(21%)
18 – 24 years	8% (10%)	10% (8%)	(6%)
25 – 34 years	39% (22%)	49% (18%)	(10%)
35 – 54 years	40% (28%)	34% (28%)	(32%)
55+ years	13% (18%)	7% (23%)	(31%)
Total	100% (100%)	100% (100%)	(100%)

Sources: Capital Bikeshare (Washington, DC) Customer Survey, 2010; Nice Ride (Minnesota) Fall Subscriber Survey; Census 2010

Marin County has a lower share of residents aged 18-24 compared to the other two cities. College students are likely to be early adopters of bike share, with Nice Ride, Hubway and Capital Bikeshare all having significant presence with bike share stations near college campuses. Approximately 6% of Marin County residents are enrolled in college or graduate studies. Despite this small population, the campuses of the College of Marin and Dominican University are important activity centers that would be good candidates for inclusion in a Marin County bike share system.

In **Table 7**, the under-18 age group represents 0% of Nice Ride and Capital Bikeshare users because minors (under 16) cannot legally use the system and those under 18 require parental approval. Although Marin County’s age profile doesn’t align with the typical bike share user base, resident users are only one component of bike share users.

**Employment**

Approximately 120,000 Marin County residents were employed in 2010, according to the US Census Bureau American Community Survey. Most residents in the area have significant commutes, with nearly 60% of Marin workers traveling to work at an employer outside the county<sup>13</sup>, including nearly 20% of the residential workforce working in San Francisco. A large population also commutes into the county for work; 55,000 jobs located in Marin County are held by workers who live outside of the county<sup>14</sup>. For residents and workers with inter-county commutes, a bike sharing system could provide a flexible new option for combined bike share/transit commute trips, and for non-home-based work-related trips. If Marin County enters into a bike share system with other Bay Area agencies, bike share membership could be especially appealing to commuters with access to bike share on either end of their trip.

<sup>13</sup> US Census Bureau Longitudinal Employer-Household Dynamics (LEHD), 2010.

<sup>14</sup> Ibid.

Table 8. Major Employment Industries in Marin County<sup>15</sup>

NAICS Industry Sector	Share of Marin County Employment
Health Care and Social Assistance	14.40%
Retail Trade	11.80%
Professional, Scientific, and Technical Services	11.50%
Educational Services	9.00%
Accommodation and Food Services	7.80%
Public Administration	6.80%
Administration & Support, Waste Management and Remediation	5.70%
Other Services (excluding Public Administration)	5.60%
Construction	5.50%
Finance and Insurance	4.70%

The health care, professional/technical services and retail trade industries are the three largest employers of Marin County residents, combined employing more than a third of Marin County workers (see **Table 8**). Another 9% of Marin County workers are employed in education. Major employers such as Marin General Hospital, AutoDesk, Fireman’s Fund insurance and other business campuses may serve as important trip generators and attractors for the bike share program. Bike sharing, in combination with public transit services, could increase residents’ access to jobs. The possibility of combining bike sharing as part of an employee benefit package or travel demand management strategy may serve as a means to promote early adoption of a bike share system (e.g. a significant proportion of annual members in Boulder signed up through corporate programs).

**Income and Social Equity**

In general, higher income brackets are disproportionately more likely to use the bike share system than low income populations. Approximately 46 percent of Capital Bikeshare users and 39 percent of Nice Ride users reported incomes over \$100,000 and in Dublin, Ireland, only 16% of users earned less than 30,000 Euros (approximately \$50,000). Based on the income profile, Marin County residents may be more likely to use bike share than other cities. Nearly half of Marin County households (45%) had incomes of over \$100,000 in 2010.

The relationship of bicycle share demand to income may be related to greater numbers of high income users living and working in the system service areas. To ensure equity of access to bicycle share, and to promote bike sharing as a mobility option for underserved areas, this feasibility study has conducted a review of identified “lifeline” transit routes and communities within Marin. Since 2005, the Metropolitan Transportation Commission (MTC) has recognized transit routes throughout the Bay Area that provide essential services and mobility options to low-income residents. MTC describes the program and route designation criteria as follows:

*The Lifeline Transportation Network comprises public transit routes identified as critical to meeting the transportation needs of low-income persons as well as a series of related spatial and temporal gaps in the*

<sup>15</sup> Ibid.

*network based on analysis by the Metropolitan Transportation Commission (MTC). Specifically, these routes meet one or more of the following criteria:*

- *The route provides direct service to a neighborhood with a high concentration of CalWORKs households;*
- *The route provides service to areas with concentrations of key destinations;*
- *The route is part of an operator's core service; or*
- *The route provides a key regional link between the local service areas of different transit operators.*

A detailed analysis of lifeline mobility services and gaps is outside the scope of this study. However, **Figure 11** and **Figure 12** highlight areas in Marin that can be viewed as priorities for serving potentially underserved populations with high transit dependence and/or need for low-cost transportation options. Two community-based transportation plans for Marin City and the Canal Neighborhood of San Rafael also provide information on gaps in transit and non-motorized transportation routes that serve similar purposes to the MTC's Lifeline Transportation Network. The Canal neighborhood and northern parts of San Rafael east of Highway 101, Marin City and adjacent segments of Mill Valley, and downtown Novato stand out in this analysis. These areas of need were considered during the development of potential bike share station locations.

Proximity to stations is of course only one element of creating a bike share system that achieves equity objectives. Although the cost of bike share membership is comparatively low compared to other transportation modes, they may be out of budget for some who could benefit from the system. Some strategies that have been initiated to engage traditionally underserved communities to actively participate in their city's bike share program include:

- Boston: the operator partners with the Boston Public Health Commission to sell \$5 memberships. The Boston Medical Center has a pilot program called "Prescribe a Bike" for low income individuals with health related issues that care providers believe can be addressed, in part, by moderate exercise. The program allows physicians to literally prescribe Hubway membership at no cost to the patient.
- Washington, DC: the operator works with Bank On DC, an organization that seeks to provide financial education and services to unbanked families and individuals. Reduced price memberships are provided to Bank On DC account holders.

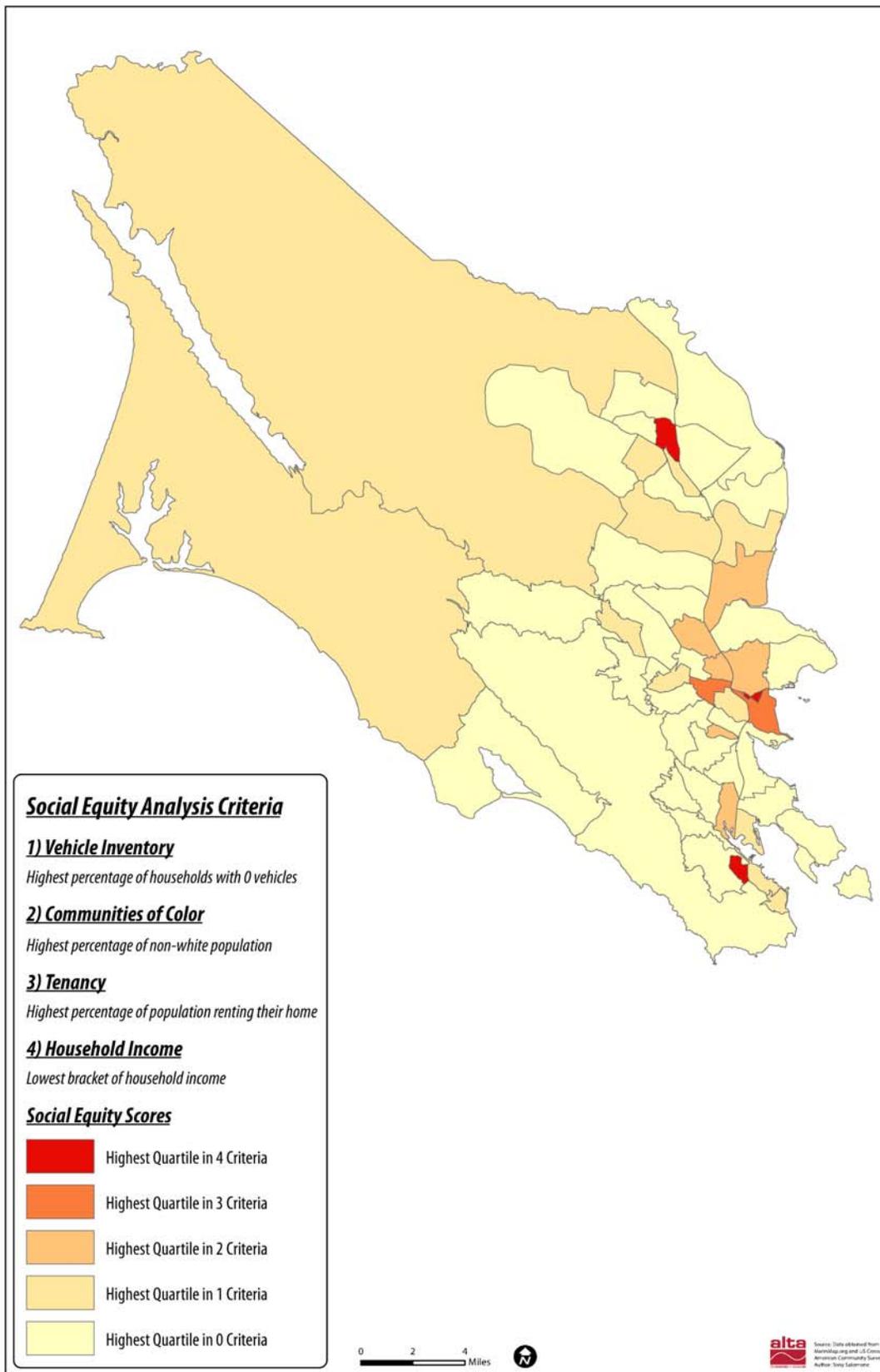


Figure 11. Priority Areas for Social Equity/Lifeline Mobility (Countywide)

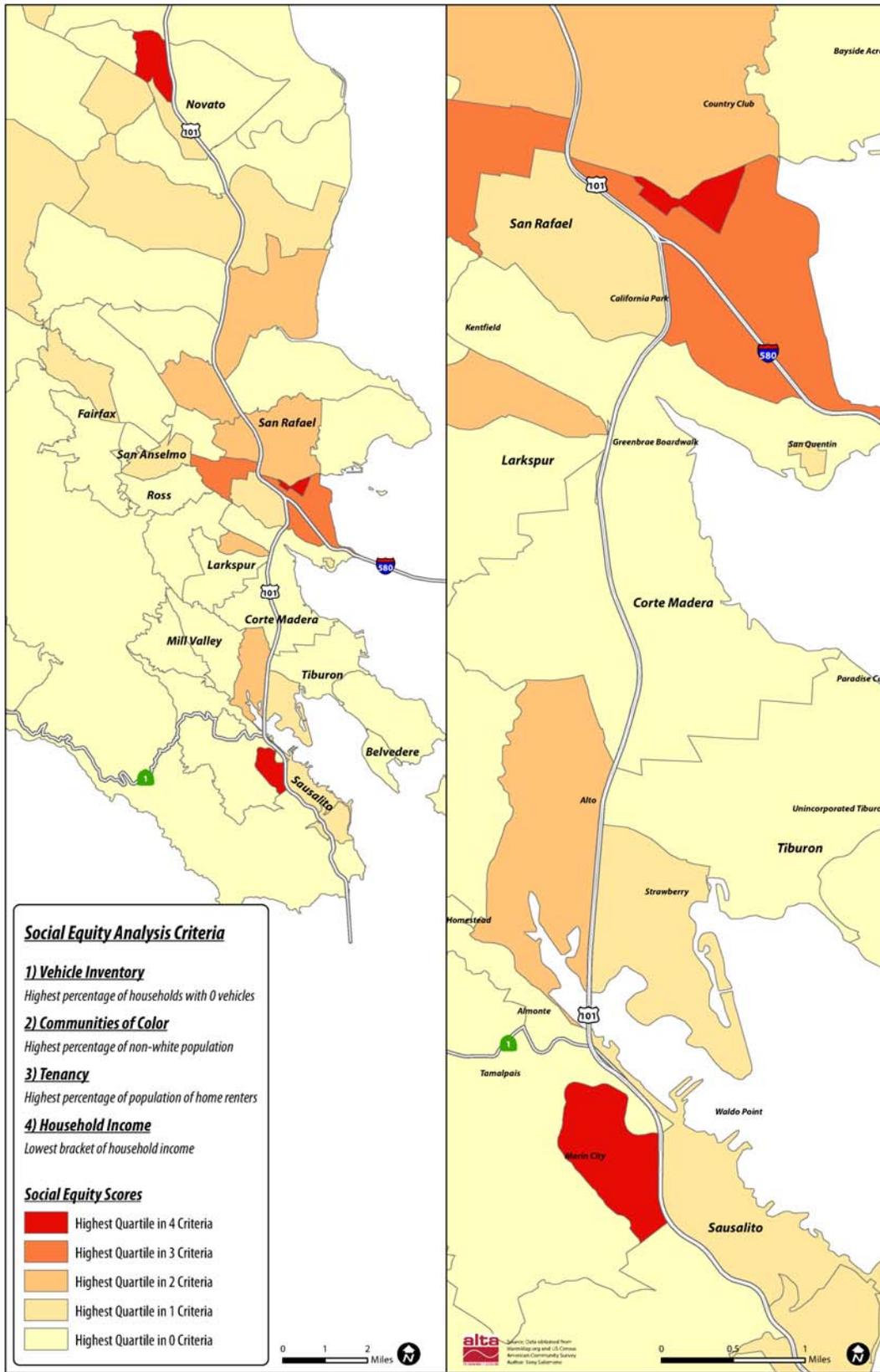


Figure 12. Social Equity/Lifeline Mobility Areas

## Visitors

Marin County is nationally known as an area of scenic natural beauty with convenient proximity to both urban San Francisco and the wine regions of Napa and Sonoma. The county’s livability is recognized regularly, most recently in Smithsonian Magazine which named Mill Valley one of the 20 Best Small Towns in America in May 2012. Visitors to Marin County spend over \$600 million annually, supporting over 6,000 local jobs and generating over \$40 million in local and state tax revenue. The county’s most popular destination, Muir Woods, draws over 750,000 visitors annually, supported seasonally by Marin Transit’s Muir Woods shuttle. In San Rafael, the Frank Lloyd Wright-designed Marin County Civic Center is the county’s second most-visited destination, which has the distinction of being the only government building ever designed by the famous architect. Many travelers to the region also stop in Sausalito and Fort Baker as a staging point along a walk or bicycle ride across the Golden Gate Bridge, others by taking the Sausalito Ferry from San Francisco’s Ferry Terminal.

Other natural attractions in Marin County include Mount Tamalpais, the birthplace of mountain biking, which draws many visiting bicyclists who would likely be inclined to try one of the first bike sharing systems on the west coast. In West Marin, the gentle curve of Stinson Beach framing Bolinas Bay makes it one of the most popular ocean beaches in the area. Marin County farms are also increasingly recognized for their sustainable agricultural practices, and visitors can purchase and enjoy their fresh produce without leaving the city at the Marin County Farmers’ Market in downtown San Rafael.

