Attachment B

Regional Bike Share Implementation Plan FOR LOS ANGELES COUNTY

PREPARED BY

FEHR PEERS
600 Wilshire Boulevard, Suite 1050
Los Angeles, CA 90017
213.261.3050

PREPARED FOR

Metro

April 22, 2015

[This page intentionally blank]

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Appendix A: Phase 1 Pilot Stations – Downtown Los Angeles

Appendix B: Phase 2 Pilot Stations – Pasadena

Appendix C: Financial Estimates

Appendix D: Potential Bikeshare Expansion Communities

Appendix E: Regional Bikeshare Suitability by City

Appendix F: Variables Considered in Bikeshare Ridership Forecasting Model

EXECUTIVE SUMMARY

This Regional Bikeshare Implementation Plan envisions a bikeshare system that is accessible to Los Angeles County residents, students, workers and visitors, and that integrates with existing Metro services to provide a seamless passenger experience and improve the reliability, efficiency and usefulness of Metro's transportation system. The envisioned system begins with 99 stations and 1,580 bikes in the Phases 1 and 2 pilot areas of Downtown Los Angeles and Pasadena, eventually growing to a total of 254 stations and 3,800 bikes in multiple communities around Los Angeles County, with future expansions to bikeshare-ready communities to be identified thereafter.

The Plan includes business plan recommendations for operating a regional bikeshare system in Los Angeles County (Chapter 3), a bikeshare readiness analysis (Chapter 4), and a station siting analysis (Chapter 5).

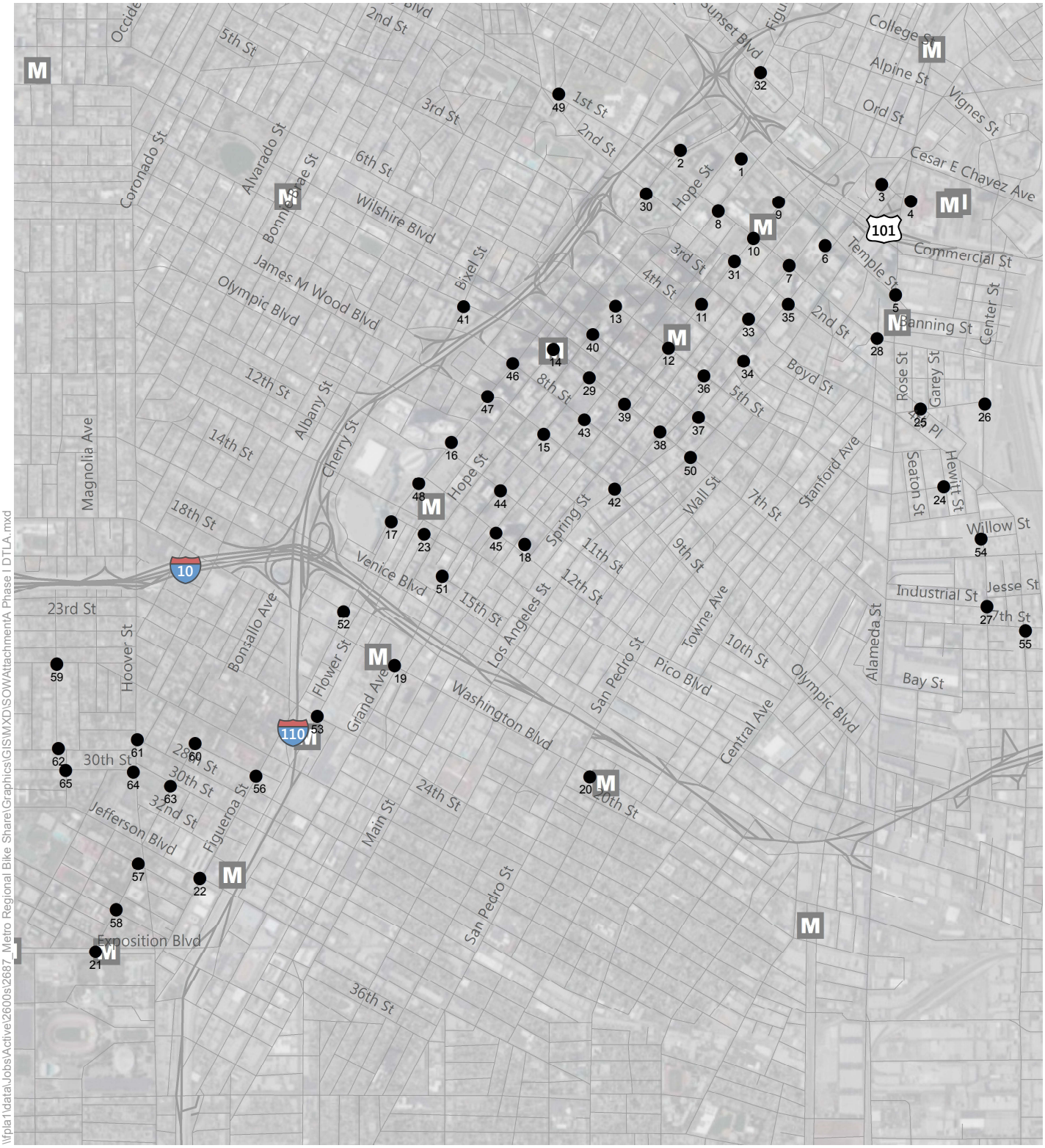
Metro will own and manage the system's equipment and will contribute up to 50 percent of the capital costs. Metro will also manage a master operations contract to provide operations and maintenance for the entire regional system and provide up to 35 percent of the net operating cost of each city's network of stations.

This study explored two options for fare structures: conventional and integrated. If TAP card integration is feasible in the pilot or future phases, an integrated fare structure, consistent with Metro bus and rail fares, along with payment media integrated through Metro's TAP card will provide a seamless passenger experience, encouraging use by existing Metro passengers and promoting use of Metro bus and rail services by new bikeshare customers. System branding, still under development by Metro Creative Services, will further integrate the system with the Metro brand while providing opportunities for sponsorship and recognition of participating jurisdictions.

Potential revenue from sponsorship, which may exceed $10 million[1] over nine years, will be used to offset program operation and maintenance costs.

Key decisions, to be made by Metro in collaboration with a selected bikeshare vendor, are still in progress on the approach to fare structures and TAP integration.

[1] Based on average from D.C., Denver, and New York City sponsorship revenues.

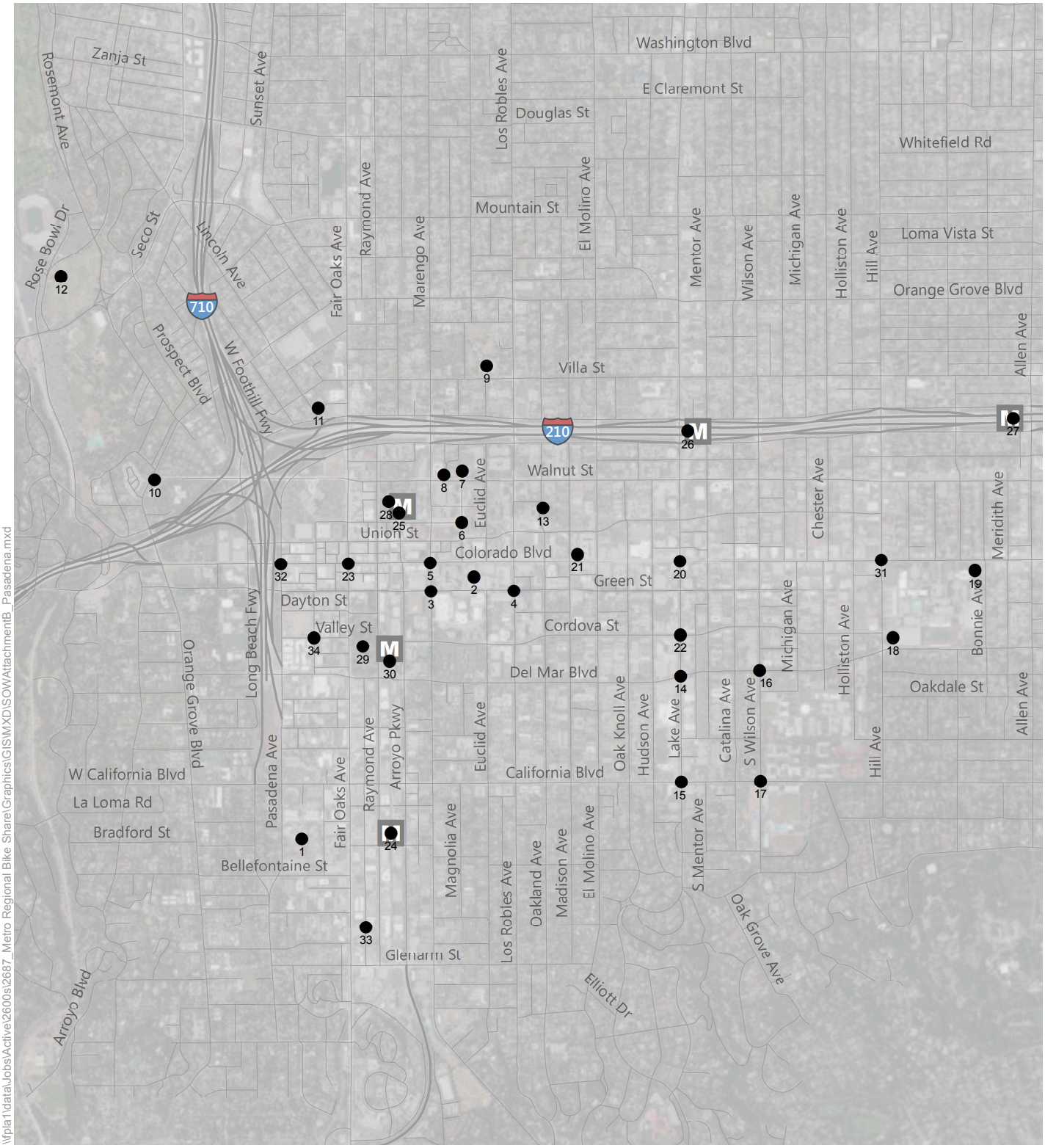


Phase I Stations in Downtown Los Angeles

- Phase I - 65 Stations

Phase I Stations
Downtown Los Angeles, CA

\\fpla1\data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\SOWAttachmentA Phase I DTLA.mxd



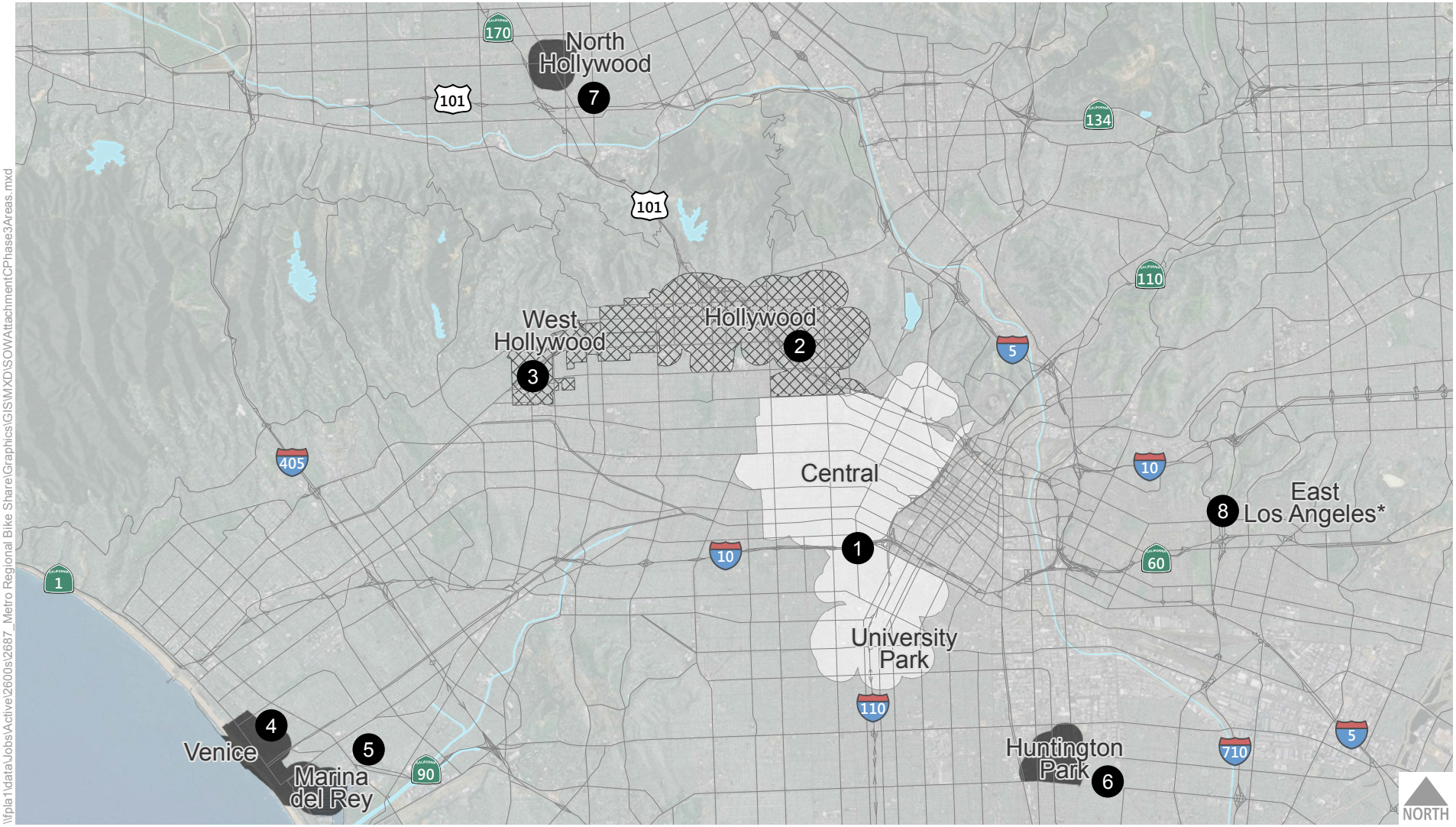
\\fpla1\data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\SOWAttachmentB_Pasadena.mxd

Metro Rail Station

Phase II Stations in Pasadena

- Phase II - 34 Stations

Phase II Stations
Pasadena, CA



\\fpla1\data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\SOW\AttachmentCPhase3Areas.mxd

* A specific boundary for the East Los Angeles Expansion Area has not yet been identified.