The high level of visitor activity at these attractions, as well as the many other Marin County destinations, may significantly impact bike share demand. Visitors and tourists to an area often do not have access to a car and many prefer the opportunity to experience a new place by walking or bicycling while vacationing. However, many of these destinations are spread throughout the County and as such it will be important to understand which of these attractions make the most sense to target for bike share trip-making (e.g., versus more traditional rental bicycle activity).

## Current Bicycle Activity

The American Community Survey estimates that 1.3% of Marin workers commute to work by bike, over twice the national average. Other regions with bike share systems often follow this trend of above average bike mode share, as shown in **Table 9**. Although high rates of bicycling aren’t necessarily a prerequisite to the creation of a bike share system – many bike share users are casual bicyclists and do not own their own bikes – the existing levels of bicycle activity in Marin indicate that bike share could be a good fit for residents.

Table 9. Bicycle Commute Mode Share in Comparison Bike Share Cities<sup>16</sup>

City/Region	Bicycle Commute Mode Share
Marin County, California	1.30%
Boulder, Colorado	9.77%
Washington, DC	2.24%
Boston, Massachusetts	1.44%
Minneapolis, Minnesota	3.70%

<sup>16</sup> US Census Bureau, 2006-2010 American Community Survey, B08301 Journey to Work.

A deeper analysis of commute mode share at the Census tract level reveals that bicycle usage varies greatly by city (see **Table 10**) and neighborhood (see **Figure 13**). Bicycling rates vary from 6% in downtown Novato and almost 4% in Corte Madera and Mill Valley, to virtually no bicycle commuting in less dense areas of the county. This analysis also highlights the potential for untapped bicycle demand in places such as San Rafael, Novato, and Ross, which currently experience less than 1% mode share. Especially in conjunction with new bicycle facility improvements, bike sharing could provide a great opportunity to facilitate mode shifts in these areas.

Table 10. Bicycle Commute Mode Share in Marin County Cities<sup>17</sup>

City/Region	Bike Commute Mode Share
Marin County, California	1.30%
Corte Madera, California	3.58%
Fairfax, California	2.10%
Larkspur, California	1.40%
Mill Valley, California	3.62%
Novato, California	0.96%*
Ross, California	0.76%
San Anselmo, California	1.84%
San Rafael, California	0.84%
Sausalito, California	2.54%
Tiburon, California	N/A

\* Within Novato, downtown has a mode share of 6.1% (the highest percentage by tract in Marin County)

Although American Community Survey Journey to Work data is the most common standard for measuring rates of bicycle activity, it is important to point out that it only captures typical commute patterns and does not account for discretionary social/errand, recreational, or school-related trips. To help assess demand for these trips, screenline bicycle counts can offer a more detailed view of bicycle traffic on specific streets and paths around the region. From 2007 to 2011, the Marin County Non-Motorized Transportation Pilot Program (NTPP) conducted annual bicycle counts at 22 locations around the region, documenting a 57% increase in the number of bicyclists counted over the five year period.<sup>18</sup> Marin County also has a nationally-recognized Safe Routes to Schools (SR2S) program, where surveys of students and parents have both shown an increase in the number of children bicycling to school.

Review of existing bicycle travel demand is generally a helpful step to understand potential feasibility of bicycle share and identify potential target areas and locations. A more thorough and specific assessment of bicycle share demand, however, is provided in the following section.

<sup>17</sup> US Census Bureau, 2006-2010 American Community Survey, B08301 Journey to Work

<sup>18</sup> For more information on the Marin NTPP, visit [www.walkbikemarin.org](http://www.walkbikemarin.org)

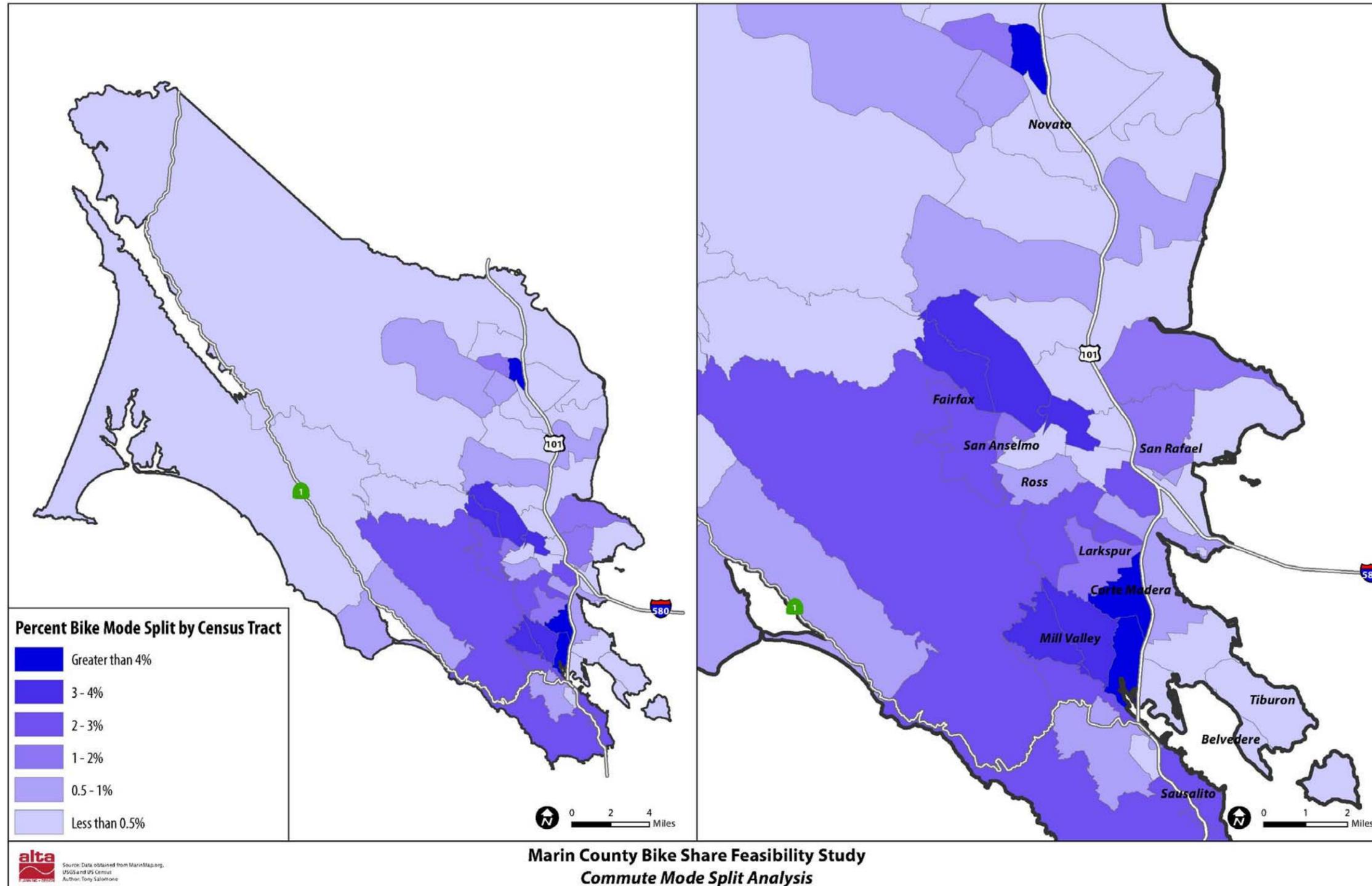


Figure 13. Current levels of bicycling activity in Marin County as measured by commute mode share. Downtown Novato has the highest rate of bicycle commuting in the county at 6.1%.

### 7.3 Demand Heat Mapping

Alta conducted a spatial analysis of Marin County to estimate bicycle share program demand in different areas using the inputs of where people live (population density), work (employment density, non-service jobs), and ‘play’ (density of service jobs, such as for hotels and food establishments), with additional modifiers for transit access, street connectivity, and topography.

High potential demand areas in Marin County are generally focused in smaller areas and spread out from another, which represents a challenge to defining a well-contained bike share program with a geographic center, as is typical of most existing systems.

These factors help determine locations with potential for both high demand for short trips and high suitability for bicycles to meet that demand, and are selected/weighted based on data from existing North American bicycle share systems. For example, while population density is itself a factor, as it would be for most transportation demand models, there is an additional modifier of population density for a particular age group (20-39) that exhibits an especially high demand for bike share trips compared to other age cohorts.

The results of the suitability analysis are shown as heat maps in **Figure 14** and **Figure 15**, which also include additional details for each of the factors included. Not surprisingly, the analysis shows most bike share demand concentrated in the eastern half of Marin County, in the following general areas:

- within Marin County’s historic town centers, especially downtown San Rafael, Sausalito, Mill Valley, and Fairfax
- at major transit nodes such as the San Rafael Transit Center; Larkspur, Tiburon and Sausalito ferry terminals; San Anselmo Transit Hub; and the future (assumed) Sonoma Marin Area Rail Transit (SMART) commuter stations
- near employment areas adjacent to Highway 101, including the Canal area of San Rafael, downtown Novato, and Corte Madera Town Center; and alongside the Sir Francis Drake Boulevard, Miracle Mile, and East Blithedale/Miller Avenue corridors

The fact that these areas generally are not contiguous and are relatively spread out from one another represents a challenge to defining a well-contained bike share system with a geographic center of demand, as has been typical with other North American bike share systems such as Washington, DC and Denver, CO. On the other hand, Marin’s constellation of village-scale activity centers and larger employment areas offers a potentially unique condition where demand for intra-city travel and “last mile” transit connections to/from job and shopping centers could be met and stimulated through a targeted bike share system.

The key to further understanding potential demand based on the heat mapping analysis is to locate a sufficient number of stations within a relatively short ride from one another, in order to provide choice and convenience for a variety of trips (i.e. to establish a ‘network effect’). Depending on pricing structure and other factors, there may also be instances where a single station could serve isolated demand areas by providing both the starting and ending point for short trips – such as running errands.

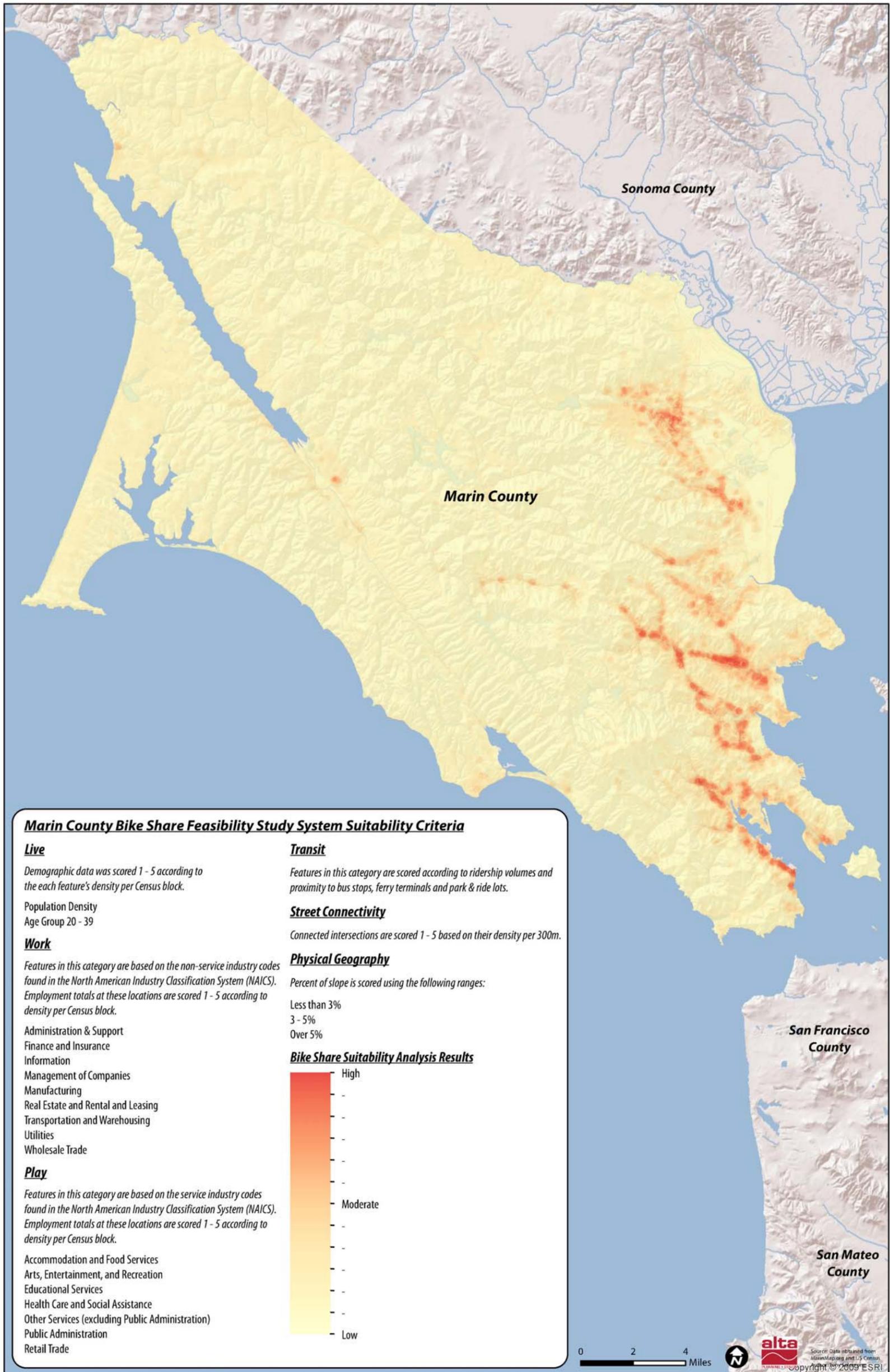


Figure 14. Marin County Bicycle Share Suitability Heat Map.

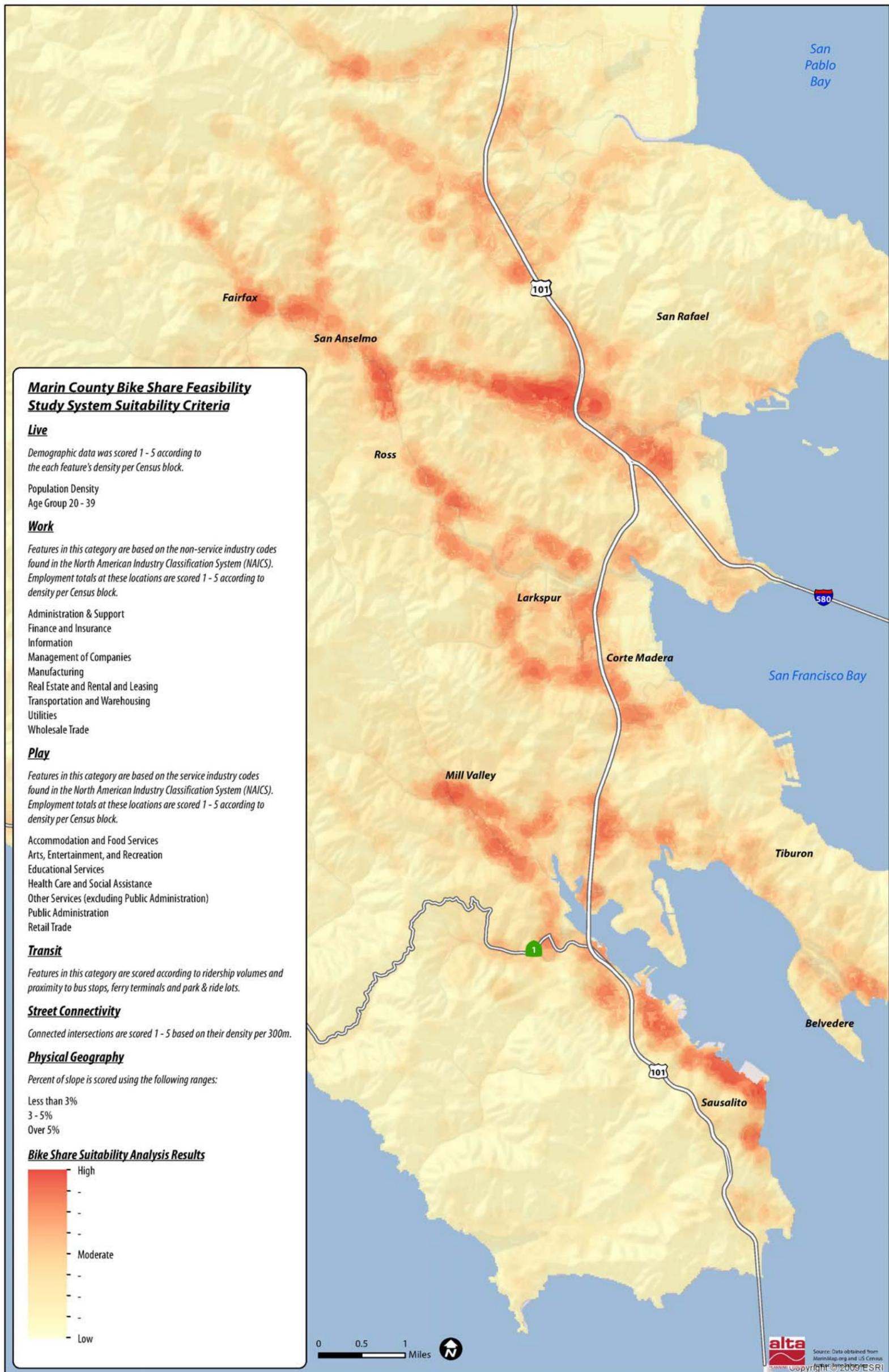


Figure 15. Marin County Bicycle Share Suitability Heat Map (Highway 101 corridor).

## 7.4 Summary

Marin County bears many characteristics supportive of a successful bike share system, yet differs in its density and demographics from other US bike share cities.

### Strengths

Key strengths of Marin include:

- Mild climate with warm winters and temperate summers allow for a year-round project
- Visitor attractions that include special events and parks and trails, as well as museums and institutions
- Vibrant commercial centers and shopping districts
- Significant transit operations, including popular ferry terminals and both regional and local bus
- An established and growing bikeway network with planned improvements
- High median income and a household income profile that matches the typical profile of bike share system memberships
- Demonstrated financial commitment for multi-modal transportation (including SMART)
- Support for actions that help address climate change and reduce vehicle miles traveled and related greenhouse gas emissions
- Proximity to anticipated Bay Area Bike Share Pilot Program

### Challenges

Despite Marin's many strengths that suggest a high suitability for bike share, the county also has several weaknesses that could challenge the success of a bike share system. Potential challenges to bike share include:

- Low college population and below average percentage of residents in typical bike share demographic (20-39)
- Distance and topographical barriers between city and commercial centers
- Segregated land uses and low residential density in city and town centers
- Many tourism/visitor destinations located in rural areas (ex. state and national parks, agri-tourism)
- Highway 101 barrier and limited street connectivity in many locations

The primary challenges that TAM will need to address in planning a bike share system are the separation of residential and commercial land uses and topographical barriers between cities, and the financing of upfront costs and ongoing operations for a viable system. Currently, most residential development is segregated from commercial areas, while typically the highest use bike share stations are located in mixed use areas with a density of both trip originators and attractors.

Significant distances and elevation between Marin's cities can intimidate casual bike share users and visitors. This may be mitigated by improving bikeway connections along these key routes, improving wayfinding for 'least effort' routes, as well as improving opportunities for linking transit with bike share to better serve longer inter-city trips and last mile connections for regional transit. Further multi-modal development such as transit-oriented developments located at stations along the future SMART corridor would also help create denser, mixed-use neighborhoods that are well-suited for bike share.

### Target Populations

A successful bicycle share program in Marin will include targeted outreach and marketing to at least four distinct user groups:

Employees on Transit: Existing bus and ferry riders, and future users of the SMART commuter train seeking last mile connections to destinations or convenient alternatives to low frequency routes

Transit-Dependent Communities: In order to meet all the program's goals, efforts must be made to encourage participation from low-income and minority populations. These users will benefit from the convenience and affordability of bicycle share, particularly for areas such as the Canal neighborhood and Marin City that are generally isolated from community and social services

Tourists: A key strategy to generate bicycle share revenue, promotion to visitors and casual users might also help support economic development in smaller town centers and improvements to recreational pathways and trails

Older Marin Residents: Representing almost one third of Marin residents, those 55 years of age and older will play a key role in determining the success of bicycle share as a healthy and environmentally-friendly alternative to driving for local discretionary trips

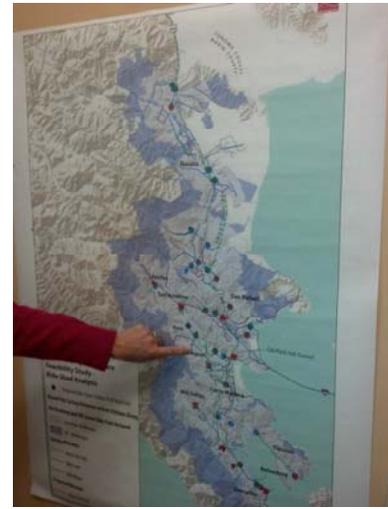
## 8 Planning & Implementation

This section outlines a conceptual framework for program planning, including possible station locations, potential phasing, trip and revenue estimates, and a review of anticipated funding needs and strategies. A recommendation to continue planning for the system and a timeline of next steps are provided, along with recommendations to pursue Transportation Demand Management (TDM) integration and consider a pilot program effort as a means to realize bike share in Marin County.

### 8.1 Station Placement & Program Size

Based on the program goals and potential demand profile outlined in Sections 6 and 7, and with consideration to other factors such as bicycle and transit facility access and trip origin/destination pairings, this Feasibility Study identifies a potential 37-station, 300-bike bicycle share system in Marin County as the basis for initial planning and analysis. This program design was developed with input from the Bicycle Share Advisory Working Group (BSAWG), and provides a conceptual framework for identifying high demand locations and phasing in a potential program over a period of years, as outlined below. **Figure 16** provides a map of the proposed station locations, while tables and figures (maps) for each phase concept summarize additional station information, including estimated demand and proximity to other bike share stations at “full build-out” of the system.

The main inputs of the bike share demand analysis include the concentration of locations where people live, work, and play, and additional modifiers for transit access, street connectivity, and topography. In order to convert these general densities of demand into actual numbers (trips), Alta maps the station locations and utilizes a regression model developed from existing bicycle share data to estimate specific demand for all proposed stations in the program. This model includes assumptions of seasonal bicycle demand variation (i.e. the general profile for bicycle use in December vs. June) and trip patterns for both casual and annual member usage. In the case of Marin County, the availability of ferries (fewer runs in winter) is also considered in the seasonal profile and trip estimates.



The Bicycle Share Advisory Working Group (BSAWG) helped identify potential station locations and phasing during the plan development process.

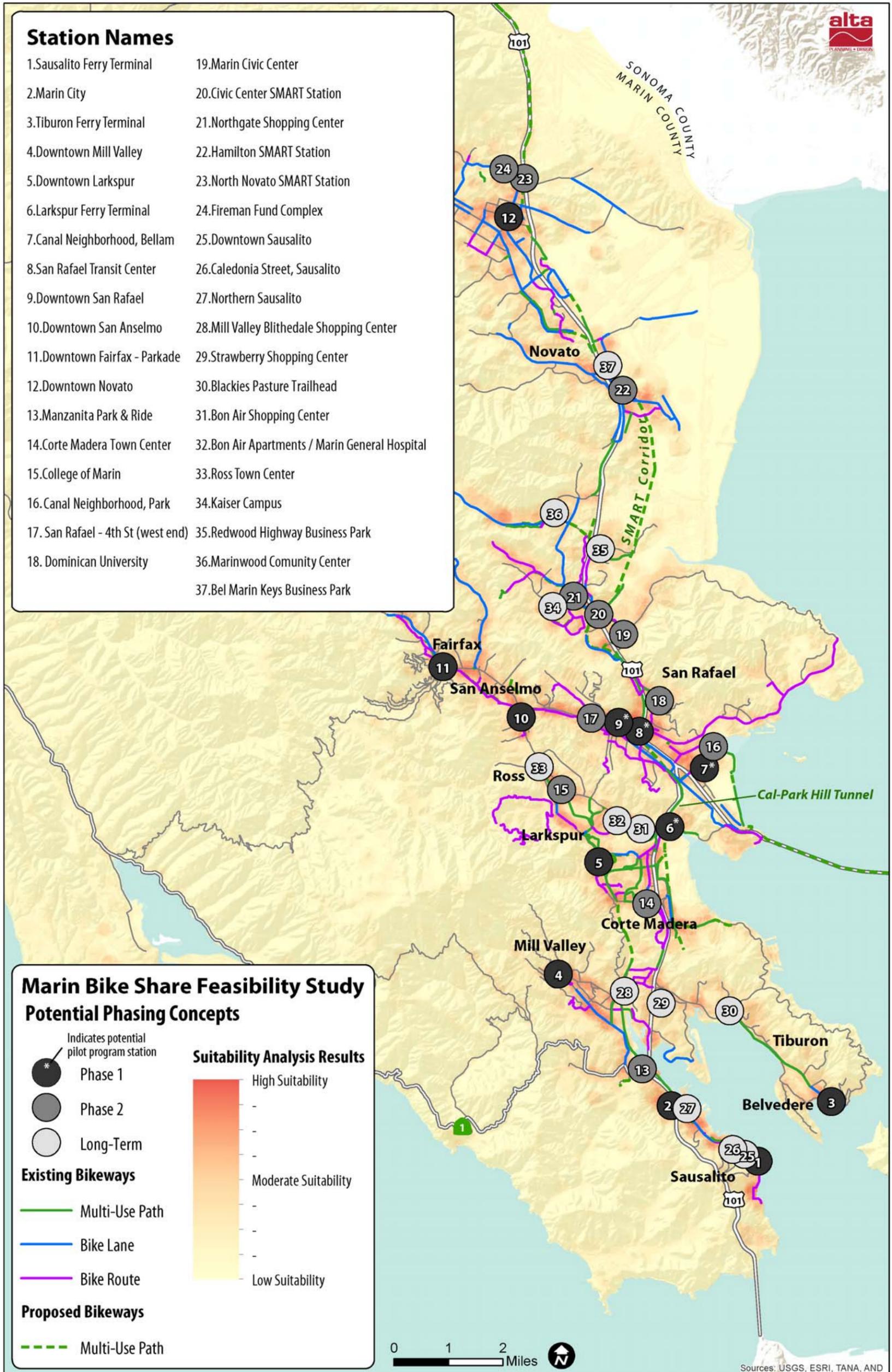


Figure 16. Summary Map of Potential Station Locations and Phasing

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## 8.2 Phasing Concepts

Below is a review of the conceptual phasing framework used to develop capital and revenue projections/estimates for the Marin County Bike Share Feasibility Study. These proposed phases and station locations are for conceptual planning purposes only, and are subject to significant revision. The specific number and siting of stations would be developed during advanced planning prior to implementation in consultation with local agencies and property owners.

### Phase 1 Concept

Phase 1 envisions twelve (12) stations and 100 bicycles in Marin, focused on the highest demand areas near downtowns and transit hubs. Initial demand is projected at between 19,000-34,000 trips (Year 1 is based on a 9-month operations concept, assuming the program would not want to start in the middle of winter), with demand in Year 2 estimated at between 29,000-44,000 trips. While a specific timeline for implementation is not identified, for the purposes of analysis it is assumed that Phase 1 could take place prior to implementation of the SMART corridor project. Station details are provided in **Table 11**. **Figure 17** provides a map of station locations and estimated daily demand, while **Figure 18**. Proposed System Rideshed Analysis (Phase 1) illustrates the potential ride shed area of the system.

Table 11. Phase 1 Station Locations (12 stations)

Station #	Station Name	Nearby Bus Stops	Estimated Annual Demand (Bikes Out)	Estimated Daily Demand (Bikes Out)	Proximate Stations 30 Minute Ride	Proximate Stations 60 Minute Ride
1	Sausalito Ferry Terminal	4	2,616	9	2	4
2	Marin City	17	2,778	9	3	7
3	Tiburon Ferry Terminal	2	2,147	7	1	5
4	Downtown Mill Valley	2	1,967	7	3	10
5	Downtown Larkspur	3	1,936	6	7	11
6	Larkspur Ferry Terminal	1	2,157	7	6	10
7	Canal Neighborhood	3	2,677	9	6	9
8	San Rafael Transit Center	10	3,472	12	7	8
9	Downtown San Rafael	4	3,279	11	7	8
10	Downtown San Anselmo	3	2,119	7	7	8
11	Downtown Fairfax	2	1,612	5	4	7
12	Downtown Novato	4	3,071	10	1	1