Potential Bikeshare Expansion Communities

- Phase III - 65 Stations
- Phase IV - 53 Stations
- Phase V - 37 Stations

1 Expansion Area

INTRODUCTION

In January 2014, The Metro Board of Directors approved the Chief Executive Officer to undertake a study of how a Metro-led bikeshare program could be implemented throughout Los Angeles County, to implement the program in a phased approach, coordinating with local cities, and to provide up to 50 percent of total capital costs and up to 35 percent of ongoing operations and maintenance costs for each participating city. The board also authorized the CEO to procure, contract, and administer the bicycle share program.

Metro staff coordinated the formation of a Bikeshare Working Group to guide the preparation of this Regional Bikeshare Implementation Plan. Group members included **Metro** staff, including TAP, OMB, and Creative Services, as well as representatives from the pilot cities of **Los Angeles** and **Pasadena**, and members of the consulting team; representatives from the cities of **Santa Monica** and **Long Beach** also participated to coordinate their efforts and update the Group on their progress.

The consulting team consisted of:

- **Fehr & Peers** – led the consultant team and planning efforts, including the bikeshare readiness analysis, ridership forecasting, station scaling recommendations, planning-level future phase community and station selection, business plan development, and data, technology, and TAP integration recommendations.
- **Sam Schwartz Engineering** – led the field-level station siting effort.
- **Parry Burnap** – provided the bikeshare operator's perspective and experience, informing all aspects of the study.
- **Economic & Planning Systems** – provided capital and operating cost and revenue estimates, potential funding sources, and sponsorship best practices.
- **MIG** – developed branding criteria for the bikeshare system.

Chapter 3 of this Regional Bikeshare Implementation Plan presents the Business Plan recommendations for operating a regional bikeshare system in Los Angeles County.

Chapter 4 describes the process and results of the bikeshare readiness analysis, including a Bikeshare Suitability Index, comparisons of Los Angeles to other bikeshare communities, the identification of expansion communities, ridership forecasting, and station size and bike quantity analysis.

Chapter 5 describes key differences in bikeshare hardware and technology, presents siting considerations and provides an example of the siting materials prepared for the first 99 stations in the Phases 1 and 2 pilot areas.

BUSINESS PLAN

This chapter provides information on the vision for the regional bikeshare system and an overview of the pilot system and future expansion phases, followed by additional details on:

- **Capital Ownership**
- **Operations Model**
- **Fare Structure**
- **TAP Integration**
- **Mobility Hub Coordination**
- **Equity**
- **Operations Funding**
- **Revenue Allocation**
- **Sponsorship**
- **Financial Estimates**

Key decisions, to be made by Metro in collaboration with a selected bikeshare vendor, are still needed on the approach to fare structures and TAP integration:

Fare Structure

- **Integrated as Metro Service** – bikeshare fares integrate seamlessly with Metro bus and rail fares.
- **Integrated as Muni –** bikeshare fares mimic the relationship between municipal transit operators and Metro, requiring a transfer fee.
- **Conventional** – bikeshare fares are unrelated to bus and rail transit fares; users pay a daily, weekly, or monthly membership fee and additional usage fees for longer-duration trips.

TAP Integration

- **Real Time Integration** – Full TAP integration allows real-time communication between the bikeshare back end system and TAP data.
- **Delayed Reconciliation –** TAP data are shared with the bikeshare vendor and reconciled with bikeshare usage data on a regular (e.g., daily) basis.
- **Minimal Integration** – TAP card is used as a unique identifier only.

Each of these approaches is described in more detail below.

VISION

This Bikeshare Implementation Plan draws its vision from Metro's Vision and Mission, as described below.

Metro Vision

> *Safe, clean, reliable, on-time, courteous service dedicated to providing Los Angeles County with a* ***world class transportation system***

Metro Mission

> *Metro is responsible for the* ***continuous improvement*** *of an* ***efficient*** *and* ***effective*** *transportation system for Los Angeles County*

The Plan's vision is also inspired by a recent Metro fare policy change that integrates fares for bus and rail passengers and includes for the first time a two-hour period of free transfers on Metro's bus and rail system when using a stored value TAP (Transit Access Pass) card to pay for the base fare.

Regional Bikeshare Vision:

Provide new and existing transit users with an ***accessible, reliable,*** *and* ***efficient*** *mobility option as an* ***integrated*** *part of Los Angeles County's world class transportation system.*

Accessible means that the system is available and easy to use for anyone who wants to bike. Barriers to join the system are minimized and the process of checking out and returning bikes is as simple as possible. The system also promotes equity with an affordable fare structure or fare assistance program and by making stations available in a variety of neighborhoods.

Reliable means that users can easily locate, check out, and return bikes when and where they need to. The bikes and stations are maintained in good working condition and the software and data connectivity are reliable to minimize outages.

Efficient means that the system is cost-competitive with other travel modes, both for passengers and for Metro as an organization. Bikeshare is a cost-effective means of providing a world class transportation system: fare recovery ratios, the amount of the cost of serving each trip that is covered by user fees, are higher for bikeshare than all but the best-performing rail and bus systems (see **Figure 1**). The system will pursue a variety of funding options to ensure that it is financially sustainable. Finally, bikeshare leverages existing transit resources to better serve existing bus and rail passengers and attract new bikeshare users to Metro's bus and rail services.

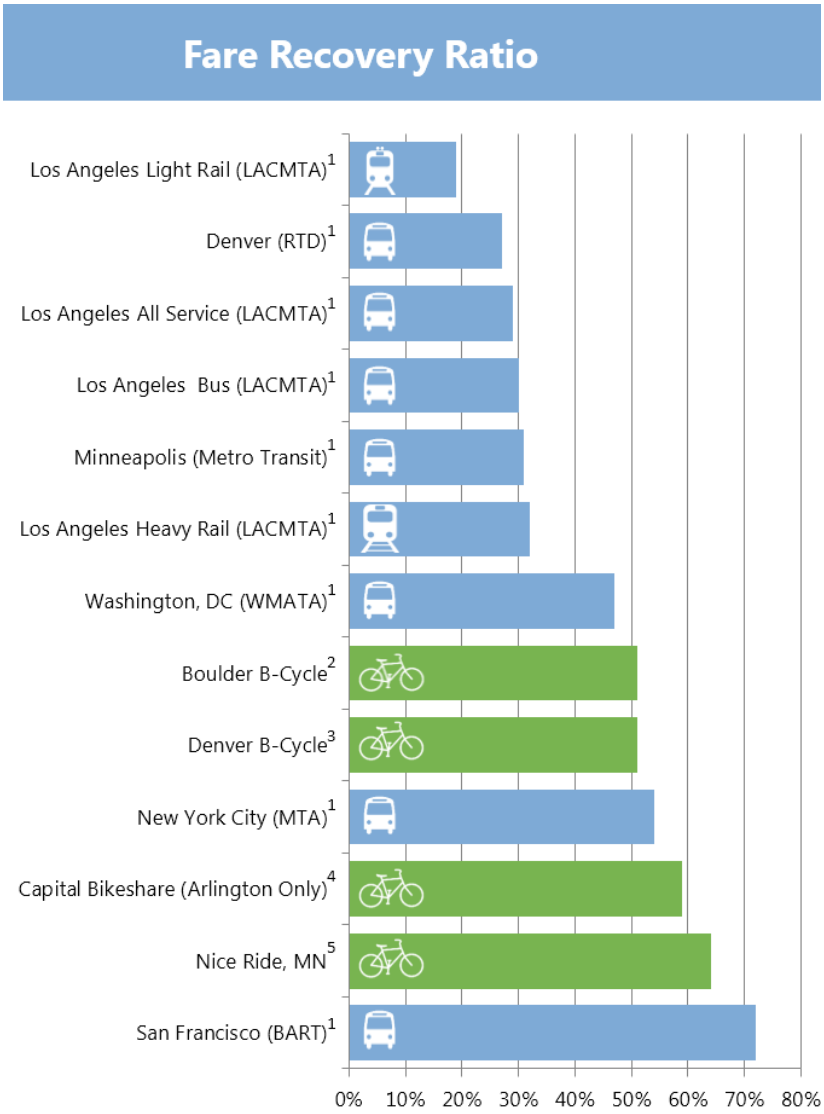


Figure 1 – Fare Recovery Ratios of Major Transit Systems

Integrated means that bikeshare is an integrated part of the public transportation system, alongside bus and rail. An integrated bikeshare system makes Metro's bus and rail services more cost competitive by efficiently serving first- and last-mile connections, thereby reducing the time costs to passengers of transfers and long walks. Bikeshare increases capacity on trains by providing an alternative to passengers bringing their bikes on board. Bikeshare can also replace short-distance bus or rail trips, freeing seats and reducing dwell times in dense and congested areas.

Integration is also accomplished by shared branding, service area, fare media, and integrated and consistent fare structure that provide a seamless passenger experience and reinforce the multimodal connections among all of Metro's services.

Metro's *First-Last Mile Strategic Plan* seeks to "expand the reach of transit through infrastructure improvements." The document conceives of a "trip" as containing three segments: a First Mile, a Metro-provided portion, and a Last Mile (see **Figure 2**). The integration of bikeshare as a first- and last-mile solution would expand Metro's role in the trip and reduce the First Mile and Last Mile portions, likely to a distance of much less than a mile. In the lower panel of **Figure 3** a Trip could consist of a shorter First Mile walk, a Metro-provided bikeshare segment, a Metro-provided rail segment, a second Metro-provided bikeshare segment, and a shorter Last Mile walk.

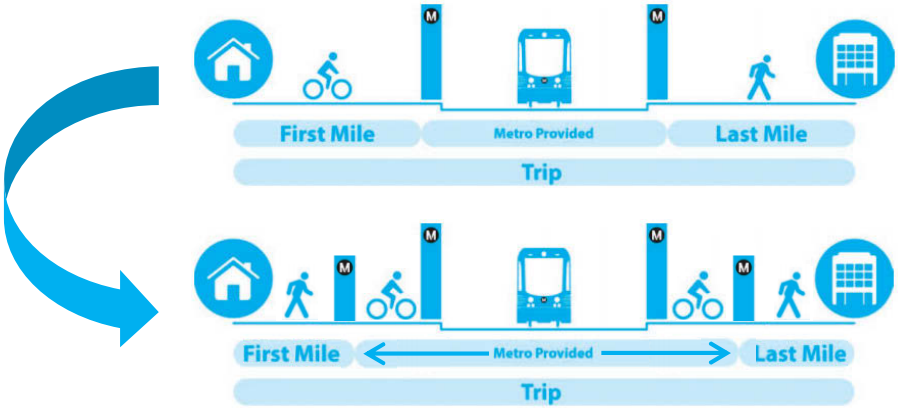


Figure 2 – Bikeshare Serving the First and Last Mile

(Image source: Metro First-Last Mile Strategic Plan)

Bikeshare can also serve as Metro's entire role in the Trip:

Figure 3 – Bikeshare Serving as the Entire Metro Trip

(Image source: Metro First-Last Mile Strategic Plan)

By integrating with bus and rail transit, bikeshare can expand Metro's customer base, growing the access sheds around rail stations and bus stops (see **Figure 4**).

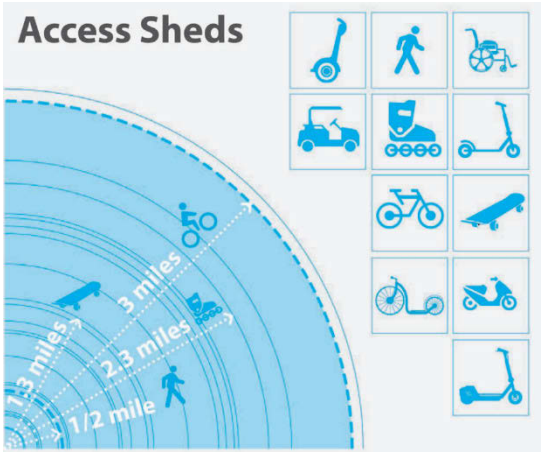


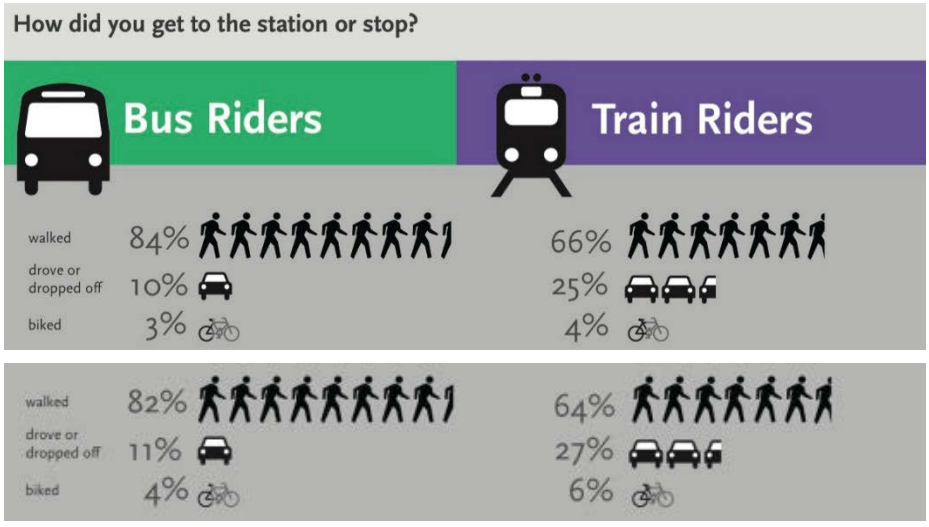
Figure 4 – Access Sheds
(Image source: Metro First-Last Mile Strategic Plan)

Bus and rail integration with bikeshare also helps Metro improve the existing passenger experience. According to Metro customer surveys conducted in 2012 and 2013, over 80 percent of bus riders and approximately two thirds of train riders arrive at their Metro station or stop by walking (see **Figure 5**); these passengers spend an average of 11 minutes walking to their station or stop. With access to bikeshare, this walk could be reduced to 5 minutes, reducing passengers' time costs and making transit more competitive with driving.[2]

For those passengers already biking to Metro's bus and rail services, bikeshare provides an option for access to a bicycle on both ends of their trip without the need to worry about locking their personal bicycles at a station or on the street and without the need for a bike to occupy extra space on transit vehicles.

Finally, some passengers currently traveling by car to begin their bus or rail trip could instead take bikeshare, reducing passenger costs for automobile operation and maintenance, reducing the burden on parents, partners, or friends who are dropping passengers off at stations, and reducing the need to allocate valuable land at Metro stations for parking.

Figure 5 – Metro Customer Survey Results



[2] http://thesource.metro.net/2012/09/19/metro-rider-survey-infographic/; http://thesource.metro.net/2013/10/30/customer-survey-results-for-2013/.

SYSTEM OVERVIEW

The Plan envisions a pilot bikeshare system of 99 stations, implemented in two phases:

- **Phase 1 (Pilot)** – 65 stations and 1,090 bikes in Downtown Los Angeles and surrounding areas, implemented in FY 15/16 and FY 16/17 (see **Figure 6**)
- **Phase 2 (Pilot)** – 34 stations and 490 bikes in Old Town Pasadena and surrounding areas, implemented in FY 17/18 (see **Figure 7**)

In addition, the Plan envisions three future expansion phases (see "Expansion Communities," below), comprising 155 stations in eight communities:

- **Phase 3** – 65 stations and 936 bikes in Westlake, Koreatown, University Park, and surrounding areas, implemented in FY 18/19
- **Phase 4** – 53 stations and 763 bikes in Hollywood, West Hollywood, and surrounding areas, implemented in FY 19/20
- **Phase 5** – 37 stations and 533 bikes in Venice, Marina del Rey, Huntington Park, North Hollywood, and East Los Angeles, implemented in FY 20/21

Appendices A and B provide maps and additional detail on the locations and quantities of stations.

The system will be led by Metro in close coordination with participating local jurisdictions and agencies ("participating jurisdiction"), each with different responsibilities as described below.

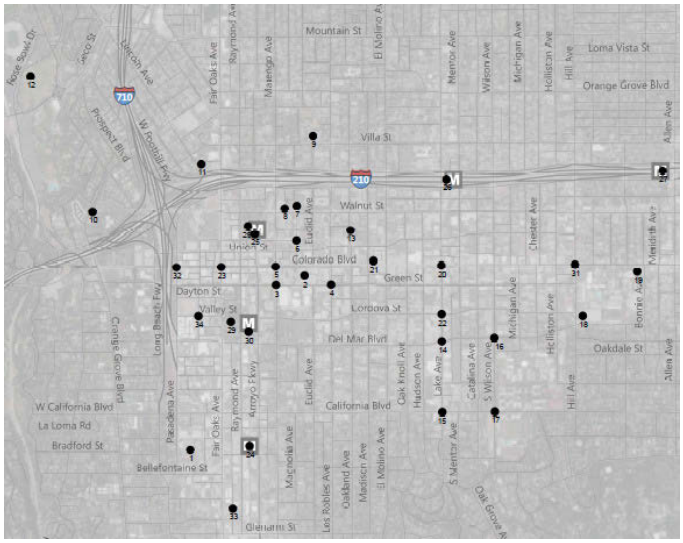


Figure 6 – Phase 1 Pilot Stations
Figure 7 – Phase 2 Pilot Stations
(not to scale)

CAPITAL OWNERSHIP

As described in Staff's January 14, 2015 report to Metro's Planning and Programming Committee, Metro will own and manage the system's equipment, including but not limited to bikes, stations, and kiosk terminals. Metro will contribute up to 50 percent of the capital cost of equipment, while participating jurisdictions will contribute the remaining share of capital costs.

OPERATIONS MODEL

Metro will manage a master operations contract with a single vendor to provide operations and maintenance for the entire regional system. As the manager of operations and maintenance, Metro may later elect to conduct a subset of operations and maintenance activities using Metro staff or other contractors to take advantage of economies of scale.

The goal is to have all parts of the regional system participate in the operation of a single system. However, Santa Monica and Long Beach already have vendors under contract, which might not align with the vendor selected for the Metro system. Metro will continue to coordinate with both jurisdictions and leave open the possibility that they will be integrated into the Regional program in the future.

FARE STRUCTURE

The Bikeshare Working Group explored several fare structures, focusing on three. The first two, called "Integrated as Metro Service" and "Integrated as Muni," attempt to integrate the bikeshare fare structure with Metro's existing fares for bus and rail transit. A third fare structure, called "Conventional," follows the format used in established bikeshare systems across the United States. The current recommendation is to pursue one of the integrated fare structures, depending on the technical capabilities of the vendor and Metro's TAP department.

There is flexibility to transition from one fare structure to another as technology allows and organizational barriers are overcome. Even if a fare structure that is fully integrated with transit fares is achieved, a parallel, conventional fare structure option may be more suitable for some users, such as tourists or other out of town visitors who only intend to use bikeshare on a short-term basis. Discounted fare programs, promotions, and other incentives can also adjust the specific fares. For example, a conventional fare structure can still provide discounts for transit riders through approaches that are less technology-intensive than full TAP integration, such as vouchers or coupons distributed on buses or in rail stations.

Integrated as Metro Service

The Integrated as Metro Service fare structure attempts to align bikeshare fares with existing fares for Metro bus and rail service to promote bikeshare as a Metro service, to encourage existing Metro transit users to use bikeshare, and to encourage new bikeshare users to ride Metro's bus and rail services.

Metro Fares As of 9/15/14	Regular	Senior 62+/ Disabled/ Medicare	College/ Vocational	Student K-12
On TAP				
1-Way Trip Includes transfers to other Metro lines for up to two hours to complete a one-way trip. Additional charges apply to ride: • Metro Silver Line • Metro Express Buses	$1.75	75¢ Peak 35¢ Off-Peak	$1.75	$1
1-Day Pass Valid for 1 day on first tap. Expires at 3am on the following day after first use. Includes: • All Metro services	$7	$2.50	–	–

Regular one-trip fares would be set at $1.75 for 30 minutes for all TAP card holders, with an additional charge of $1.75 for each additional 30-minute period. **Figure 8** illustrates the fare structure for a single bikeshare trip lasting more than 30 minutes.

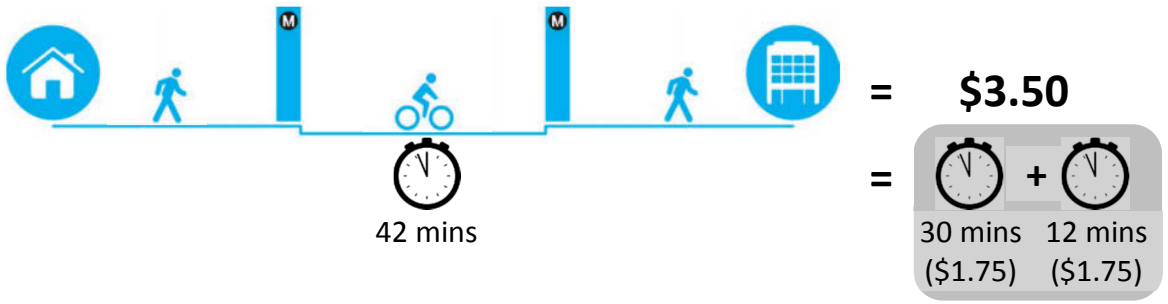


Figure 8 – Integrated Fare Structure Example

The Integrated as Metro Service fare structure takes advantage of Metro's existing infrastructure for offering reduced fares for seniors, students, and disabled passengers, helping to ensure equitable access to the bikeshare system. The fare structure also allows free transfers from a Metro bus or rail trip to bikeshare, which includes trips of up to 30 minutes each at no additional charge to complete a one-way trip within two hours. **Figure 9** illustrates an example where a passenger takes bikeshare to a rail station, disembarks at the destination end and uses bikeshare to complete the trip.

An additional charge of $1.75 for each additional 30-minute period of bikeshare use beyond the first still applies. Implementing this fare structure will require integration with the TAP card to track transit passenger transfers.

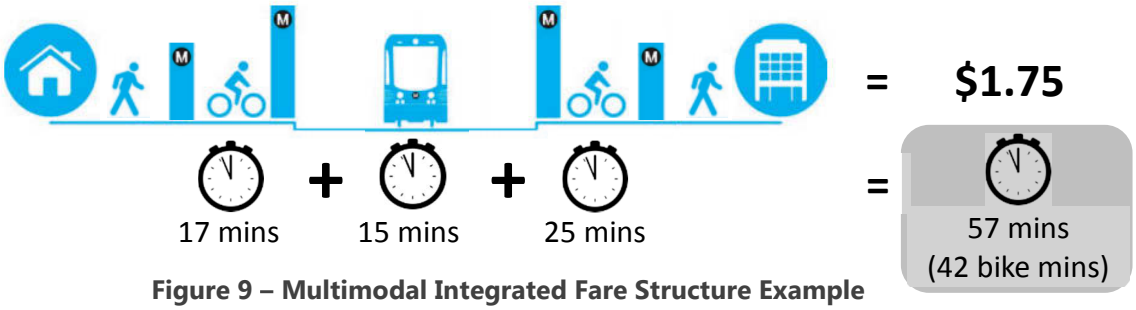


Figure 9 – Multimodal Integrated Fare Structure Example

1-Day, 7-Day, and 30-Day passes are also available through the Integrated as Metro Service fare structure using the same rates as existing passes for bus and rail, currently $7 for a 1-Day pass, $25 for a 7-Day pass, and $100 for a 30-Day pass. In addition to unlimited bus and rail trips, these passes allow an unlimited number of 30-minute bikeshare trips during the pass' active period; any bikeshare trips longer than 30 minutes will incur an additional $1.75 fee per additional 30 minutes. **Figure 10** illustrates the difference in fares with a 1-Day pass between a single bikeshare trip longer than 30 minutes and multiple trips each less than 30 minutes.