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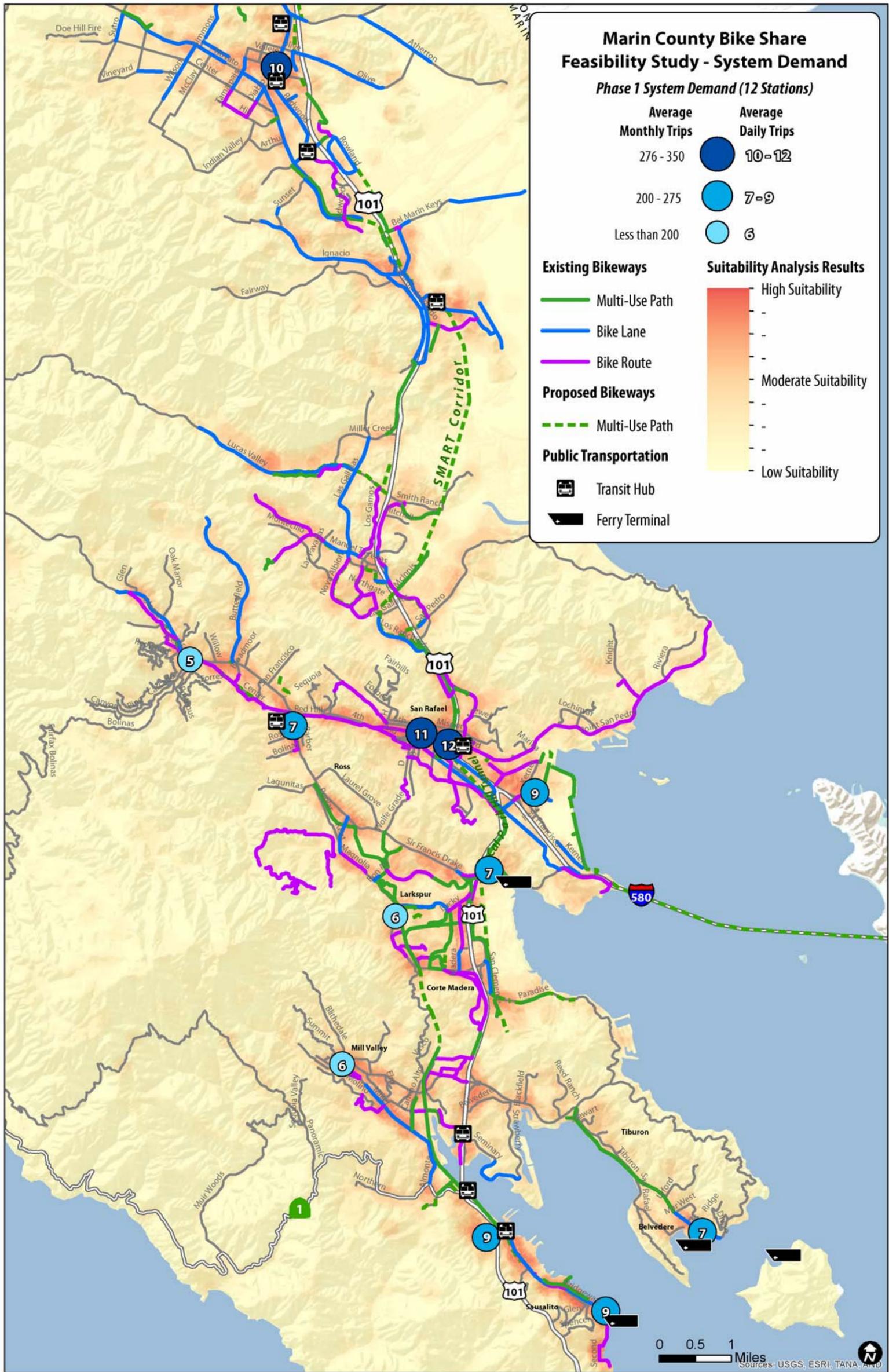


Figure 17. Proposed Station Locations and Demand (Phase 1)



**Phase 2 Concept**

In Year 3, the Phase 2 concept envisions an expansion of the program by approximately 12 stations and 100 bicycles for a total of 200 bicycles and 24 stations. For this phase, SMART is assumed to be operational and initial demand is projected at between 35,000-69,000 trips, with this increasing up to 82,000 trips in Year 4 as the system is further promoted and more users come online. **Table 12** provides detailed station information, while **Figure 19** and **Figure 20** map station locations/daily demand estimates and system ridedshed.

Table 12. Phase 2 Station Locations (24 stations).

Station #	Station Name	Nearby Bus Stops	Estimated Annual Demand (Bikes Out)	Estimated Daily Demand (Bikes Out)	Proximate Stations 30 Minute Ride	Proximate Stations 60 Minute Ride
1	Sausalito Ferry Terminal	4	2,640	9	4	8
2	Marin City	17	2,778	9	4	8
3	Tiburon Ferry Terminal	2	2,158	7	1	7
4	Downtown Mill Valley	2	1,911	6	4	14
5	Downtown Larkspur	3	2082	7	9	17
6	Larkspur Ferry Terminal	1	2,157	7	9	17
7	Canal Neighborhood - Bellam	3	2,659	9	1	6
8	San Rafael Transit Center	10	3,527	12	13	16
9	Downtown San Rafael	4	3,332	11	13	16
10	Downtown San Anselmo	3	2,157	7	9	15
11	Downtown Fairfax	2	1,683	6	5	13
12	Downtown Novato	4	3,091	10	3	4
13	Manzanita Park & Ride	6	1,526	5	4	13
14	Corte Madera Town Center	4	1,999	7	15	31
15	College of Marin	7	2,824	9	14	28
16	Canal Neighborhood – Pickleweed Park	2	1,826	6	9	15
17	San Rafael 4 <sup>th</sup> Street (west end)	2	1,856	6	13	16
18	Dominican University	6	2,306	8	11	15
19	Marin Civic Center	5	1,552	5	9	14
20	Civic Center SMART Station	3	1,521	5	7	14
21	Northgate Shopping Center	4	1,951	7	7	14
22	Hamilton SMART Station	4	1,572	5	1	11
23	Novato North SMART Station	6	1,685	6	3	4
24	Fireman Fund Complex	5	1,524	5	3	4

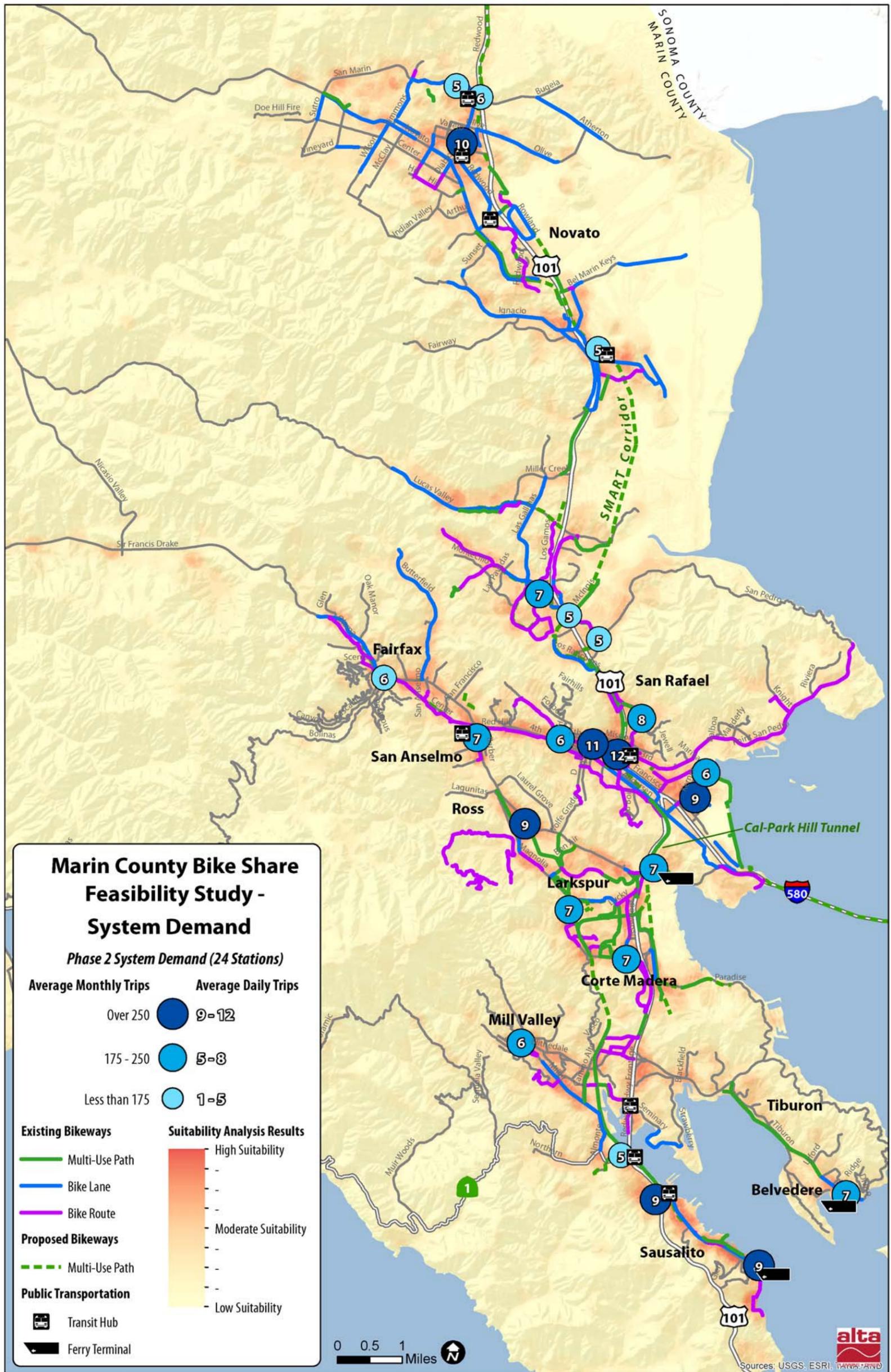


Figure 19. Proposed Station Locations and Demand (Phase 2)

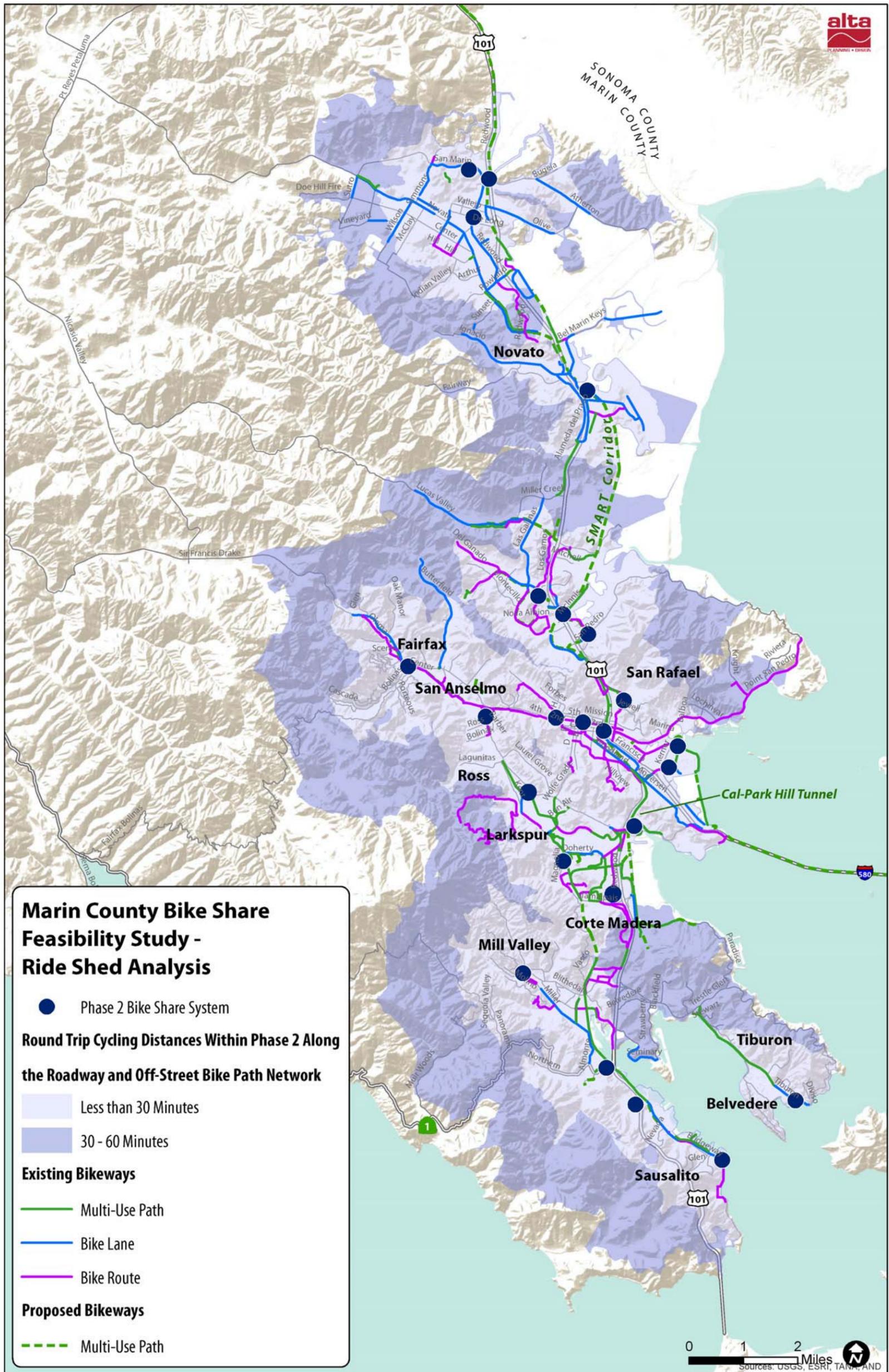


Figure 20. Proposed System Rideshed Analysis (Phase 2)

**Potential Phase 3**

Implementation of the Phase 3 concept brings additional expansion of the program at up to 13 additional locations, for a potential total of 37 stations and 300 bicycles. These are stations with lower estimates of ridership, with greater likelihood of success as part of a more robust system. The primary recipients of new stations are in business parks in north San Rafael, two hospitals, Ross Town Center, and additional locations along the perimeter of Richardson Bay in southern Marin. Initial demand for a fully built-out system (assuming year 5 of program) is projected at between 46,000-98,000 trips, with this potentially increasing to 125,000 trips or more as the program matures in subsequent years. Demand estimates beyond Year 6 are not calculated. **Table 13** provides station level details, while **Figure 21** and **Figure 22** map station locations, daily demand, and system rideshed.

Table 13. Phase 3 Station Locations (37 stations).

Station #	Station Name	Nearby Bus Stops	Estimated Annual Demand (Bikes Out)	Estimated Daily Demand (Bikes Out)	Proximate Stations 30 Minute Ride	Proximate Stations 60 Minute Ride
1	Sausalito Ferry Terminal	4	2,664	9	4	12
2	Marin City	17	2,845	9	9	19
3	Tiburon Ferry Terminal	2	2,185	7	3	13
4	Downtown Mill Valley	2	1,967	7	9	25
5	Downtown Larkspur	3	1,876	7	16	31
6	Larkspur Ferry Terminal	1	2,157	7	15	31
7	Canal Neighborhood - Bellam	3	2,793	9	14	28
8	San Rafael Transit Center	10	3,610	12	20	28
9	Downtown San Rafael	4	3,413	11	18	28
10	Downtown San Anselmo	3	2,216	7	13	26
11	Downtown Fairfax	2	1,683	6	8	22
12	Downtown Novato	4	3,097	10	4	5
13	Manzanita Park & Ride	6	1,576	5	11	24
14	Corte Madera Town Center	4	1,999	7	15	31
15	College of Marin	7	2,824	9	14	28
16	Canal Neighborhood – Pickleweed Park	2	1,881	6	12	26
17	San Rafael 4 <sup>th</sup> Street (west end)	2	1,912	6	17	27
18	Dominican University	6	2,368	8	16	26
19	Marin Civic Center	5	1,593	5	12	23
20	Civic Center SMART Station	3	1,562	5	10	23
21	Northgate Shopping Center	4	1,998	7	10	27
22	Hamilton SMART Station	4	1,590	5	3	15

Transportation Authority of Marin (TAM)

Station #	Station Name	Nearby Bus Stops	Estimated Annual Demand (Bikes Out)	Estimated Daily Demand (Bikes Out)	Proximate Stations 30 Minute Ride	Proximate Stations 60 Minute Ride
23	Novato North SMART Station	6	1,690	6	3	5
24	Fireman Fund Complex	5	1,529	5	3	5
25	Downtown Sausalito	3	1,931	6	6	13
26	Caledonia Street - Sausalito	4	2,357	8	7	14
27	Northern Sausalito	3	1,941	6	9	19
28	Blackie's Pasture Trailhead	4	1,121	4	7	23
29	Strawberry Shopping Center	4	2,210	7	9	25
30	Mill Valley Blithedale Shopping Center	2	1,403	5	11	26
31	Bon Air Shopping Center	2	1,472	5	14	30
32	Bon Air Apartments or Marin General Hospital	2	1,828	6	14	28
33	Ross Town Center	2	388	1	12	28
34	Kaiser Campus	4	2,475	8	10	23
35	Redwood Highway Business Park	5	2,499	8	9	23
36	Marinwood Community Center	7	1,269	4	6	21
37	Bel Marin Keys Business Park	6	2,115	6	3	14