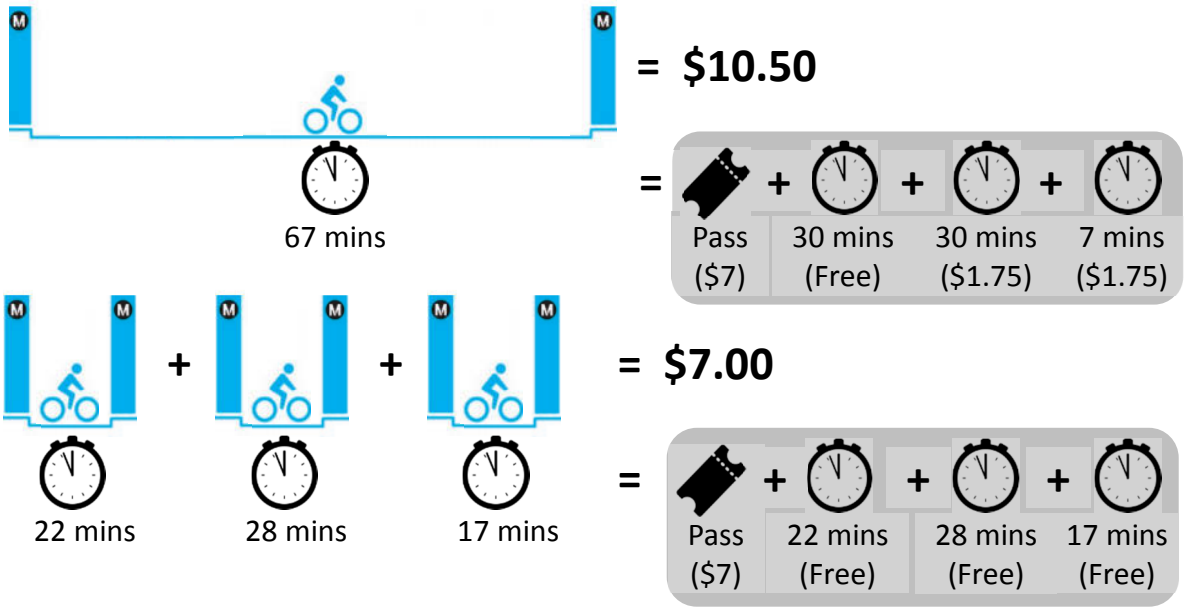
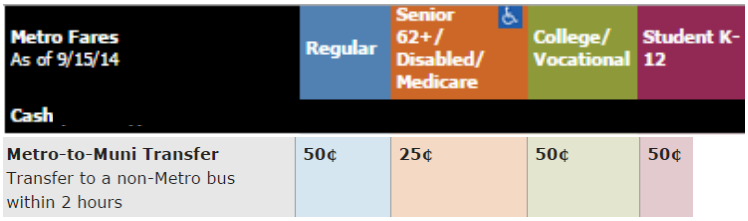


Figure 10 – Integrated Fare Example with 1-Day Pass

Bikeshare users who do not wish to purchase a TAP card connecting them with Metro bus and rail services could also purchase a conventional bike-share-only pass (described below).

Integrated as Muni

The Integrated as Muni fare structure is similar to the Integrated as Metro Service fare structure (above), except Metro bus and rail passengers with TAP cards must pay a 50-cent transfer fee to transfer from bus or rail to bikeshare (see **Figure 11**) . The transfer includes one trip up to 30 minutes in duration; trips longer than 30 minutes incur an additional fee of $1.75 per additional 30 minutes.



Metro Fares As of 9/15/14 Cash	Regular	Senior 62+/ Disabled/ Medicare	College/ Vocational	Student K-12
Metro-to-Muni Transfer Transfer to a non-Metro bus within 2 hours	50¢	25¢	50¢	50¢

Figure 11 – Existing Metro to Muni Transfer Fares

Bikeshare users who do not wish to connect to Metro bus and rail services could also purchase a conventional bike-share-only pass (described below).

Conventional

The Conventional fare structure is similar to the fare structure used in established bikeshare systems across the United States (examples from other bikeshare programs are illustrated in **Figure 12**). With this fare structure, there would be no integration with Metro bus or rail fares; bikeshare fares would be independent of other transit fares and transfers would not be included.

Once the user purchases a membership (this study assumes $7 for a 24-hour pass or $120 for an annual pass), she is allowed to make unlimited 30-minute trips within the active period of the pass. Trips longer than 30 minutes incur increasing "overtime" fees (example from CitiBike below). This study assumes an additional $1.75 fee for each 30-minute period beyond the first).

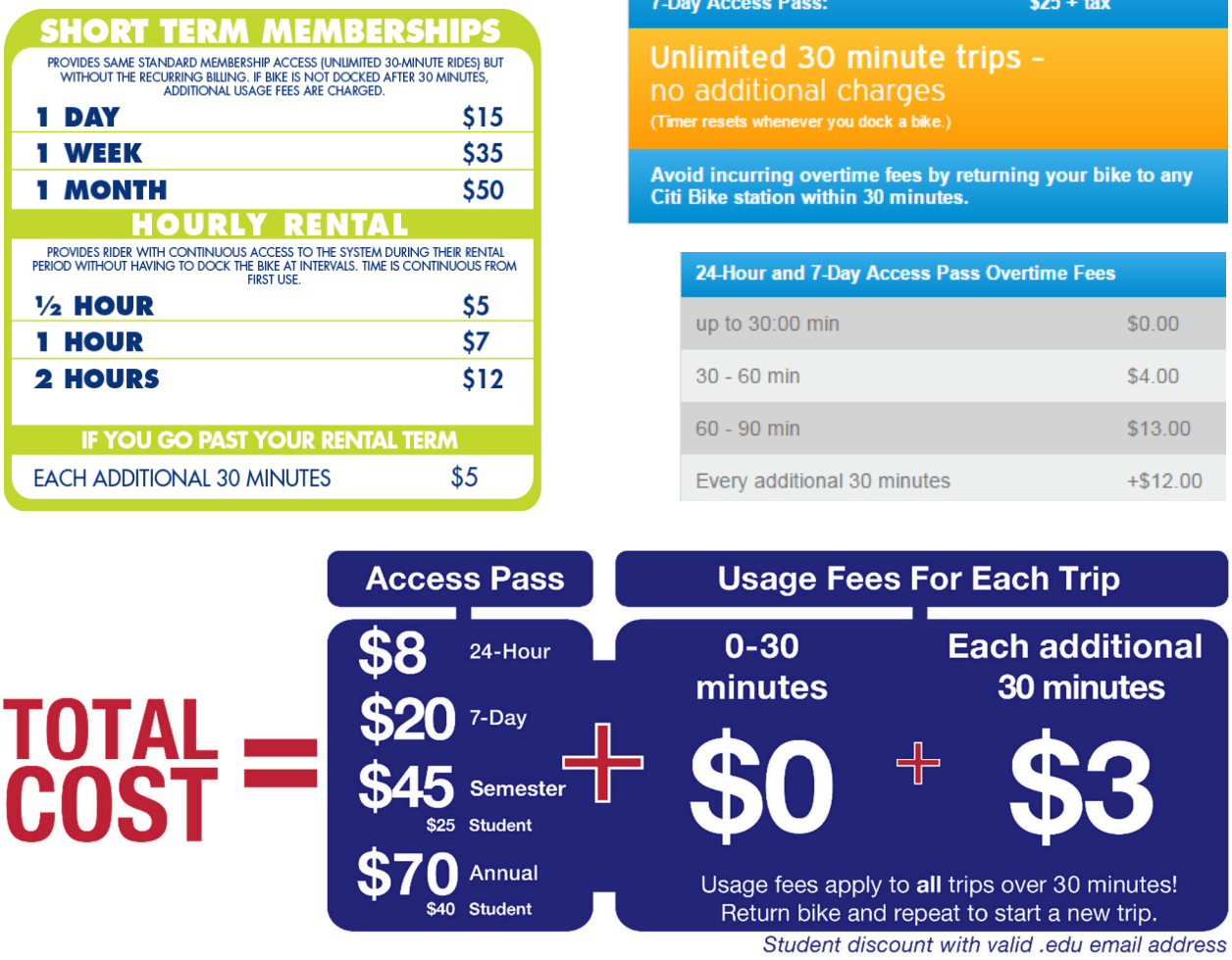


Figure 12 – Examples of Conventional Fares from DecoBike, CitiBike, and Boulder B-cycle Systems (clockwise from top left)

TAP INTEGRATION

Motivation

Integrating bikeshare fare media with the existing TAP card used for Metro's bus and rail services offers the opportunity to simplify the passenger experience, reinforce Metro branding, attract existing Metro passengers to the bikeshare system and encourage new bikeshare users to ride Metro's bus and rail services. TAP integration provides benefits to several stakeholder groups, including new and existing passengers, the bikeshare system, existing bus and transit interests, and third party TAP vendors.

A complex fare payment system can deter passengers from trying bikeshare (see **Figure 13**); creating a seamless payment system with TAP improves the passenger experience by making bikeshare use more convenient and accessible. A common payment method also allows passengers integrated use of bikeshare, bus, and rail transit across jurisdictional boundaries.

The bikeshare system itself benefits in multiple ways. First, providing a seamless user experience increases system ridership.[3] Second, TAP integration provides access to an extensive existing distribution network of Ticket Vending Machines (TVM) at Metro Rail stations and to over 500 Third Party Vendors (TPV) that would be costly for the bikeshare system alone to replicate. This network allows Metro's bikeshare program to connect with a

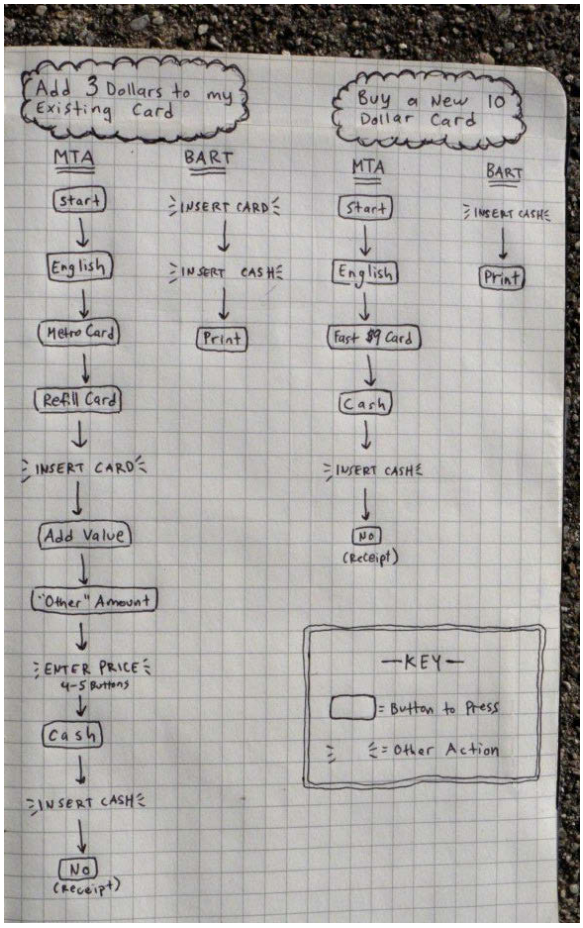


Figure 13 – User impression of fare machine experiences in New York City and San Francisco

[3] Transit Cooperative Research Program (TCRP) Report 95 found that in Cincinnati, most transit passs holders cited convenience as the major factor in their purchase decision; 11 percent of purchasers purchased a pass despite the pass not offering any cost savings for their existing level of transit use (p. 12-23). In Atlanta, cost savings was the most important factor for 56 percent of respondents, but 42 percent of respondents listed convenience-related answers, such as no need for cash, easier boarding, once-a-month payments, and easier transfers, as the primary reason for purchasing a pass.

population of lower-income, transit-dependent riders that other bikeshare systems have had difficulty reaching.

Existing bus and rail transit interests also benefit from bringing bus and rail access to the fingertips of bikeshare users who may not otherwise consider using bus and rail transit. TAP integration improves the potential for increased bus and rail transit ridership for Metro and Municipal transit agencies in areas where bikeshare is deployed. Integrated revenue collection also offers the potential to increase system-wide fare recovery as the Regional Bikeshare System expands (see **Figure 1**, above).

Third party TAP vendors gain additional foot traffic from a new demographic of users: bikeshare users tend to be younger and higher-income than bus and rail transit riders. This benefit may also help Metro attract and retain third party vendors.

Integration Needs

The main goal of TAP integration is a single fare medium that provides a seamless user experience for access to bikeshare and other transit modes. Because of the complexities of integrating with Metro's existing TAP card infrastructure, this section presents three potential approaches: "Real Time" integration, "Delayed Reconciliation," and "Minimal Integration." Variations of these approaches could also achieve varying degrees of integration as technology and organizational processes allow.

For both the Integrated as Metro Service and Integrated as Muni fare structures (described above), real time data integration between bikeshare and the existing TAP system would provide the best user experience and flexibility for system management. However, because this level of integration is likely to be complex and costly, a "delayed reconciliation" approach that requires only daily or weekly data sharing could also be considered.

A third "Minimal Integration" model, in which the TAP card is used as a unique user identifier only, is possible. To users, this model is integrated only in the sense that users use the TAP card as a link to a separate bikeshare account. The fare structure could not be fully integrated because transfer information about bus and rail trips would not be available; mutual benefits to bus, rail, and bikeshare transit would be minimal. Implementation of fare structure and payments would be handled entirely by the bikeshare operator.

The following sections describe in more detail the basic functionality necessary to achieve the desired level of TAP integration. However, a bikeshare system that achieves some integration benefits could be implemented with a subset of the TAP functionality described. Common elements to any approach are described first, followed by options for Real Time Data, Delayed Reconciliation, and Minimal Integration.

Common Functionality

Regardless of the level of integration, users will need to be able to purchase TAP cards. With integration, bikeshare users can use Metro's existing TAP card vending infrastructure. Substantial changes to the

vending infrastructure to accommodate bikeshare are not anticipated. Users who already have TAP cards can use them. Users who do not yet have TAP cards can purchase new TAP cards Online (http://taptogo.net/tap/locator/); from a TVM, located in all Metro Rail stations; from one of over 500 TPVs; or from a Metro Customer Center. Bikeshare could provide new opportunities for TAP card vending from bikeshare kiosks or from new TVMs located near selected bikeshare kiosks.

Users will also need to register for the bikeshare program to provide accountability for the checked out bikes and allow for payment processing. Bikeshare users will register their membership with the bikeshare operator and provide a credit card number that can be charged in the event of theft or damage to the Metro bike. In some options, the credit card number can also be charged to pay fares or "extended use fees" (see below). Users' TAP stored value will not be used to pay fares or fees. Users can register their TAP cards for use on the bikeshare system by the 16-digit number that already uniquely identifies each TAP card. Users can register online through the program's website or on a mobile app; both channels could be managed by the bikeshare operator. If technological barriers can be addressed, users could also sign up for bikeshare at Metro's network of TVMs.

Real Time Data Integration

First, users will need to purchase a 1-Day, 7-Day, or 30-Day pass on TAP. Changes to the process currently in place for purchasing a TAP pass are not anticipated. Users can purchase passes at TAP Vending Machines, at Metro Customer Centers, from Third Party Vendors, online (http://taptogo.net/replenish.php), or by phone (1-866-TAPTOGO).

Figure 14 – Metro Bus and Rail TAP Validators
http://www.metro.net/riding/fares/check-tap-cards-expiration-date/

Users will then need to activate the purchased pass. One option currently available to accomplish this is by tapping it on a Bus or Rail TAP validator. Users would first tap their TAP card on a bus or rail TAP validator to activate a new pass (see **Figure 14**). With this approach, there is the possibility for significant confusion among new users who might not intuit the need to take a bus or rail trip before using bikeshare, reduced adoption of bikeshare, and an increased volume of customer service issues; however there would not be a need for changes to the process currently in place for activating a TAP pass.

A second option for activating the purchased pass is to enable activation of passes for use on bikeshare terminals regardless of whether or not they have previously been used at a bus or rail validator. Bikeshare terminals could be either kiosks located at each station, devices located on each Metro Bike, or both. Passes that have been previously used on bus or rail would already be active for use on bikeshare as well. There are at least two potential options for activating passes for bikeshare use without previous use on bus or rail. First, Metro's TVMs are equipped with TAP validators for loading new passes or stored value onto TAP cards (see **Figure 15**). TVMs could be configured with a new option to activate a previously-purchased pass, avoiding the need to activate passes at bikeshare terminals. Alternatively, users could tap their TAP cards to validators located at each bikeshare terminal. Just as with bus or rail, the first tap would activate the pass, provided another pass is not already active.

Figure 15 – Metro TVM with TAP Validator
http://walknridela.com/wordpress/wp-content/uploads/2010/06/MTATVM23.jpg

Next, the system will need to initiate a bikeshare trip. The user taps the TAP card to the validator on the bikeshare terminal. The validator needs to (1) read the unique identifier of the TAP card, which has already been linked to a unique bikeshare user during the registration step (above) and (2) read whether or not the TAP card is carrying an activated pass. With this information the bikeshare operator's software will release the bike to the user and begin tracking the trip. If the user has an activated pass, there will be no initial charge; otherwise, the user's credit card will be charged as needed.

When the user returns the bike to a designated station or, in the case of a "smart bike" system, locks the bike and ends the trip with a mobile app or on-bike button, the bikeshare operator's software will close the trip record, recording, among other details, the duration of the bikeshare trip. Based on the duration of the trip, the bikeshare operator will charge the user's credit card an Extended Use Fee for trips lasting longer than 30 minutes. The need for additional TAP functionality is not anticipated in this step.

As an optional final step, the TAP system can be used to reconcile user charges and allocate revenue to bikeshare, bus, and rail, as appropriate (see "Revenue Allocation," below). At the end of an agreed-upon period (e.g., monthly, quarterly, annually), Metro staff will reconcile the revenue collected from pass sales based on how the pass is used. The bikeshare operator will provide a data set with trip records for each unique user (identified by the 16-digit TAP card number). Metro staff (or an embedded bikeshare operator employee under Metro supervision) will then join these records to Metro's records of each user's revenue from passes purchased and trips taken on bus and rail. Revenue from each user's pass purchases will then be allocated according to the number of trips taken on bus, rail, and bikeshare.

Delayed Reconciliation

The Delayed Reconciliation approach is similar to the Real Time Data Integration approach (see above), but introduces a lag in user billing because of the need for additional processing. When initiating the bikeshare trip the validator only needs to read the unique identifier of the TAP card. This information will

be stored with a timestamp for later comparison. At the end of an agreed-upon period (daily or weekly), the bikeshare operator will provide a data set with trip records for each unique user (identified by the 16-digit TAP card number). Metro Staff (or an embedded bikeshare operator employee under Metro supervision) will join these records to Metro's records of each user's pass purchase history to determine whether each trip was covered by an active pass. The bikeshare operator will charge the user's registered credit card for any trips not covered by a pass as Walk-Up trips.

Minimal Integration

The TAP card will be used as a "key" or unique user identifier only. The bikeshare terminal (kiosk or bike) only needs to be able to read the TAP card's unique identifier. Memberships and fare structures for bikeshare will be completely separate from bus and rail, and all back-end system functions will be handled by the bikeshare operator.

Funding

Initial conversations with Metro's TAP department suggest that integrating bikeshare with TAP can be costly and complex. To the extent possible, Metro should require the selected bikeshare vendor to make its hardware and payments system compatible with existing TAP infrastructure. To the extent that Metro will need to adjust its infrastructure to interface with bikeshare, it should consider the benefits to the overall mission of the organization of integrating bikeshare with bus and rail when deciding on a level of financial and staff support for implementing TAP integration changes. External funding sources may also be available to support the transition: PeopleForBikes is administering grant funding to bikeshare operators, cities, and local nonprofits to develop and implement strategies that increase bikeshare in underserved communities.[4] Integrating bikeshare with TAP and with bus and rail transit leverages existing equity-focused fare structures and provides new transportation opportunity for underserved communities. Active Transportation Program (ATP), Transportation Investment Generating Economic Recovery (TIGER), and Metro ExpressLanes funding could also be used to offset costs.

Metro's Mission

Metro is responsible for the continuous improvement of an efficient and effective transportation system for Los Angeles County.

MOBILITY HUBS COORDINATION

Funded via a grant from the Federal Transit Administration's Jobs Access Reverse Commute (JARC) program, the Mobility Hubs project may provide integrated bikeshare, carshare, secure bike parking systems and jitney services at strategic locations throughout Downtown Los Angeles, Hollywood and Long Beach. The Mobility Hubs project could also include a guaranteed ride home program, an

[4] http://www.peopleforbikes.org/blog/entry/bike-share-isnt-equitable-lets-change-that

integrated transit pass with Mobility Hub service, and a centralized, online trip planning and reservation system. With a purpose of providing enhanced mobility access and options for eligible low income individuals seeking access to jobs and job-related opportunities (see **Figure 16**), JARC explicitly requires that related funding and implementation of the Mobility Hubs be driven intentionally and explicitly for eligible low-income individuals seeking access to jobs and job-related opportunities.

The selected Metro Countywide Bikeshare vendor will be required to coordinate with the participating jurisdiction and selected vendor(s) of the future Mobility Hubs project to implement, operate and maintain bikeshare station locations. The Mobility Hubs Operating Plan envisions advancing the Hollywood project sooner than is currently anticipated in the Bikeshare Implementation Plan. To effectuate this, Metro, the City of Los Angeles and the selected bikeshare vendor will coordinate and evaluate feasible strategies to advance Hollywood implementation.

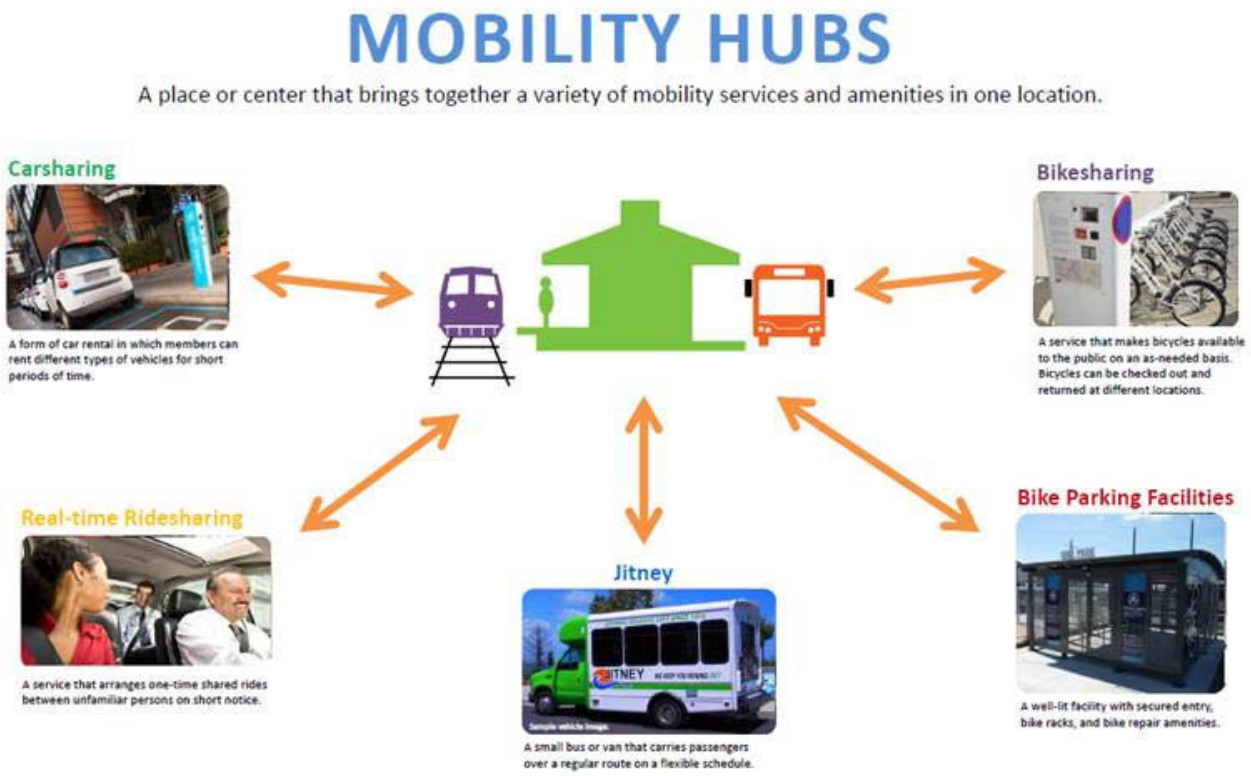


Figure 16 – Mobility Hub Concept Diagram
Needs Assessment Study and Operating Plan for the Los Angeles/ Long Beach Integrated Mobility Hubs Project, funded by JARC

EQUITY

Bicycling in general and bike sharing in particular have historically struggled to attract lower-income individuals and people of color.[5] African-Americans have significantly lower levels of self-reported bicycle use than the general population, and low-income and non-white households are estimated to have significantly lower rates of bicycle ownership.[6] By providing low-cost access to bicycles, bikeshare could help reduce barriers to bicycling and encourage bike use in historically underserved communities. In Washington, D.C., bikeshare users reported significantly lower income than the general cycling population, suggesting that Capital Bikeshare might expand bike access to some lower-income cyclists. Nevertheless, African-Americans make up only 3 percent of Capital Bikeshare users and only 1 percent of Boston Hubway users, while 81 percent of Denver B-cycle users are white and only 21 percent have annual household incomes below $50,000.[7]

Lowering Barriers – Financial Access

Metro should explore multiple options for providing equitable access to bikeshare, including TAP integration and other programs for promoting access to the system.