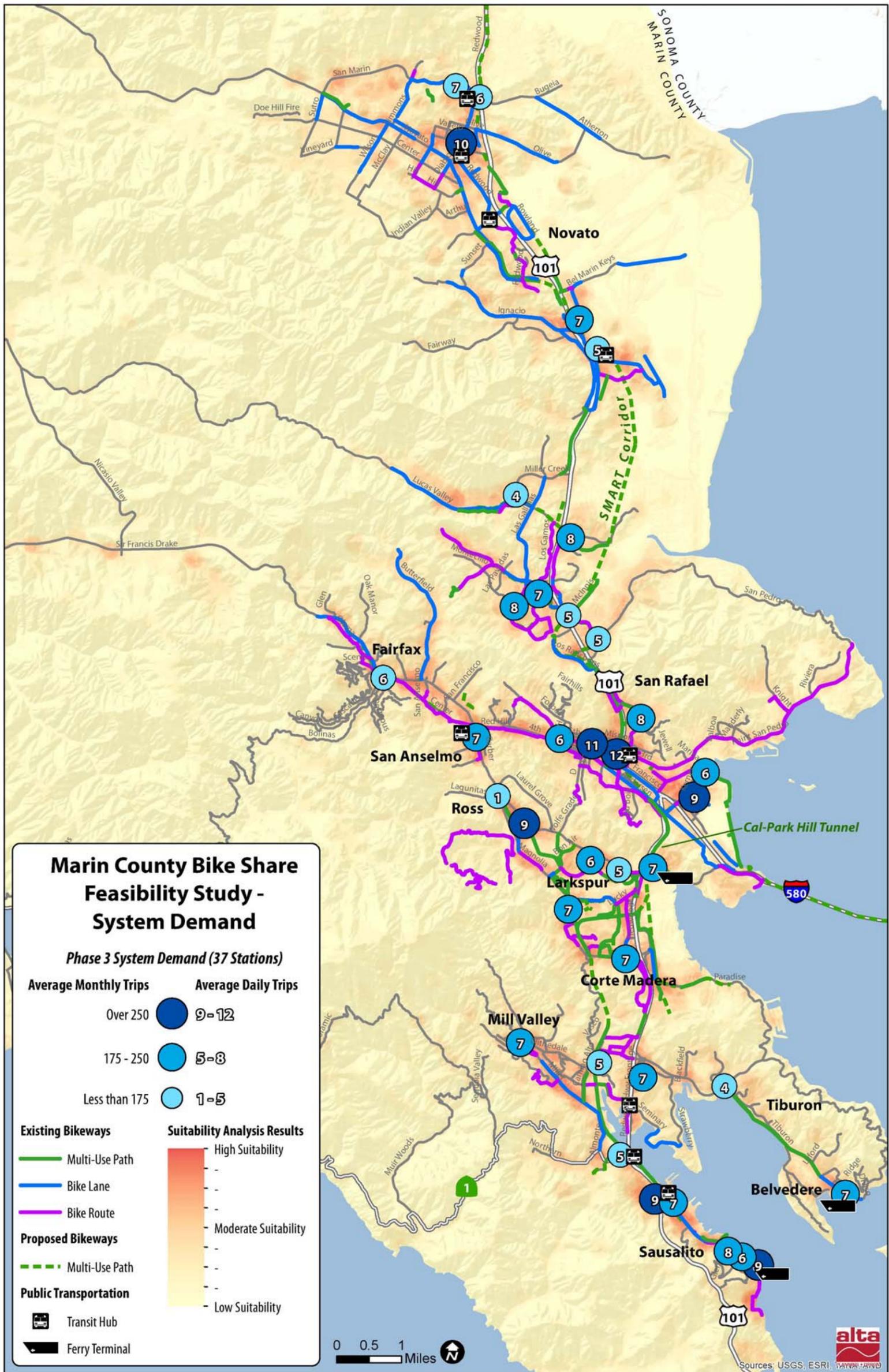


Figure 21. Proposed Station Locations and Demand (Phase 3)

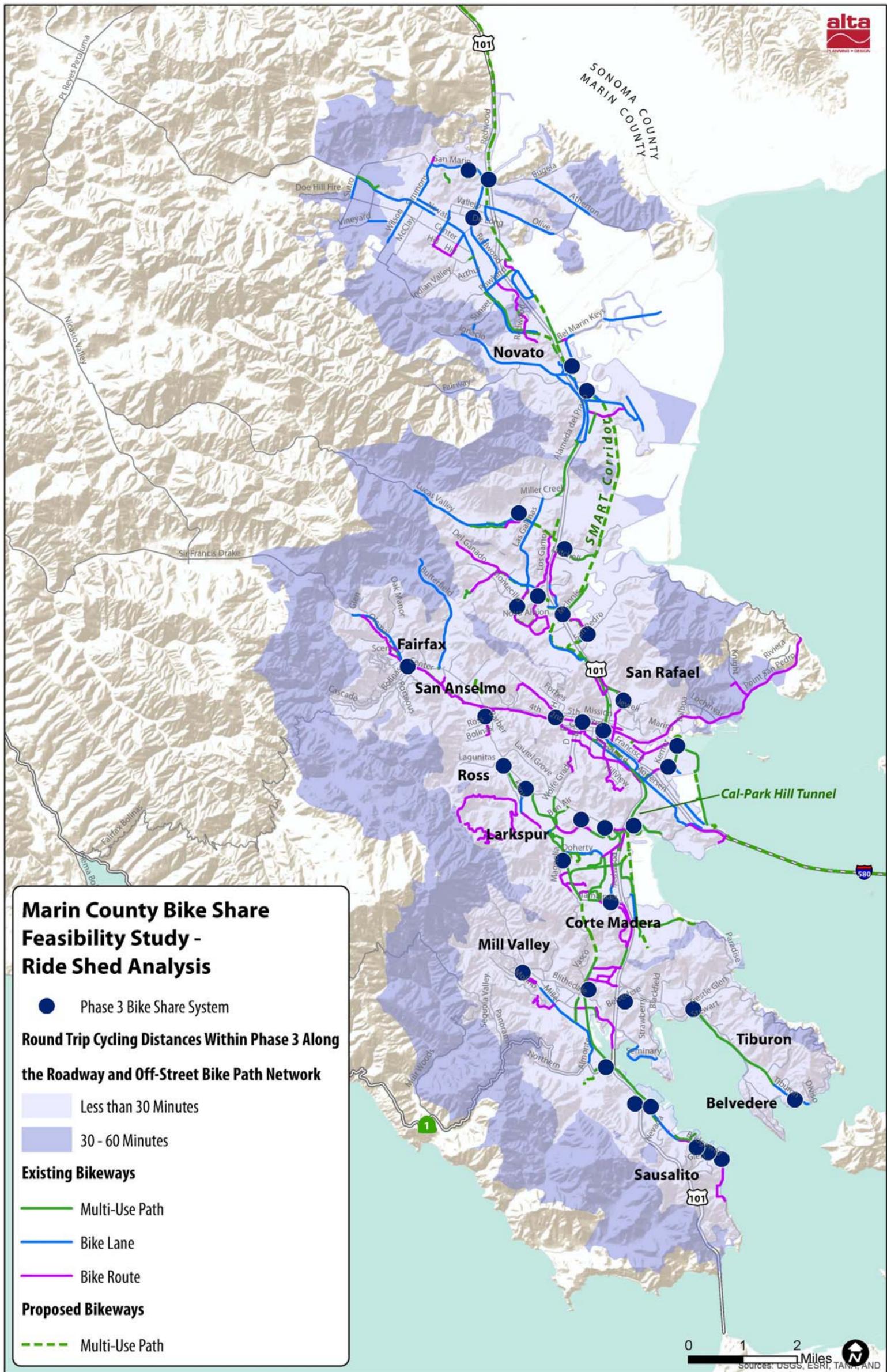


Figure 22. Proposed System Rideshed Analysis (Phase 3)

## 8.3 Demand and Phasing Analysis

For the proposed scenarios above, the demand estimates range from 0.5 trips per bike per day to approximately 1 trip per bike per day for the higher performing stations and phases. The low demand figures do not compare well with other bike share systems, although the higher end is comparable to other systems currently in operation (e.g. Boulder, CO) and in planning (e.g. Palo Alto, as part of the Bay Area Bike Share program). For the purposes of this study, it is recommended that an overall benchmark of approximately 1 trip/bike/day be established as a minimum threshold for feasibility in response to the goals of the Marin County Bike Share Program.

Bike share demand in Marin County appears sufficiently high to support a small program catered to last mile transit and ferry connections. A larger program expanded throughout urbanized Marin will likely require proactive measures (such as targeted promotion to large employers) and market capture from residents over the age of 55 to be successful.

The estimated demand for the Phase 1 program scenario comes close to meeting this threshold, albeit only in the second year as demand is expected to increase. This appears to be modestly good news for prospects of a Marin program, although subsequent phases indicate maintaining this level of demand (and by extension the benefit/cost of a bike share trip) will be a challenge. Several strategies may be considered in response to these estimates:

### **Integrate Transportation Demand Management (TDM) Strategies**

According to the demand model, the difference between 0.5 and 1.0 trips/bike/day (the low and high end estimate) equates to approximately 300 new annual members for each phase. To bolster demand for bike share by this amount, this number is proposed as a target figure for a **Transportation Demand Management (TDM)** effort that reaches out to large employers and promotes membership subscriptions (either at full cost or a discounted bulk rate). While such a TDM “modifier” of the baseline estimated demand would have only a small impact on user revenue (see next section), it would help achieve progress toward the goals of reducing congestion and pollution and of promoting a healthier, more active lifestyle. Section 8.4 provides additional discussion of TDM considerations. It should be noted that in order to present feasible scenarios, the demand increases associated with the TDM modifier were used to generate the maps and detailed tables from the preceding section, as well as the estimates provided in **Table 16**.

### **Consider a Pilot Phase**

The initial phase (Phase 1) concept is estimated to cost \$750,000 in potential grant funding, which may be beyond the capacity of local funding (unless a more robust funding strategy can be identified during an advanced feasibility planning stage). If necessary, a starter pilot program of 3-4 stations may help minimize the up-front capital and launch costs while still helping target the highest demand areas and building momentum toward a larger system.

The key to a successful pilot phase is to use resulting data to understand the critical factors for successful operation and expansion, and potentially using excess revenues (if any) to generate matching funds for larger grant requests or system reinvestment. With this in mind, two potential pilot scenarios were considered for further analysis:

- Larkspur Ferry – Canal Neighborhood – Downtown San Rafael: This pilot concept would provide a link between key transit hubs in Central Marin and test demand for both commute trips and discretionary trip-making in downtown San Rafael. An additional station in the Canal neighborhood might also be included to test marketing/outreach strategies and provide an immediate option for this

transit-dependent area. If successful, incremental expansion northward to the Marin Civic Center area, west to San Anselmo and Fairfax, and southward to downtown Larkspur, Corte Madera, and the College of Marin is possible.

- Sausalito Ferry – Marin City – Mill Valley: This concept could generate feedback on both visitor-oriented and commute-oriented demand, and would provide an immediate option for another identified ‘lifeline’ neighborhood. It may also help understand the potential impacts of higher personal bicycling rates on bike share annual memberships.

If funding for a Phase 1 (100 bicycle) system cannot be secured, a smaller pilot phase still would likely provide mobility benefits while testing potential demand for a larger system. A 30-bicycle pilot program is estimated to cost \$250,000 in up-front costs with potential to continue as a self-funded operation

Based on estimates from the Alta Bicycle Share Demand Model, and from feedback from the Bicycle Sharing Advisory Working Group (BSAWG), the Larkspur Ferry-Canal Neighborhood-Downtown San Rafael pilot concept is strongly preferred over the southern Marin option. Analysis of this preferred pilot concept, which is subject to change, is summarized in **Table 16**.

#### 8.4 Estimated Launch & Operating Costs

Capital costs for a modern (4<sup>th</sup> generation) bicycle share system similar to the proposed San Francisco Bay Area program are approximately \$5,400 per bicycle. Some recent bike share systems appear to utilize a slightly less expensive (and presumably, less rugged) bicycle that is estimated at \$4,800/bicycle.<sup>19</sup> These costs include the actual bicycle and its components, as well as the station kiosks and docking equipment.

For the purposes of the Feasibility Study financial performance assessment, this potential difference in purchase costs was utilized to provide a “high” and “low” cost range. Other lower capital cost bike share models do exist (i.e., station-less systems), but these were not included in the financial performance model. For setting up and installing (“launching”) a station-based system, costs are assumed to be relatively fixed at \$1,500/bicycle (Alta Bicycle Share estimate). For the potential small pilot effort, however, the ‘per bike’ launch costs are assumed to be slightly higher due to scaling issues.

Estimated annual operating costs for 4<sup>th</sup> generation systems can vary significantly (between \$1,300-\$3,000 per bike) depending on a number of factors, including:

- system rebalancing demand,
- maintenance/warehousing needs,
- local travel costs, and
- whether the system is sharing costs associated with regional customer service, administrative, technical support and marketing services, or is providing these services independently.

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<sup>19</sup> Based on a back of the envelope calculation of Bike Nation’s proposals for Long Beach and Los Angeles, CA. Exact figures not available.

Although actual costs can vary, Alta would estimate annual operating costs for a potential Marin system at \$1,600/bicycle, which for a system of 300 bicycles would be \$480,000/year.

For this estimate, it is assumed that:

- **customer service and back end operations** would be integrated with an experienced operator with existing access to administrative and technical support (customer call centers, online servers, marketing, etc.);
- a significant number of (but not all) stations in the system would be self-balancing (i.e., they do not require active management to keep bicycles available or to ensure a station has open docks); and
- operations could be adjusted seasonally or as part of a Service Level Agreement (i.e. expectations for such things as how long a station can be empty or how often bikes have to be checked could be modified to fit within an established budget).

Estimated sponsorship and grant funding needs are based on relatively fixed cost assumptions for the purchase and installation of bicycles and stations. Potential ongoing operating costs, however, are more variable and include a number of assumptions that are detailed in this section.

To provide a reasonable range of cost assumptions, the \$1,600/bike operating cost scenario is considered a “low cost” case scenario, while \$2,000/bike was used to establish a “high” estimate. For the purposes of the financial testing included in **Table 16**, an average operating cost of \$1,800/bicycle was utilized.

### **Operating Cost Considerations**

A major potential and highly variable cost of operations is the need to rebalance bicycles during the day to ensure enough docks and bikes for riders at the appropriate times and locations. In most bicycle share programs, a fleet of vehicles is maintained by the operator and is sent out to reposition bikes as supply information is made available (via continuous data feeds from the docking stations). By rebalancing bikes, the operator can ensure that nearly all members are able to find a bicycle at their preferred location and more importantly, park a bicycle at an available station in order to avoid higher fees. If an open docking station is not available at the end of one’s trip, the user can contact the call center to get an extension of time and the location of the nearest available dock. If the bike has an independent lock, the user could lock the bicycle to the nearest secure location and notify the call center that the bike has been returned.