By integrating fare structures and access through the TAP card, Metro will link the bikeshare program to a large population of transit users traditionally underserved by bikeshare programs. The integration of fares and fare media allows Metro to leverage its existing discounted fare programs for seniors 62 years and older, disabled and medicare-eligible passengers, college and vocational students, and K-12 students.

Other bikeshare systems present additional examples of programs that can be used to improve financial access for underserved communities. Capital Bikeshare has partnered with Bank on DC to offer discounted memberships and debit and credit accounts to unbanked individuals who would not otherwise have access to bikeshare;[8] the program has also reached out to the homeless and unemployed communities, providing discounted memberships to those enrolled in job training sessions.[9] NYC Bikeshare, the

---

[5] Federal Highway Administration. "Bikesharing in the United States: State of the Practice and Guide to Implementation." September 2012. http://www.bicyclinginfo.org/promote/bikeshareintheus.pdf.

[6] Buck, Darren. "Encouraging Equitable Access to Public Bikesharing Systems." 22 December 2012.

[7] http://dc.streetsblog.org/2012/10/03/why-isnt-bike-share-reaching-more-low-income-people/

[8] "Capital Bikeshare Launches Bank on DC Program." 16 December 2011. http://www.capitalbikeshare.com/news/2011/12/16/1140

[9] DePillis, Lydia. "Capital Bikeshare Rolls Out Homeless Pilot." 20 March 2012. http://www.washingtoncitypaper.com/blogs/housingcomplex/2012/03/20/capital-bikeshare-rolls-out-homeless-pilot/

operator of Citi Bike, has also partnered with local housing authorities to increase access to its program.[10] New York City Housing Authority residents and select Community Development Credit Union members are eligible for discounted, $60 annual memberships (a $35 savings). Denver Bike Sharing offers free B-cycle memberships, not tied to a credit card, to Denver Housing Authority residents of buildings adjacent to B-cycle stations. Although DBS has found funding to subsidize these membership and usage fees, significant time and effort go into providing the memberships: Housing Authority staff screen applicants for eligibility and good standing and DBS staff visit sites to recruit members; staff also need to manually adjust records in the software system to exempt these users from fees. Minneapolis' Nice Ride system has eliminated the credit card hold held as a deposit, which presented a barrier to some potential users.[11] Finally, discounts for students, seniors and military are common; Denver offers discounted, $60 annual memberships (a $20 savings) to these groups.

Station Siting – Physical Access

Locating bikeshare stations in communities disproportionately underrepresented in bicycling can improve their mobility by providing affordable access to bicycles. Ensuring that stations are placed near neighborhoods and transit lines that low-income riders use will increase the likelihood that they can integrate the system into their regular travel. Siting stations near neighborhoods with transit dependent residents, affordable housing, public transit lines, and off-campus college housing can serve additional users who do not have regular access to a car or bike. Beyond providing stations to improve equity in targeted neighborhoods, the program should also ensure that these stations are well-connected to the rest of the system and provide a diverse range of trip-making opportunities for community members.

For the stations located in Downtown Los Angeles, Metro performed an analysis of the share of minority population within a quarter-mile and half-mile radius of the bike share stations. These percentages were then compared against the Los Angeles County average (see **Table 1**). The analysis shows that the areas within walking distance of the proposed demonstration stations have a higher minority share of residents than the County as a whole. Thus, there is no disproportionate burden imposed upon minority residents by the location of the Downtown Los Angeles stations.

Metro performed a similar analysis for the share of population in poverty (see **Table 2**). The analysis shows a higher percentage of households in poverty within walking distance of the proposed demonstration program stations than for the County as a whole. Thus, there is no disproportionate burden imposed upon households in poverty by the location of the Downtown Los Angeles stations.

---

[10] Schmitt, Angie. "Why Isn't Bike-Share Reaching More Low-Income People?" 3 October 2012. http://dc.streetsblog.org/2012/10/03/why-isnt-bike-share-reaching-more-low-income-people/

[11] "Frequently Asked Questions: What about low income New Yorkers?" http://citibikenyc.com/faq#_What_about_low_income

TABLE 1 – MINORITY ANALYSIS			
Analysis Area	**Population**	**Minority Population**	**Minority Population %**
Quarter-Mile Buffer	129,312	103,334	79.9%
Half-Mile Buffer	197,602	168,243	85.1%
Los Angeles County	9,818,605	6,869,996	70.0%
Note: Data aggregated from Census Block level.			

TABLE 2 – POVERTY ANALYSIS			
Analysis Area	**Population**	**Poverty Population**	**Poverty Population %**
Quarter-Mile Buffer	127,618	54,559	42.8%
Half-Mile Buffer	186,883	76,627	41.0%
Los Angeles County	9,604,871	1,508,618	15.7%
Note: Data aggregated from Census Tract level.			

Marketing and Outreach – Information Access

New bikeshare systems typically benefit from lots of mainstream press, but reaching broader communities may be more difficult. Only eight of twenty surveyed operators reported current or planned community-specific outreach efforts; of those that did, several indicate targeted outreach through affordable housing authorities, churches, and community-based organizations.[12] Partnerships with community organizations can help users learn to use bikeshare, ride a bike in traffic, and choose comfortable and convenient biking routes. Partnerships with large employers and unions for awareness building and membership discounts can help to reach service industry workers. Promotional materials in multiple languages can help to reach a wide range of communities. While marketing to diverse communities is important, it is also essential to ensure that these populations have physical and financial access to the bikeshare system, so that marketing efforts can attract new members and new trips.

[12] Buck, Darren. "Encouraging Equitable Access to Public Bikesharing Systems." 22 December 2012.

An Ongoing Effort

Reaching historically underserved communities will require continued effort on the part of the bikeshare operator. Metro should consider employing a broad range of strategies to engage potential bikeshare users and develop a ridership base that reflects the population of Los Angeles County.

OPERATIONS FUNDING

Per Board direction, Metro will provide up to 35 percent of operating costs. The Bikeshare Working Group considered two approaches to calculating Metro's contribution: "Gross" and "Net."

Under the Gross approach, Metro provides up to 35 percent of total operating costs, while participating jurisdictions cover any shortfall between the system's operating revenues (user memberships and fares) plus Metro's 35 percent contribution and the total operating cost of the system. If the system's operating revenues exceed 65 percent of total operating costs, Metro's contribution will be less than 35 percent, and participating jurisdictions will pay nothing. If the system's operating revenues exceed its total operating costs, any surplus will be split in the same proportion, with 65 percent going to the participating jurisdiction and 35 percent going to Metro. Revenues from sponsorship are not included in this calculation, but considered separately (see "Sponsorship," below). **Figure 17** illustrates the sharing of costs and revenues with the Gross approach for three scenarios, where operating revenues equal 50 percent, 70 percent, or 120 percent of the system's operating cost.

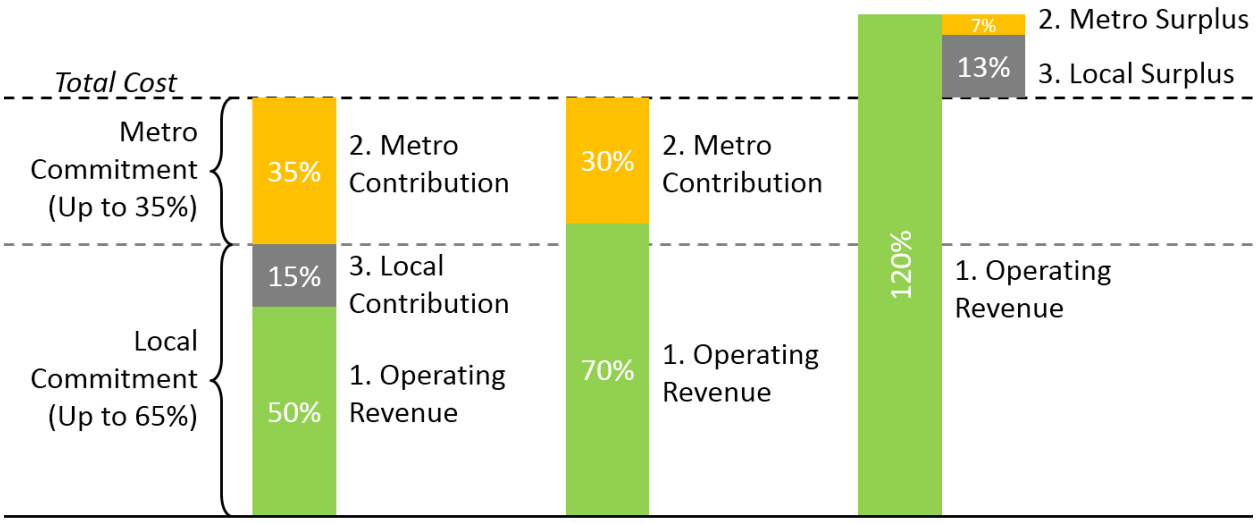


Figure 17 – Gross Operations Funding Model

Under the Net approach, system operating revenues first offset total operating costs. Metro then contributes 35 percent of the resulting shortfall, while participating jurisdictions contribute 65 percent of the shortfall. Surpluses are shared as under the Gross approach. **Figure 18** illustrates the sharing of costs and revenues with the Net approach for same three scenarios.

The current recommendation is to pursue the Net operations funding approach.

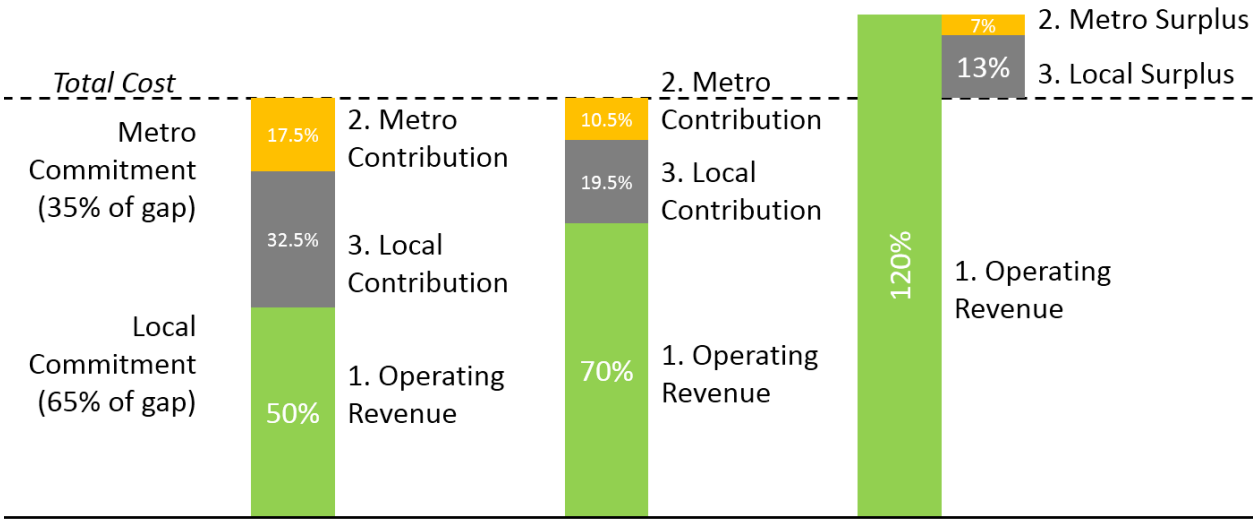


Figure 18 – Net Operations Funding Model

REVENUE ALLOCATION

To calculate the share of contributions by Metro and participating jurisdictions, revenues from bikeshare activities must be tracked separately from other Metro revenue. Given the technological and administrative complexities of full TAP integration, the initial recommendation for bikeshare revenue accounting is simplified, limiting the ability to allocate pass revenue to bikeshare. As a long-term goal, the revenue contributions of bikeshare to Metro's overall operating budget should be quantified along with its costs.

Initial Direction

With the Integrated as Metro Service fare structure, the current revenue allocation direction is for only overtime fees (for trips lasting longer than 30 minutes) and bike-share-only passes to be allocated to bikeshare.