Service levels are crucial for a well-operated bike share system. They determine the customer experience (e.g. bikes with maintenance issues, graffiti on stations, full or empty stations) and are heavily correlated to operating costs. For example, if an operator is required to check each bike each day, the system will be more expensive to operate than if they are required to check every bike each month.

There are some aspects of the service levels that will be dependent on funding. Specifically, if operations for the bike share system are supported by system revenues, the model could allow for a relaxation of some service levels if the system is generating less revenue than anticipated. This allows an operator to reduce its baseline costs to provide longer-term financial sustainability of the system. If the operations contract is fully-funded, then there is no need to scale service levels to revenues.

Maintaining satellite systems can be difficult and either needs separate operating systems and staff, or requires travelling large distances between systems. For example, if Marin was to attempt integration with a San Francisco program, it would not be practical to have operating crews travel from San Francisco to maintain and redistribute bikes. The “down time” associated with travelling back and forth would affect

service levels and be an inefficient use of staff time. Given there is likely to be little (or no) bicycling back and forth between Marin County and San Francisco, it may be prudent either contract out to local bike shops for maintaining and rebalancing the system or create a small Marin-focused operations unit.

The size of the system is also a key consideration for satellite systems. There are a number of fixed costs associated with operating the system that do not scale with the number of stations or bikes. Relatively, smaller systems cost more to operate (per station or per bike) than larger systems. Experience so far suggests that economies of scale do not materialize until a system reaches 10 stations or more.

The placement of related station pairs can help create a balanced distribution of trips between bike share stations that minimizes the need to manually relocate bikes throughout the system. Similarly, other locations may be limited to round-trips that start and end at the same station, where the bicycle is used for quick errands and returned to the original docking station. The Phase 1 downtown Novato station would likely be an example of such a self-balancing station, since there would be limited connectivity to other stations and higher potential use of the independent locking mechanism for short round-trips.

At other locations, large waves of one-way commute traffic are a potential concern for rebalancing. Especially at locations such as the Larkspur, Tiburon, and Sausalito Ferry Terminals, morning commute trips may fill up available docks at a station, leaving users who arrive later no place to return their bike. If these locations are likely to be in high demand, they may merit consideration for increased dock space (and increased initial capital costs) in order to minimize ongoing operations costs from system rebalancing. Alternatively, there might be opportunities to partner with a local business to rebalance the system less expensively, or for there to be incentives built into the pricing structure for member-initiated rebalancing.

## 8.5 Revenue Assumptions

### User Fees

A fee schedule for membership and per-trip usage must be established in order to convert projected demand identified from previous tasks into a financial revenue forecast for assessing the economic feasibility of system implementation. **Table 14** highlights a ‘typical’ fee schedule, one which is similar to that expected for the proposed San Francisco Bicycle Share Pilot Program<sup>20</sup>. This schedule is designed to generate revenue while providing a financial disincentive for using bike share over a traditional bicycle rental for trips over 4-5 hours (fees above 180 minutes continue to rise in 30-minute increments but are not shown).

Table 14. Sample Program Fee Schedule (Typical)

	Casual Fee Structure	Member Fee Structure
Base Subscription	\$7/day, \$12/3-day	\$70 annual
<b>Duration</b>	<b>Per Trip Fees</b>	
0-30 mins	\$0.00	\$0.00
30-60 mins	\$2.00	\$1.50
60-90 mins	\$6.00	\$4.50

<sup>20</sup> Subject to change. The final details of the San Francisco Bike Share Pilot Program are under negotiation at the time of this writing and have not been confirmed. The San Francisco Bike Share Pilot Program is being implemented by the consultant Alta Planning and Design’s sister company, Alta Bicycle Share.

	Casual Fee Structure	Member Fee Structure
90-120 mins	\$14.00	\$10.50
120-150 mins	\$22.00	\$16.50
150-180 mins	\$30.00	\$22.50

**Visitor and casual membership demand** is a key consideration within the overall system demand profile in terms of revenue. Approximately one-half to two-thirds or more of user revenue is generated through casual memberships and fees (1-3 day pass purchases as opposed to annual memberships), while such users typically account for only one-quarter of bicycle share trips. This is because of both a higher pricing structure for one-time memberships as well as a greater willingness of casual users to pay for longer rides than is exhibited by annual members who pay a single annual fee and typically avoid surcharges.

Establishing a fee structure similar to the proposed San Francisco Bicycle Share Pilot Program could help produce consistency across the Bay Area. This consistency is by no means required, however, and conditions in Marin County may merit some differences. For example, longer distances between destinations could make the 30-minute free period at the start of each trip too short for some users to reach key destination pairs. Extending the free ride period longer than 30 minutes could increase user confidence and convenience. The addition of an independent lock to the shared bicycle model could also increase the number of feasible destinations within a short radius of bike share stations, as users would not have to depend on finding an available docking station to leave their bicycle. Lastly, the fee structure could be modified differently for visitors and members, retaining a revenue-generating trip fee structure for visitors while increasing the availability of potential low to no cost trips for members.

**Table 15** highlights an alternative potential fee schedule that takes into account the above features for Marin County. While the base subscription remains the same, the per-trip fees are modified to provide a longer grace period for annual members and a less aggressive fee structure for both annual and casual members. Under this scenario, for example, a 120-minute ride would cost an annual member only \$3 (as opposed to \$10.50 under Alternative A), while a casual member would be charged \$6 (as opposed to \$14). For rides over 150 minutes, tiered fees increase by \$10 every half hour in order to continue discouraging long trips and recovering additional revenue when those trips do occur.

Table 15. Potential Program Fee Schedule (Modified)

	Casual Fee Structure	Member Fee Structure
<b>Base Subscription</b>	\$7/day, \$12/3-day	\$70 annual
<b>Duration</b>	<b>Per Trip Fees</b>	
0-30 mins	\$0.00	\$0.00
30-60 mins	\$1.50	\$0.00
60-90 mins	\$3.00	\$1.50
90-120 mins	\$6.00	\$3.00
120-150 mins	\$12.00	\$6.00
150-180 mins	\$24.00	\$12.00

Since the demand model expects very few annual members to trigger additional fees, the alternative fee structure with reduced annual member trip fees has very little effect on estimated revenue. Both models

project average user revenue in the range of \$600 - \$1,000 per bicycle, with the “Modified” schedule estimating slightly lower revenues. Practically speaking, it is possible that the lower pricing structure could actually incentivize trips that trigger additional fees, and thus remove any difference in revenue between the alternatives.

The Alta Bicycle Share Demand Model is not calibrated to decipher changes in demand based on slight variations in the membership or fee structure. Such analysis will have to be qualitative and based on input from stakeholders, and reviewed and approved by the system’s board and directors or similar body. It is also not clear what the practical impact might be of the modified fee structure on bike share availability, and by extension the potential need for additional up-front capital costs. If too many members are taking longer trips due to lower fees, there will be less turn over and re-use of bicycles and thus the program may have to purchase additional bicycles to limit the instances of empty docking stations. Understanding how to strike the correct balance between fees and total bicycles will require careful monitoring during the initial installation of the program.

### **Large Employer Based Revenues (Transportation Demand Management)**

Revenue projections include the assumption of additional memberships sold through a proposed **Transportation Demand Management (TDM) campaign** to raise participation in bike share and leverage bike share to replace vehicle trips. Such a program would be directed at large employers who could purchase memberships for their employees, potentially at a bulk rate. In Washington, DC, a membership discount promotion through LivingSocial was successful at signing new bike share program members. A recent Capital Bikeshare member survey found that 38% of survey respondents had used the LivingSocial coupon to purchase their membership, with participation reaching as high as 69% of members who joined through the three-month peak period of the promotion. The coupon was used more heavily by women and members under 35.

### **Sponsorships**

Based on Alta’s experience, we estimate that the user revenues alone, even with aggressive TDM and marketing, will not be sufficient to fund the program, and that approximately **\$800-1,000/bicycle/year in private sponsorships** will be needed for the program to sustain itself once the system is in place. Stations should be strategically located to help promote private sponsorship and help defray ongoing operational costs not covered by user fees. Educational, health, and science/technology institutions such as Kaiser Permanente and Dominican University are potential candidates for bike share sponsorship. For example, a sponsor could subsidize a station or advertise on the bike share system, such as on station kiosks or on the bikes themselves. A large geographic coverage area may also provide greater incentive for a title sponsor, if the system is visible throughout the county and thus the “market” for the advertising has greater reach.

Sponsorship is different from advertising in that it typically involves a long-term relationship between the sponsor and the vendor, where stickers are put on the infrastructure (bikes, stations, and/or website) with a logo and/or statement that “Company X supports Marin County Bike Share”. Sponsorship can come in a variety of forms, shown in Figure 23, including:

- Title sponsorship: where a company pays for full and exclusive sponsorship rights to the system and its components, i.e. stations, bikes, etc. Sponsor’s name is included in referring to the system, e.g., London Barclay’s Cycle Hire.
- Presenting sponsor: receives recognition in mention of the system, e.g. “Denver Bikeshare presented by Kaiser Permanente”. In most cases (e.g. Toronto, Boston, Denver), presenting sponsorship includes branding some of the stations and bikes, however presenting sponsors do not have exclusive rights to

## Marin County Bicycle Share Feasibility Study

the system and share sponsorship with other organizations. A detailed valuation of presenting sponsorship would need to be conducted and negotiated with any potential sponsor(s).

- Station and bike fleet sponsorship: general presentation of the sponsor's logo and/or a simple message, e.g., "this station is sponsored by company X" placed on the map frame, kiosk, and / or the docking points at a station or logos placed on the bicycle frames, baskets, or fenders. The value of station and bike sponsorship depends on the market and uptake is variable.
- Other: webpage, back of receipt, membership keys, helmets, mobile applications, etc.

One sponsorship scenario for Marin County is to secure a presenting sponsor (or sponsors) and several smaller station sponsors. Similar models in North American bike share systems include:

- Toronto: existing sponsors were brought along by the operator (Public Bike Share Company, who own and operate the Montreal Bixi system). This minimizes the effort of having to find new sponsors and pay marketing commission. These presenting sponsors were signed for approximately \$600,000 per year (\$800 per bike per year) and as part of the deal are provided logo placement on the map frames, bike fenders, and docking stations on 75% of the equipment (the remaining 25% is available to other sponsors although not yet sold).
- Boston: the presenting sponsor (New Balance) was signed for approximately \$600,000 for three years (\$333/bike/year) and is provided its logo on all the station map frames and bike fenders in the system but shares this space with station sponsors who pay an annual fee for logo placement on the station map frame and a certain number of bikes. At the time of system launch (July 2011), approximately 60% of station sponsorships had been sold for \$50,000 each for three years (\$16,667 per year). Advertising is also sold on one side of the map panel to supplement sponsorship revenue.
- Denver: a three-year presenting sponsorship was secured with Kaiser Permanente Colorado for \$450,000 (\$300 / bike / year). Station sponsorship is also available with sponsors paying \$30,000 for one year or \$20,000 per year for 3 years for a website listing, logo placement at a station kiosk, and logo placement on 10 bikes (current uptake uncertain).
- Minneapolis: Blue Cross Blue Shield of Minnesota contributed \$2.5 million as the presenting sponsor of Phases 1 and 2 of Nice Ride. The presenting sponsor takes all the bike advertising space as part of its contract. As a result, station sponsorship is valued somewhat lower than in Denver at \$10,000 per station per year.<sup>21</sup> Anecdotally, approximately 35% of stations were under sponsorship in July 2011.

A municipality or supporting agency such as TAM can help engage potential sponsors early in the planning process to best understand outside funding needs and program feasibility. Another approach, which is increasingly common, is to place the burden of sponsorship on the potential program operator/vendor either explicitly in a request for proposals (RFP), or through an Expression of Interest (EOI). In these cases interested vendors would essentially base their operating proposals on their own investigations or assumptions of sponsorship revenue, and have a set timeframe for executing agreements. Depending on the results of the Bay Area Bicycle Share sponsorship negotiations, there may also be an opportunity to "buy into" a sponsorship contract that has already been established for San Francisco and other participating cities.

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<sup>21</sup> It is understood that Nice Ride is considering changing their station sponsorship model to offer tiered station sponsorship pricing, valued according to the level of exposure. This is an effort to increase the uptake of sponsorship (goal of 100%) with an expectation to raise an average of approximately \$5,000 per station.

## Grants

Based on the results of the phasing scenarios described above, and the financial projections summarized in **Table 16**, the Marin County bicycle share program could require approximately \$2.35 million in grants or other one-time funding sources over five years to cover capital and launch expenses for a 300-bicycle system<sup>22</sup>. **To purchase equipment and launch a smaller initial system, required grant funding (assuming no local funding) could range from as low as \$250,000 for a 30 bicycle pilot effort to \$750,000 for a larger program (envisioned as Phase I in this report).**

### *Congestion Management and Air Quality (CMAQ)/One Bay Area Grant Programs*

The most popular source of grant funding for bicycle share systems are federal Congestion Management and Air Quality (CMAQ) grants, which in the Bay Area are generally administered by the Metropolitan Transportation Council (MTC). Either through the agency's competitive grant programs, such as the Climate Action Initiatives Program, or through discretionary local funding as part of the One Bay Area Grant Program (OBAG), CMAQ funding is one potential source for one-time revenue to fund capital investment in bicycle share.

### *Bicycle Transportation Account (BTA)*<sup>23</sup>

Caltrans' Bicycle Transportation Account (BTA) program provides cities and towns with approximately \$7 million in funding annually to improve safety and convenience for bicycle commuters, including students bicycling to school. Local agencies applying for BTA funding must first have an approved Bicycle Transportation Plan, and provide a 10% match. Although bicycle share programs are not currently listed under eligible expenses, the program's intent is to provide a flexible funding source for local bicycle improvements and may be an additional funding option to consider. More information on BTA can be found here: <http://www.dot.ca.gov/hq/LocalPrograms/bta/btawebPage.htm>

### *Healthy Communities Grants*

The Environmental Protection Agency (EPA), National Recreation and Parks Association (NRPA), and other agencies and private foundations are increasingly funding active transportation projects to combat obesity, asthma, and other environmental and public health issues. Often labeled under "Healthy Community" initiatives, these grant awards are typically lower than other capital project-focused sources, but could provide opportunities for expanded outreach and policy planning for communities of concern within Marin, including the Canal neighborhood, Marin City, and Novato.

### *Federal Transit Authority / Highway Administration*

Other grant sources that have funded multiple bike share programs are the Federal Transit Authority's (FTA) Bus Livability grant program and the FHWA's Transportation, Community, and System Preservation Program (TCSP). Depending on the outcome of the San Francisco Bay Area Pilot Bike Share Program, other regional grant sources may emerge that specifically target expansion of bicycle sharing programs.

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<sup>22</sup> Estimated grant or other one-time funding needs are based on relatively aggressive expansion of the program, and may be lower if initial phases are allowed to operate for several years at a profit.

<sup>23</sup> Caltrans has recently announced changes to the BTA program as part of a larger consolidation effort in response to the 2012 federal transportation funding bill (known as Map -21). These changes may affect funding and eligibility for the BTA program.