Although a 1-Day, 7-Day or 30-Day TAP pass could be used to access bikeshare, none of the revenue from the sale of those passes would support the bikeshare program. Since the vast majority of bikeshare trips are under 30 minutes (over 91% in the Capital Bikeshare system),[13] most individual bikeshare trips would not generate any revenue for the bikeshare program. **Figure 19** illustrates an example trip in which the passenger purchases a day pass, rides bikeshare to connect to rail, takes a second bikeshare trip at the destination end, and then returns by connecting from bus to rail. The passenger spends $7 for the 1-Day pass and starts her trip. Although two of the five legs of the entire trip are made by bikeshare, all bikeshare trips segments are less than 30 minutes, so none of the collected revenue is allocated to bikeshare.

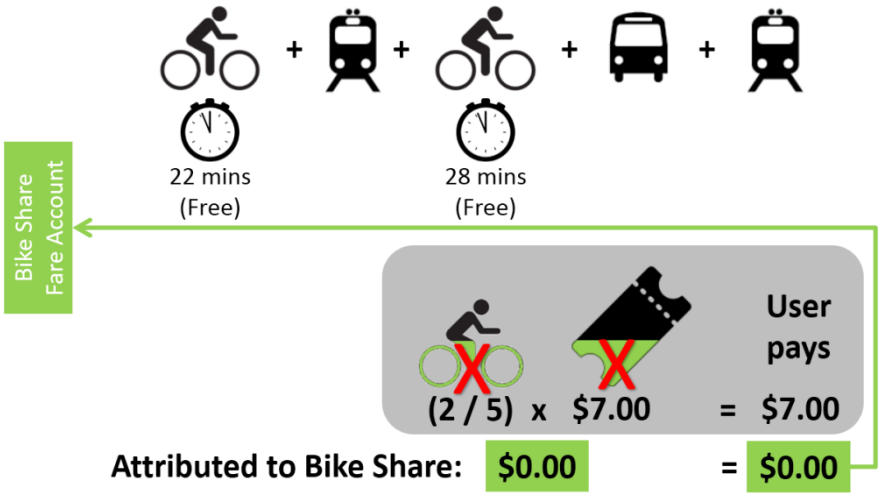


Figure 19 – Integrated-as-Metro Pass Revenue Allocation

[13] http://cabidashboard.ddot.dc.gov/cabidashboard

Revenue allocation for a single one-way trip on TAP is similar. **Figure 20** illustrates an example trip where the passenger uses bikeshare for both the first and last mile connections of the trip. He purchases a one-way trip fare for $1.75, rides bikeshare, transfers to rail, and then takes a second bikeshare trip lasting longer than 30 minutes (as noted above, bikeshare trips longer than 30 minutes are not typical). Two of the three legs of the entire trip are made by bikeshare, but none of the pass revenue is attributed to bikeshare and allocated to the Bikeshare Fare Account. Because one bikeshare leg of the trip lasted longer than 30 minutes, he also incurs an additional $1.75 charge, which is processed separately by the bikeshare operator and allocated to the Bikeshare Fare Account.

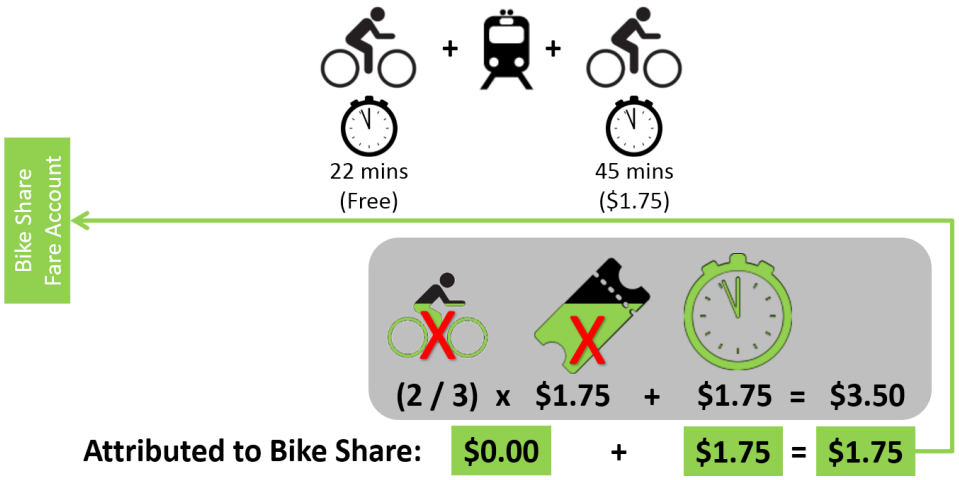


Figure 20 – Integrated-as-Metro Single Trip Revenue Allocation

The Integrated as Muni fare structure would have a similar revenue allocation, with an additional 50-cent transfer fee allocated to bikeshare. **Figure 21** illustrates the same example trip as depicted in Figure 19, in which the passenger purchases a day pass, rides bikeshare to connect to rail, takes a second bikeshare trip at the destination end, and then returns by connecting from bus to rail. The passenger spends $7 for the 1-Day pass and starts her trip on bike share, for which she pays an additional 50-cent fee. She pays a second 50-cent fee for the second bike share leg; the remaining transfers to Metro Bus and Rail are free. Only the two 50-cent fees, a total of $1.00, are allocated to the bike share account.

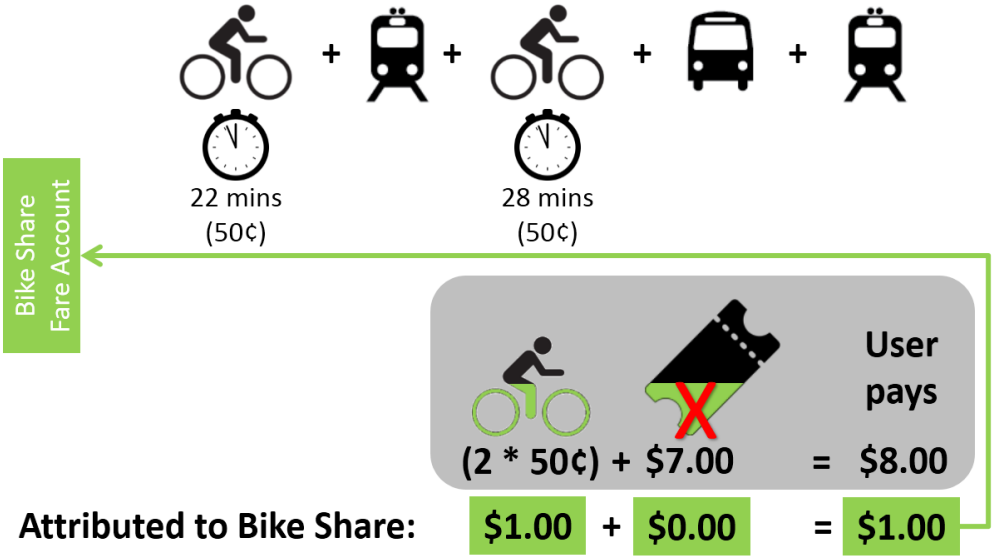


Figure 21 – Integrated-as-Muni Pass Revenue Allocation

Figure 22 illustrates the same example trip as depicted in Figure 20, where the passenger uses bikeshare for both the first and last mile connections of the trip. He purchases a one-way trip fare for $1.75, rides bikeshare, transfers to rail, and then takes a second bikeshare trip lasting longer than 30 minutes. Two of the three legs of the entire trip are made by bikeshare, so he pays two, 50-cent transfer fees, which are attributed to bikeshare and allocated to the Bikeshare Fare Account. Because one bikeshare leg of the trip lasted longer than 30 minutes, he also incurs an additional $1.75 charge, which is processed separately by the bikeshare operator and allocated to the Bikeshare Fare Account. In total, $2.75 ($1.00 in transfer fees and a $1.75 additional use fee) is allocated to the Bikeshare Fare Account.

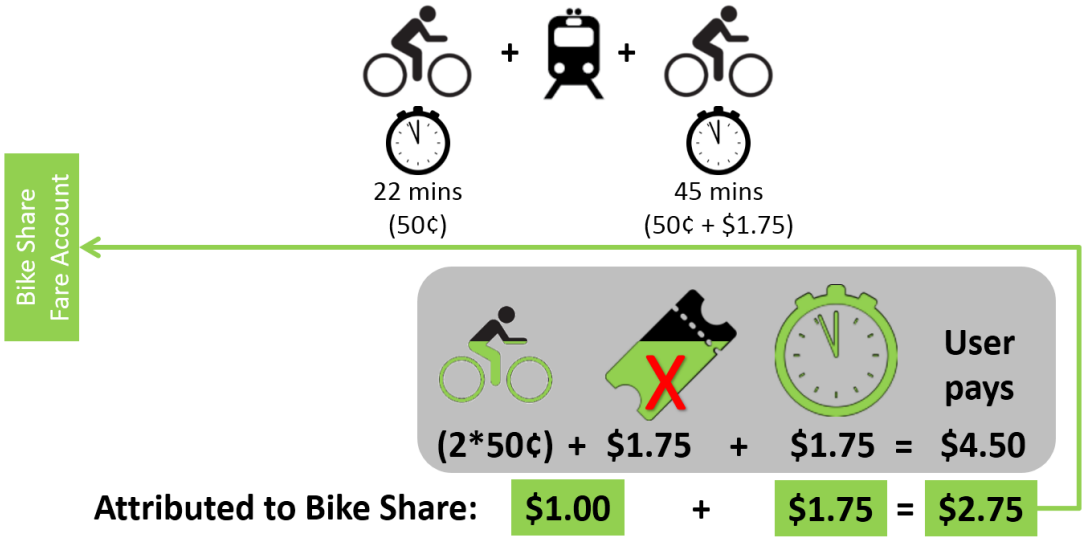


Figure 22 – Integrated-as-Muni Single Trip Revenue Allocation

Fully-Integrated Fare Structure

As technological and institutional barriers to revenue allocation are addressed, the revenue contributions of bikeshare to Metro's overall operating budget should be quantified. One concept for equitable accounting of bikeshare's portion of fare revenue is to allocate revenue in proportion to use. For 1-Day, 7-Day and 30-day TAP passes, pass revenue would be allocated by the percent of trip legs made by each mode. The portion of revenues allocated to bikeshare could be set aside in a Bikeshare Fare Account to offset bikeshare-related expenses.

Figure 23 illustrates the same example trip as depicted in Figure 19, in which the passenger purchases a day pass, rides bikeshare to connect to rail, takes a second bikeshare trip at the destination end, and then returns by connecting from bus to rail. The passenger spends $7 for the 1-Day pass and starts her trip. Two of the five legs of the entire trip are made by bikeshare, so 2/5 of the $7 pass, or $2.80, are attributed to bikeshare and allocated to the Bikeshare Fare Account. If any bikeshare leg of the trip would last longer than 30 minutes, she would incur an additional $1.75 charge for each additional 30-minute period, which would be processed separately by the bikeshare operator and allocated to the Bikeshare Fare Account.