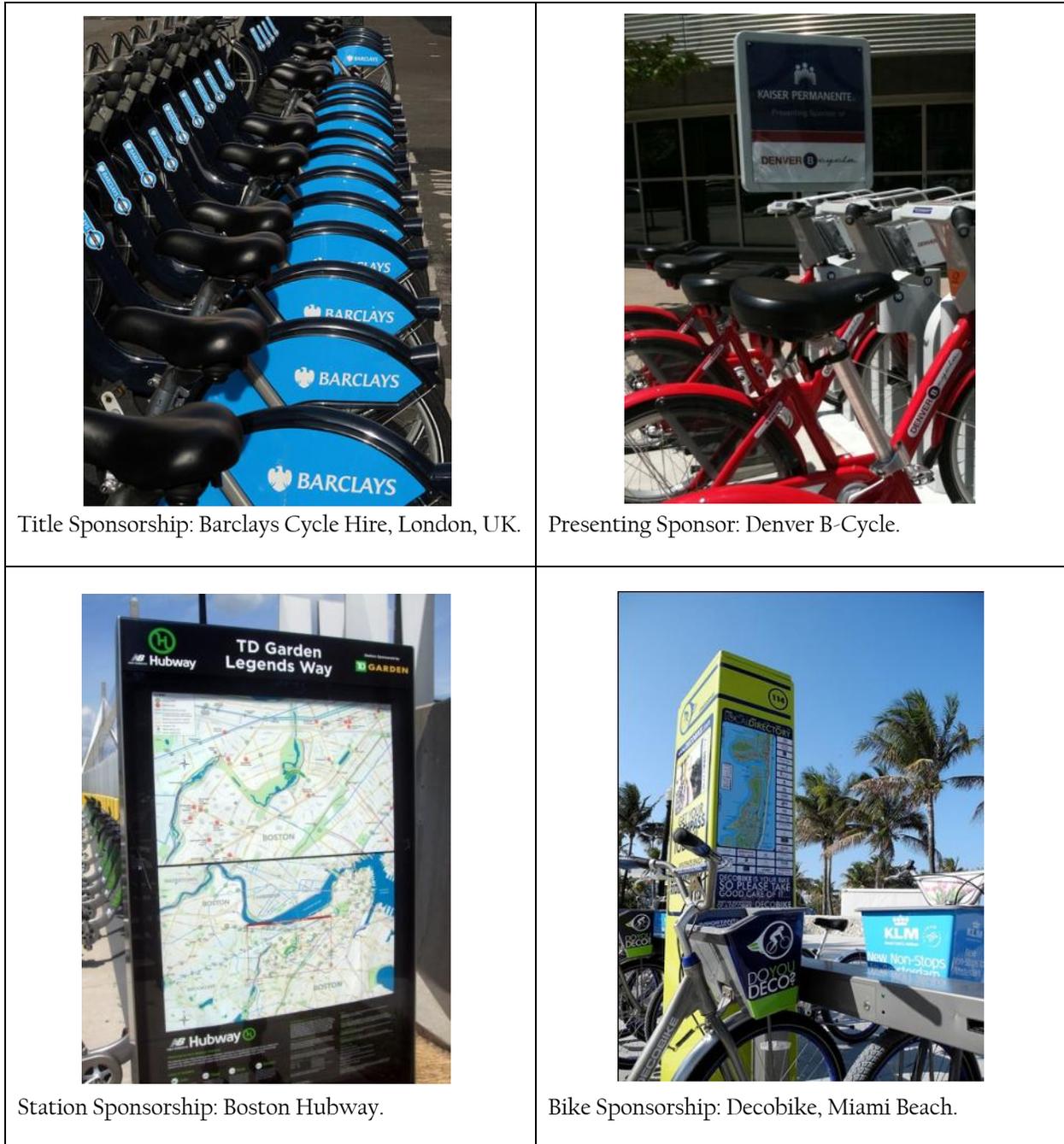


Figure 23. Bike Share Sponsorship Examples.

### Government Partnerships

Bike sharing typically requires the cooperation of public agencies and private corporations. Public agencies can play a role in funding, management, and operation. However, most systems use very little local public funds, relying more on a combination of federal and state grants, corporate sponsorship (or advertising), and user generated revenues.

Public agencies have tended to take a back seat in administering and operating bike share systems, instead contracting these services to non-profit organizations or private companies. Public agencies do, however, bring the following value and support to bike sharing:

- In-kind services such as staff time, assistance with permitting, etc.
- Right-of-way and/or property for station locations.
- Avenues and skills for pursuing grant funding.
- Potential local public funding sources.
- Outreach to potential members.
- Marketing through promotional and informational materials (such as website and bicycle maps) and market research.
- Large membership potential (as large employers).
- Creating policies that are conducive to bike sharing.

### **Other Potential Revenue Sources**

Bike share funding sources continue to evolve. Some other potential funding sources include:

- Funding the program as an extension of transit. The synergies with transit make bike sharing a logical extension of transit service. However, in practice, there are only a handful of systems globally where the transit agency actually operates the system including OV-Fiets in the Netherlands and Deutsche Bahn’s Call-A-Bike system in multiple cities in Germany. In the US, Boston and Chattanooga received FTA funding through the local transit agencies (MBTA and CARTA, respectively), but these agencies have acted as funding pass-through entities, not operating entities. Originally, Chattanooga envisioned the potential of CARTA having an operational role, however, upon a deeper understanding of the uniqueness of bike share operations, CARTA opted out of this role in favor of a contract operator. It is possible in the future that once a system is up and running, transit agencies could pick up an operational role, especially in smaller satellite systems.
- Station purchase. Large employer campuses such as Kaiser Permanente or Dominican University may purchase stations directly (that may allow them to control sponsorship content). In these cases, stations could be purchased outright and at least cover the significant capital cost per station, but should also consider some portion of operating cost if sponsorship of the station is not permitted or desired.

## **8.6 Financial Summary**

The financial projections for a Marin County bicycle share program are summarized in **Table 16**. As stated above, the costs associated with the program would almost certainly require a three-pronged approach to revenue beyond user fees:

1. Aggressive promotion of bicycle share as part of existing and future Transportation Demand Management (TDM) packages, which would raise a small amount of additional revenue while greatly increasing the projected baseline demand for trips. This is especially important for generating demand at stations identified in Phases 2 and 3.
2. Establishment of sponsorship revenue in the range of \$800-\$1,000/bicycle, procured through a variety of strategies and opportunities, to help cover ongoing operating costs
3. Grant funding or other one-time revenues to support the up-front capital purchase of the bicycles and station equipment. An initial outlay of \$250,000 may be sufficient to cover a pilot phase, and up to \$2 million (or more) may be needed for a ‘mature’ system that reaches all demand areas in Marin.

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Table 16. Estimated System Demand and Financial Performance

Operating Phase		Members <sup>1</sup>		Estimated Annual Demand (Trips) <sup>1</sup>			Costs				Revenues				Net Balance <sup>6</sup>	
	Bikes	Annual	Casual	Total	Annual Member	Casual Member	Trips/Bike/Day	Total	Capital <sup>2</sup>	Launch <sup>2</sup>	Operating <sup>3</sup>	Total	User Fees <sup>1</sup>	Sponsorships <sup>4</sup>	Grants <sup>4</sup>	
Pilot <sup>5</sup>		30														
San Rafael-Larkspur Ferry		100	1,000	8,000	6,000	2,000	1	\$265,000	\$160,000	\$60,000	\$45,000	\$290,000	\$30,000	\$10,000	<b>\$250,000</b>	\$25,000
Phase 1 - 12 Stations		100														
Year 1 (9 months)		600	2,000	34,000	30,000	4,000	1.24	\$900,000	\$540,000	\$180,000	\$180,000	\$900,000	\$70,000	\$80,000	<b>\$750,000</b>	\$0
Year 2		700	3,000	44,000	39,000	5,000	1.20	\$180,000	\$0	\$0	\$180,000	\$180,000	\$100,000	\$80,000	\$0	\$0
Phase 2 - 24 Stations		200														
Year 3		1,200	4,000	69,000	61,000	8,000	0.95	\$1,080,000	\$540,000	\$180,000	\$360,000	\$1,105,000	\$145,000	\$160,000	<b>\$800,000</b>	\$25,000
Year 4		1,300	5,000	82,000	72,000	10,000	1.12	\$360,000	\$0	\$0	\$360,000	\$335,000	\$175,000	\$160,000	\$0	\$0
Build Out - 37 Stations		300														
Year 5		1,800	5,000	98,000	86,500	11,500	0.89	\$1,220,000	\$540,000	\$180,000	\$500,000	\$1,230,000	\$190,000	\$240,000	<b>\$800,000</b>	\$10,000
Year 6		1,900	7,000	126,000	111,500	14,500	1.15	\$500,000	\$0	\$0	\$500,000	\$490,000	\$250,000	\$240,000	\$0	\$0

**Notes:**

- 1 Estimates generated from Alta Bicycle Share Demand Model (based on actual ridership and revenues from other U.S. systems) with assumption of increased membership and usage benefits due to recommended Transportation Demand Management (TDM) strategies.
- 2 Capital and launch costs based on experience from other systems and San Francisco pilot program estimates.
- 3 Operating costs are generally estimated at \$1,800/bicycle, but can vary significantly depending on a number of factors, including service level agreements, station rebalancing, and program scale. For full system build out, per bike operating costs have been slightly adjusted (lowered) to account for these factors.
- 4 Sponsorships and grants have not been secured and are shown for planning purposes only. Sponsorship estimate of \$800/bicycle includes reasonable potential revenue from system and station naming rights, advertising on bicycles and at stations. Grant totals reflect estimated need to cover system capital and launch for each potential phase.
- 5 Although the size and locations of a potential pilot phase have not been determined, the San Rafael-Larkspur Ferry concept is used to develop ridership and revenue estimates. Due to scale, operating cost and sponsorship revenue estimates have been adjusted.
- 6 Net totals reflect year-over-year balance except for pilot phase. Given the cost and grant/sponsorship revenue assumptions, each phase is assumed to be operating at a profit after the second year due to projected growth in membership and usage fees.

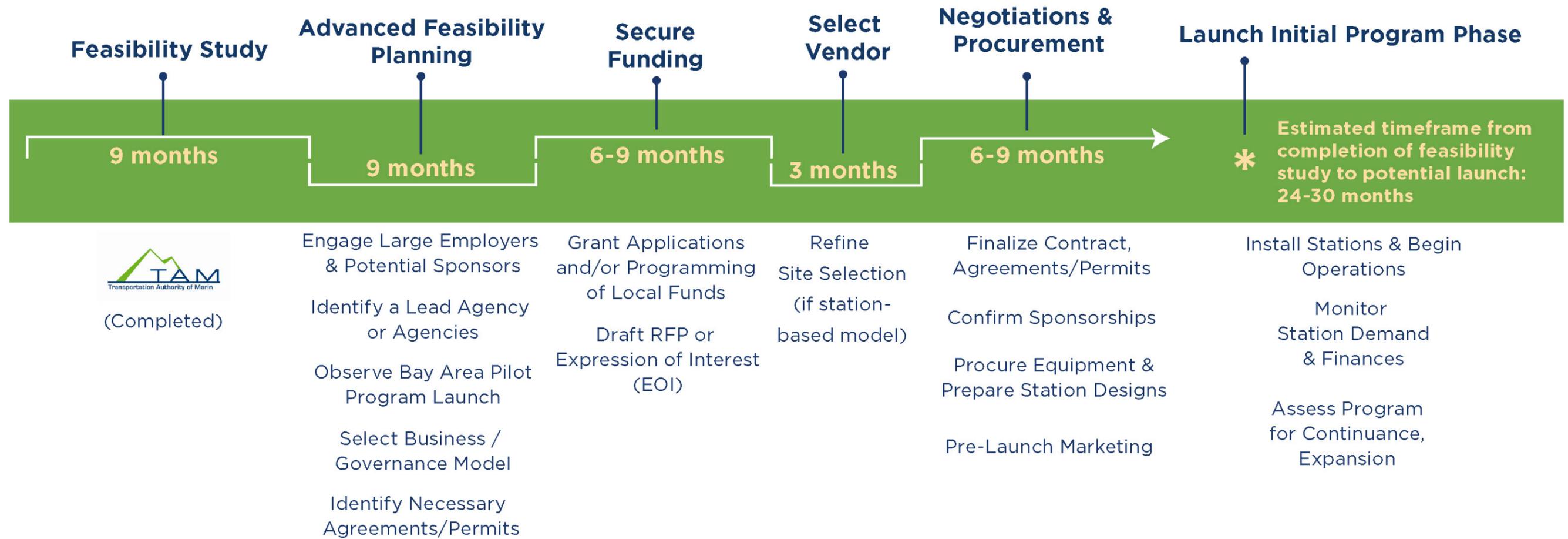


Figure 24. Potential Timeline for Planning and Implementation of Bicycle Share System.

## 8.7 Summary and Next Steps

Marin County has several of the characteristics required to make bike sharing successful, including vibrant commercial centers, relatively extensive public transit, large numbers of visitors, a supportive culture of bicycling and active living, and a policy environment that prioritizes the growth of sustainable transportation options. There are also characteristics of Marin (and its various jurisdictions) that are less conducive to bicycle sharing demand: lower densities of housing and jobs; high car ownership; hilly topography; and limited bikeway infrastructure in potential high demand areas. Impacts from other factors, such as an older demographic and proximity to an anticipated bike share program along the San Francisco peninsula area, remain unclear.

Although stopping short of identifying a preferred business model and system, analysis in this report indicates that a station-based bicycle share program in the urbanized areas of Marin County is feasible, and should be further explored. To assist planning efforts, 37 potential bike share station locations are identified, along with their projected user demand, associated revenues, and expected costs. As with many other systems, private sponsorship (title sponsorship and advertising on the stations and/or bikes) will likely be necessary to help cover the ongoing operating costs, while one-time grant sources will be necessary for up-front capital purchases and installation.

Due in part for the need of up front capital funding, and also due to the uncertainty of demand for a larger system, a phased approach to implementation is recommended. Potential phases range from a pilot effort of 30 bicycles and 4 stations to expanded systems of 100, 200, and 300 bicycles. These phases should generally target ferry terminals and transit centers, transit-dependent neighborhoods, city centers, and areas with high employment.

An estimated 24-30 months are needed to plan, fund, and implement an initial bicycle share program in Marin County. This estimate is subject to change, and assumes continued interest and engagement by key stakeholders and success at procuring grant or local funding. Highlighted below are next steps to maintaining the ‘critical path’ for this timeline and helping build overall consensus to move forward with a program.

### NEXT STEPS FOR ADVANCED FEASIBILITY PLANNING

#### Selecting a Lead Agency and Business Model

A primary question for Marin relates to coordination and ownership: who will “own” the system? This has implications on how the system is administered and operated as well as how revenues and costs are distributed. It will be important to identify which characteristics should be consistent across the region and which should be unique to each “sub-system”. For example, the technology and membership structure should be consistent throughout the County so that users can seamlessly transfer from one sub-system to another. To help define a preferred system for Marin, TAM should continue to explore potential sources of funding and work with key stakeholders who may have an interest in bike sharing. Once a governance and business model is chosen, a more detailed understanding of the necessary agreements and permits can also be identified.

### **Engaging Potential Local Sponsors and Large Employers**

As documented in this report, the feasibility of a bicycle share program is predicated on the procurement of sponsorship revenues and the support of large employers (through purchase of bulk memberships) in addition to grant funding. Reaching out to these potential stakeholders as part of an advanced feasibility planning effort should help “ground truth” the revenue estimates while helping build local momentum for the program.

### **Observing and Assessing the Bay Area Pilot Program Launch**

Within the next year, the Bay Area Bike Share Pilot Program led by BAAQMD should be launching in San Francisco and in communities along the Caltrain corridor. While the performance of the system may provide instructive feedback on potential demand elsewhere in the Bay Area, a key focus for Marin should also be to understand the potential implications of the governance structure and the contractual details of the sponsorship revenue that will be generated. These factors will help determine the potential benefits of emulating the Bay Area program model and/or lessons learned that can be incorporated into Marin’s efforts moving forward.

### **Station Siting**

Although not a critical task in the near term, local jurisdictions or other interested stakeholders could help sustain momentum for a program by conducting independent assessments of the proposed bike share station locations identified in this report. Items for confirmation include potential on-street and private property configurations at preferred sites, overall visibility of stations, access to/from adjacent bikeways, remaining accessibility of sidewalks/walkways, compatibility with adjacent transit facilities and land uses, solar access (if solar-powered), levelness of proposed site, and other characteristics that may affect the ability to install or operate a station. Even if an alternative “station-less” system is ultimately chosen, many of these considerations will still be important to locate “core zones” for locating bicycle racks, wayfinding, and other features.

Final site designs typically require mutual agreement between the program sponsor, local jurisdiction (if not the sponsor), and the operator, as well as the processing and approval of local relevant permits. While higher-level questions ultimately need to be answering first, having the feasibility of station locations confirmed by local stakeholders will help speed up the implementation process once these questions are resolved.

## 9 Appendix A – Case Studies

### Boulder B-cycle

**Launch:** May 2011

**Size:** 25 stations / 200 bikes

Population: 90,000

**Funding:** Capital funding obtained through federal, state and local government grants, private funding and foundation grants (\$1.25 million – 85% grants / 15% donations). Operations funding comes from sponsorship (a number of sponsorship options are available including on the basket, badge, and station kiosk), memberships, and usage fees (\$500,000 per year (est.) – 64% sponsorship / 36% membership and usage fees).



Source: Josh Montague  
(<http://www.flickr.com/photos/jmontague>)

**Management:** Non-profit

**Cost:** \$55 annual membership, \$15 weekly, \$5 daily pass; first 60 minutes free, \$4 for each additional 30 minutes.

**Access:** casual users pay with credit card at the consol, members are provided a B-Card.

Boulder B-cycle is operated by a non-profit that was specially-formed to bring bike sharing to Boulder. The City of Boulder is represented as a liaison to the Board of Directors. The objectives of the program are to provide a green transportation option to residents and visitors, encourage more people to bicycle, and to operate a financially sustainable transportation system.

**Statistics (2011):** 1,170 annual members, 6,000 24-hour passes sold, 18,500 trips (48% by annual members). Three-quarters of annual members were part of a corporate membership program; 83% of trips less than 60 minutes (the free-ride period); 76% of users have a transit pass and 20% of these say they connect to public transit.

### Boston Hubway

**Launch:** July 2011

**Size:** 61 stations / 610 bikes (currently under expansion to 110 stations and 1,000 bikes in the cities of Boston, Cambridge, Brookline, and Somerville)

**Population:** 650,000 (Boston)

**Funding:** Capital funding obtained through federal (CMAQ, FTA) and local (Boston Public Health Commission) grants (\$4.5 million – 75% grants / 25% sponsorships).

Operation funding comes from naming sponsorship (New Balance) and station sponsorship (a number of sponsorship options are available including on the basket, badge, and station kiosk), memberships, and usage fees (\$0.7 – 0.8 million per year - sponsorship).

**Management:** Public – private partnership. Each City contracts directly with a City staff director that works with the private operator who is responsible for management, operations, and maintenance.

**Cost:** \$85 annual membership, \$12 three-day, \$5 daily pass; first 30 minutes free, graduated pricing structure for additional 30 minute periods (varies for members and casual users).

**Access:** casual users pay with credit card at the kiosk, members are provided a membership key to unlock bikes without using the kiosk.

The initial RFP was issued by the regional planning commission (MAPC) with the intent of each city contracting directly with the operator. The region secured federal funding from the FTA, which is managed by the MAPC. Boston was the first city in the region to launch with a combination of federal and local grants, and private sector sponsorship. Subsequent cities including Cambridge, Brookline, and Somerville are using the federal grant money and limited private sponsorship to launch. The program is operated by a private operator (Alta Bicycle Share) under direct contract with each of the cities.

**Statistics (2011):** over 3,700 annual members and over 30,000 casual memberships sold, over 142,000 trips. A survey of Hubway members concluded that the number one reason for usage is that it's the fastest way to get around town. Boston Bikes has a partnership with the Boston Public Health Commission to provide subsidized helmets (\$7.99) available at convenience stores across the city. There were +2,600 distributed last year (sold and given for free). Boston also offers an affordable membership to qualified individual, which offers a \$5 membership, free helmet and 60 min of free riding time per trip. The system relaunched in April 2012, and annual members have already climbed to 4,900. Hubway reached 100,000 rides for the 2012 season in fewer than two months, and surpassed 250,000 total rides in May 2012.



Source: [thehubway.com](http://thehubway.com)

### San Francisco / Caltrain Corridor

**Launch (Projected):** October 2012, truncated pilot phase (SF only); roll out of the full five-city pilot program is to-be-determined based on timing/success of private sponsorship

**Size:** 50 stations / 500 bikes (San Francisco only); 100 stations / 1,000 bicycles (Five-city pilot program)

**Population:** 805,000 (San Francisco); 77,000 (Redwood City), 64,000 (Palo Alto), 74,000 (Mountain View), 945,000 (San Jose)

**Funding:** \$5.9 million in capital funding obtained through a grant from the Bay Area Air Quality Management District (Air District) in partnership with MTC and their Climate Initiatives Program. Additional funding for the launch and operations of the full pilot system is anticipated to come from corporate sponsorship (a number of options are available including title sponsor naming rights, individual station sponsorships, and bicycle basket/badge and station kiosk advertising), memberships, and usage fees.

Based on other cities, operating costs could be expected to cost in the order of \$2,200 / bike / year and user-revenues generating in the order of \$1,800 / bike / year – although actual revenues and operating costs may vary as much as 30-50% depending on demand / local conditions, station locations, and the operating service levels.

**Management:** Public - Private partnership. The Air District is currently serving as the program administrator, with Alta Bicycle Share as the private operator of the system. The continuance of and long-term management plan for a Bay Area program are still to be determined, based on the results of the pilot study.

**Cost:** TBD

**Access:** casual users pay with credit card at the kiosk, members are provided a membership key to unlock bikes without using the kiosk.

The prospect of a successful San Francisco Bay Area-based bike share program may provide an intriguing option for Marin County, both in terms of a streamlined “plug and play” operations model and in attracting membership demand through regional compatibility. Although most program specifics are not yet determined, there is the potential for an “umbrella” system, similar to Boston, under which individual municipalities (or regional entities) could contract directly with the private operator.

Statistics: N/A

## Chattanooga Bicycle Transit System

Launch: 2012

**Size:** 30 stations / 300 bikes

Population: 170,000

**Funding:** Capital funding obtained through federal grant (\$2 million CMAQ) and private foundation support (\$0.2 million). Operations funding comes from sponsorship (a number of sponsorship options are available including on the basket, badge, and station kiosk), memberships, and usage fees.

**Management:** Public - private partnership. A private operator (Alta Bicycle Share) will operate the system in return for a share of the revenues.



**Cost:** \$75 annual membership, \$6 daily pass; first 60 minutes free, \$5 for each additional 30 minutes.

**Access:** casual users pay with credit card at the kiosk, members are provided a membership key.

Chattanooga Bicycle Transit System is a public / private partnership model whereby the City and the operator (Alta Bicycle Share) will share in revenues from the system. The objectives of the program are to provide an additional mobility option that provides an extension of the existing CARTA transit service.

## 10 Appendix B: Bicycle Helmet Use

### Bicycle Helmet Use Law

California state law has required the use of bicycle helmets for riders under age 18 since 1994. California Vehicle Code Section 21212 reads:

*21212. (a) A person under 18 years of age shall not operate a bicycle, a nonmotorized scooter, or a skateboard, nor shall they wear in-line or roller skates, nor ride upon a bicycle, a nonmotorized scooter, or a skateboard as a passenger, upon a street, bikeway, as defined in Section 890.4 of the Streets and Highways Code, or any other public bicycle path or trail unless that person is wearing a properly fitted and fastened bicycle helmet that meets the standards of either the American Society for Testing and Materials (ASTM) or the United States Consumer Product Safety Commission (CPSC), or standards subsequently established by those entities. This requirement also applies to a person who rides upon a bicycle while in a restraining seat that is attached to the bicycle or in a trailer towed by the bicycle.<sup>25</sup>*

However, this law will have limited impact on potential bicycle share use in Marin County, because customers must be 18 or older to become a bike share member and rent a bike. In other areas, child bicycle helmet laws allow minors of a certain age to ride a bicycle without a helmet; 16 years is a common age for this exemption.

If Marin County or the State of California were to adopt a mandatory helmet law for adult bicyclists, demand for bike share could be severely impacted. Currently there are only two systems in the world operating with a helmet requirement in place – Melbourne Bike Share and Brisbane’s CityCycle, both in Australia. A 2010 survey in Melbourne reported that approximately 25% of respondents identified having to wear a helmet as a barrier to using the system. The same survey found 36% of respondents would have used bike share more often if seamless access to a helmet was provided. Mexico City and Tel Aviv previously had mandatory bicycle helmet laws, but repealed them prior to the implementing bike sharing systems. Seattle and Vancouver, British Columbia have adult helmet requirements and are investigating the feasibility of providing helmets as part of a future bike sharing program.

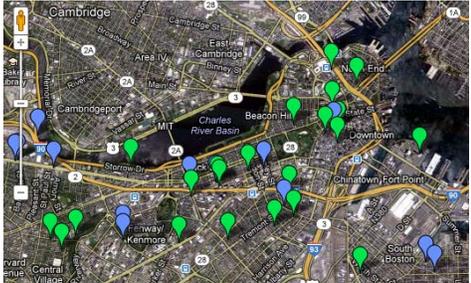
### Bicycle Helmet Use Encouragement Strategies

In addition to general bicycle safety information, many existing bicycle share systems promote helmet use among members through outreach materials, discount offers, retail partnerships, and other methods.

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<sup>25</sup> <http://www.dmv.ca.gov/pubs/vctop/d11/vc21212.htm>

Table 10-1. Bicycle Helmet Encouragement Strategies

System Name and City	Bicycle Helmet Encouragement Strategy						
<p>Capital Bikeshare, Washington DC</p>	<div style="border: 2px solid red; border-radius: 15px; padding: 10px;"> <p style="color: orange; font-weight: bold; margin: 0;">Helmet Option</p> <p><input type="checkbox"/> Check this box if you would like to purchase a Helmet for an additional cost of \$16.00.</p> <div style="display: flex; align-items: center; margin: 10px 0;">  <table border="1" style="border-collapse: collapse; text-align: left;"> <tr> <td style="padding: 5px;">Model</td> <td style="padding: 5px;">Top Gear Model 9</td> </tr> <tr> <td style="padding: 5px;">Sizing</td> <td style="padding: 5px;">Helmet fits 22.83 to 24.4 inches through instant fitting dial turn retention system, includes snap-on visor, a quick release Nexus buckle, and meets the CPSC standards.</td> </tr> <tr> <td style="padding: 5px;">Total Price</td> <td style="padding: 5px;"><b>\$16.00</b></td> </tr> </table> </div> <p style="font-size: small; margin-top: 10px;"><b>NOTE:</b> Helmets are shipped to the personal address of your Capital Bikeshare membership account within 5-7 business days. Helmet sales are final. Inquiries regarding helmet shipments may be made to <a href="mailto:helmets@capitalbikeshare.com">helmets@capitalbikeshare.com</a>.</p> </div> <p>Capital Bikeshare offers inexpensive, branded helmets to new members during online sign up.<sup>26</sup></p>	Model	Top Gear Model 9	Sizing	Helmet fits 22.83 to 24.4 inches through instant fitting dial turn retention system, includes snap-on visor, a quick release Nexus buckle, and meets the CPSC standards.	Total Price	<b>\$16.00</b>
Model	Top Gear Model 9						
Sizing	Helmet fits 22.83 to 24.4 inches through instant fitting dial turn retention system, includes snap-on visor, a quick release Nexus buckle, and meets the CPSC standards.						
Total Price	<b>\$16.00</b>						
<p>Hubway, Boston</p>	<div style="display: flex;"> <div style="flex: 1;"> <p><b>Hubway helmet retail locations</b></p> <p>Green markers indicate helmet retailer Blue markers indicate full-service bike shop</p> <p>Unlisted - Open Collaboration - 24,481 views Created on Jun 24, 2011 - By <a href="#">scushman</a> - Updated Sep 11 <a href="#">Rate this map</a> - <a href="#">Write a comment</a> - <a href="#">KML</a></p> <ul style="list-style-type: none"> <li><span style="color: green;">●</span> <b>Beth Israel Hospital Gift Shop</b> FriendShop - East Campus Beth Israel Deaconess Medical Center Feldberg Building, 2nd Floor 330 Brookline Ave Boston, MA 02215</li> <li><span style="color: green;">●</span> <b>Beth Israel Hospital Gift Shop</b> FriendShop - West Campus Beth Israel Deaconess Medical Center Farr Building, Lobby 1 Deaconess Road Boston, MA 02215</li> <li><span style="color: green;">●</span> <b>Boston Medical Center Gift Shop in the Menino Lobby</b> One Boston Medical Center Place Boston, MA 02118</li> </ul> </div> <div style="flex: 1;">  </div> </div> <p>In Boston, Hubway has partnered with several dozen retailers, including CVS and Walgreens pharmacy chains, to provide low cost, \$7.99 helmets available for sale.<sup>27</sup> An online map helps direct users to nearby locations to purchase a helmet.</p>						
<p>Montreal BIXI</p>	<p>Montreal BIXI members receive a 10% discount on helmet purchases at Ça Roule Montréal, a local bicycle repair and rental shop.<sup>28</sup></p>						

<sup>26</sup> <https://www.capitalbikeshare.com/signup>

<sup>27</sup> <http://www.thehubway.com/bike-rental-and-helmet-shops>

<sup>28</sup> <https://montreal.bixi.com/offres-speciales/promotions/avantages-aux-membres-en>

System Name and City	Bicycle Helmet Encouragement Strategy
<p>Melbourne Bike Share</p>	 <p><b>Helmets</b></p> <p>Helmets are available for just \$5 at many retail outlets or vending machines at Southern Cross Station and Melbourne University.</p> <p>Bicycle helmet use is mandatory in Melbourne. In addition to retail locations, Melbourne bicycle share users can purchase helmets for \$5 at vending machines located near high-use bicycle share stations. Helmets may then be returned for a partial refund of \$3.</p>
<p>Nice Ride, Minneapolis</p>	 <p>In Minneapolis, Nice Ride partners with local bicycle rental shops to provide discounted helmets to bicycle share customers.</p>