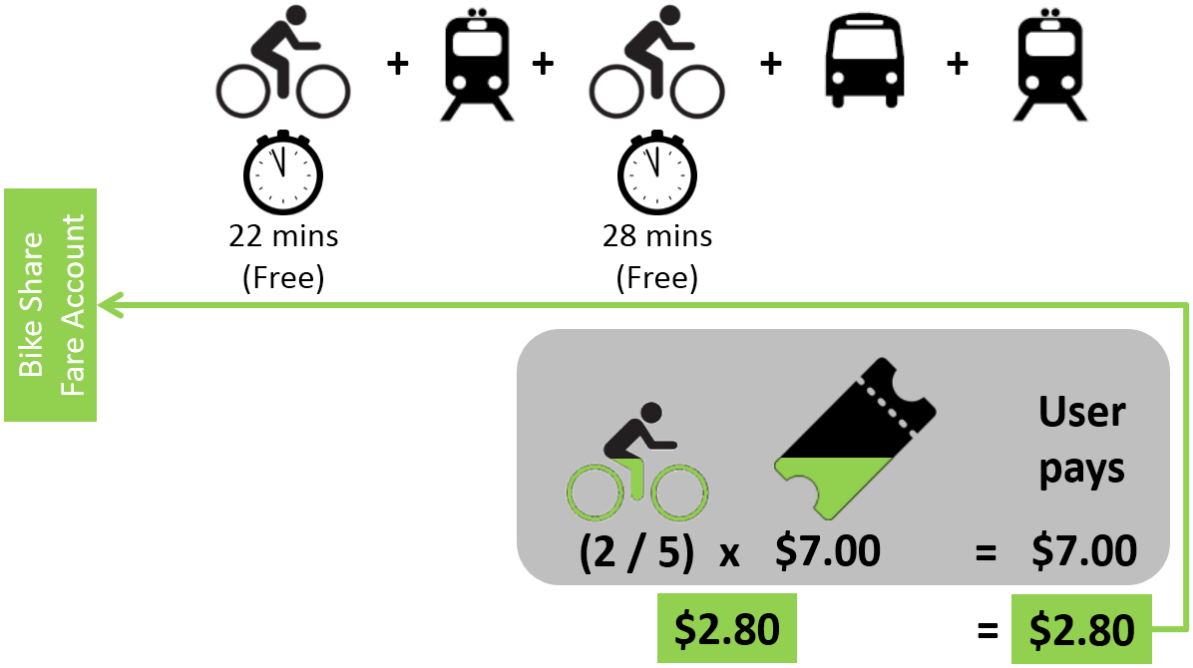


Figure 23 – Fully Integrated Pass Revenue Allocation

Revenue allocation for a single one-way trip on TAP is similar. **Figure 24** illustrates the same example trip as depicted in Figure 20, where the passenger uses bikeshare for both the first and last mile connections of the trip. He purchases a one-way trip fare for $1.75, rides bikeshare, transfers to rail, and then takes a second bikeshare trip lasting longer than 30 minutes. Two of the three legs of the entire trip are made by bikeshare, so 2/3 of the $1.75 fare, or $1.17, are attributed to bikeshare and allocated to the Bikeshare Fare Account. Because one bikeshare leg of the trip lasted longer than 30 minutes, he also incurs an additional $1.75 charge, which is processed separately by the bikeshare operator and allocated to the Bikeshare Fare Account. In total, $2.92 ($1.17 in pass revenue and a $1.75 additional use fee) is allocated to the Bikeshare Fare Account.

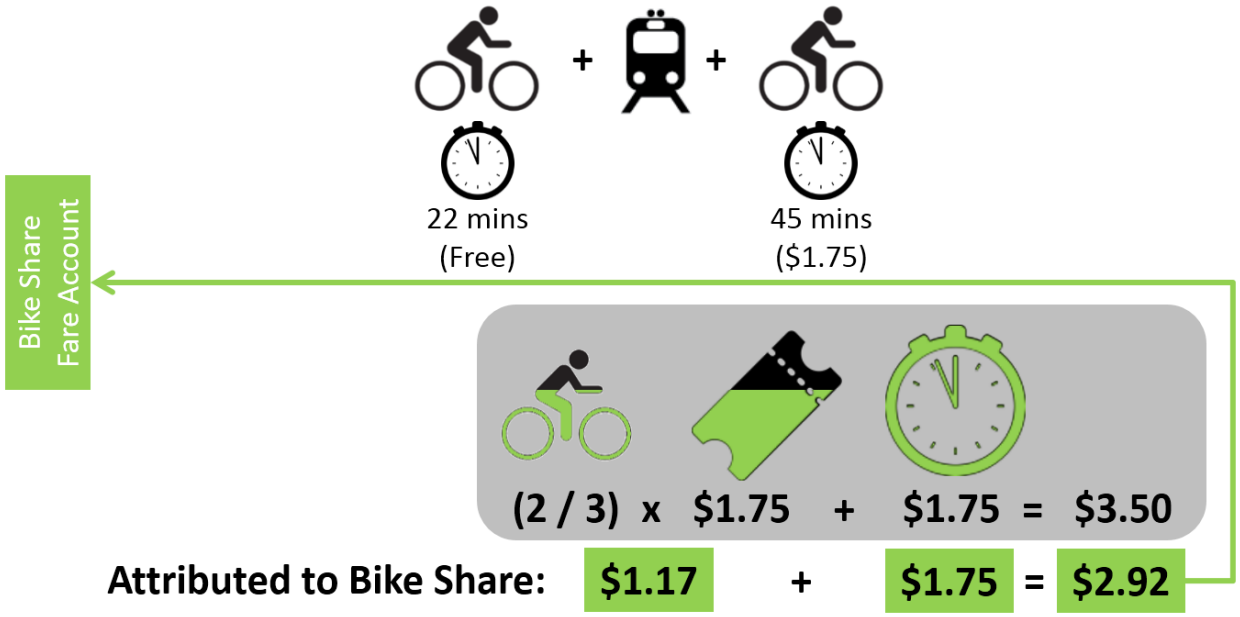


Figure 24 – Fully Integrated Single Trip Revenue Allocation

For Bikeshare Only Annual Passes, 100 percent of pass revenue and 100 percent of additional use fees are attributed to bikeshare and allocated to the Bikeshare Fare Account.

Jurisdictional Revenue Allocation

Under either revenue allocation scenario, revenues for trip fees and one-way bikeshare only fares will be divided among jurisdictions according to the location where the bike was checked out (trip origin) and membership fees for annual passes will be allocated according to the location of the signup. Membership fees from online signups not within a participating jurisdiction (as reported by the member) would be shared among all participating jurisdictions in proportion to their number of docks. As the system grows, Metro may need to revisit the policy of crediting trips by origin location to instead credit half to the check-out location and half to the check-in location if a one-direction imbalance of trips is a persistent problem.

SPONSORSHIP

Metro will pursue and manage a systemwide sponsorship contract, such as naming rights, a title sponsorship, or consistent recognition across all bikeshare equipment. Metro will also retain control over the primary on-bike branding presence. Revenues from the systemwide sponsorship contract will first be applied toward Metro's financial commitment. Any revenues that exceed Metro's commitment will be applied toward the jurisdictions' operating and maintenance share. Any sponsorship revenue beyond what is needed to offset the full operating cost of the program could be retained by Metro for future capital expansion of the program or Metro could come to an agreement with participating jurisdiction on how to dedicate revenue. Participating jurisdictions will manage local sponsors and advertising contracts, such as station-level (kiosk) sponsorships and advertisement, and retain revenue from local sponsorships. Metro will aim to provide participating jurisdictions with a secondary on-bike presence recognizing their contribution.

Because of the unique characteristics of the Los Angeles region and uncertainty about the final amount of on-bike and on-station space available for sponsor recognition, it is difficult to estimate the level of sponsorship revenue that could be expected from the Los Angeles County Regional Bikeshare program. **Table 3** provides sponsorship information from three established U.S. bikeshare systems for reference.

TABLE 3 – SPONSORSHIP EXAMPLES							
System	**Sponsorship Value**	**Years**	**Annual Value**	**Bikes**	**Annual Value / Bike**	**Stations**	**Annual Value / Station**
CitiBike Title Sponsor	$41,000,000	6	$6,833,000	6,000	$1,139	330	$20,707
NiceRide MN Title + Station Sponsors	$4,115,000	–	$1,129,000	1,550	$728	170	$6,640
Title Sponsors Only	*$2,915,000*	*4*	*$729,000*	*1,550*	*$470*	*170*	*$4,290*
Station Sponsors Only	$1,200,000	*3*	*$400,000*	*1,550*	*$258*	*170*	*$2,350*
Denver B-cycle	$1,676,000	3	$559,000	700	$798	84	$6,650

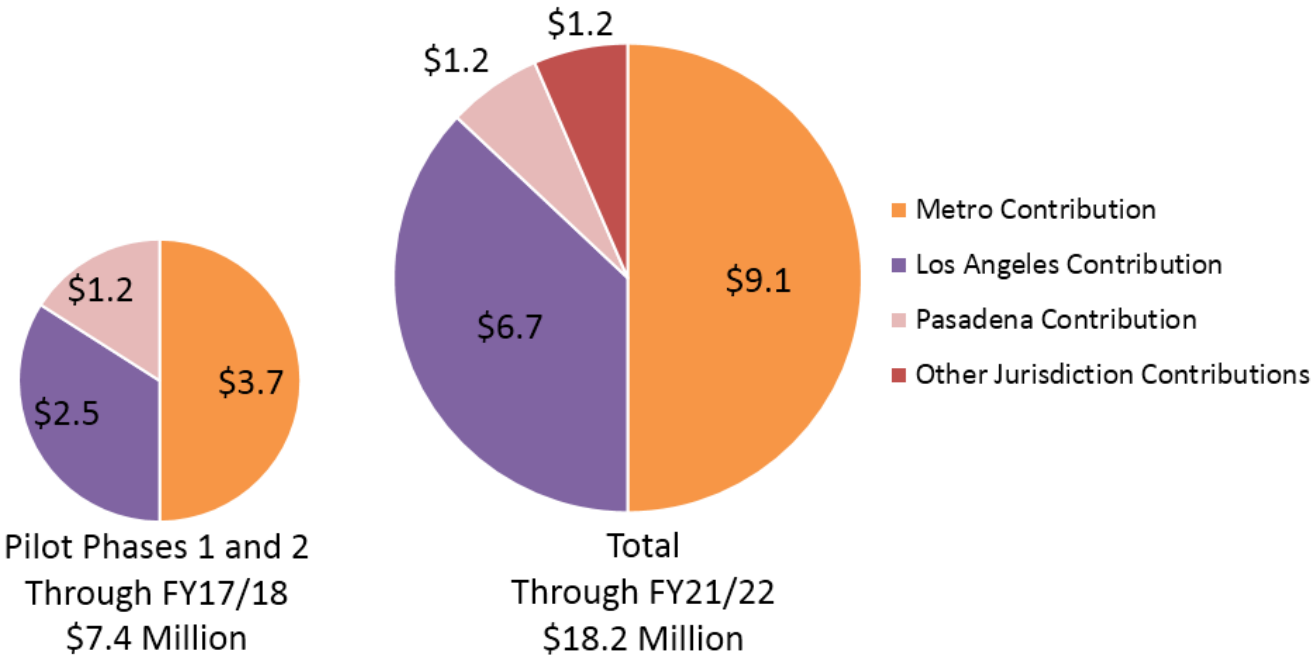
FINANCIAL ESTIMATES

Capital Contributions

Total capital costs were estimated based on Economic and Planning Systems Inc.'s case study research on Capital Bikeshare, Boulder B-Cycle, Denver B-cycle and Nice Ride Minnesota. Capital costs of $77,539 for the stations in Downtown Los Angeles, based on a 30 dock per station average, and $69,584 in other areas, based on a 25 dock per station average, were assumed. **Figure 25** illustrates the distribution of capital contributions among Metro and participating jurisdictions based on Metro's 50 percent capital contribution.

Although these capital cost estimates assume a ratio of approximately 1.8 docks per bike, the recent trend in bike share operations has been to work toward a ratio of two docks per bike to reduce the need for bike rebalancing and reduce the number of instances when all docks at a station are full. Holding the number of bikes constant and installing additional docks would result in higher capital costs. On the other hand, using smart bike hardware would reduce the need for physical docking stations and potentially reduce capital costs.

Figure 25 – Capital Contributions



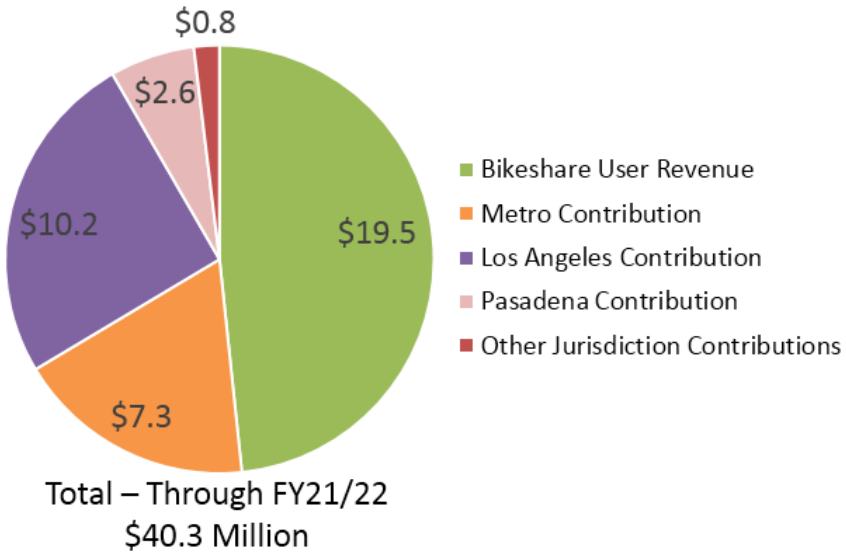
Operating Contributions

Total operating costs were also estimated from Economic and Planning Systems Inc.'s case study research. A per-bike annual operating cost of $2,900, the highest average among the systems studied, was assumed. Despite selecting the high end of the costs for studied systems currently in operation, the estimate could underrepresent actual costs Metro may face due to continued evolution of the bike share industry. As vendors who may have initially offered reduced costs gain experience and a more accurate understanding of the costs and risk of bike share operation, they are adjusting their pricing to capture the full range of costs they incur, including investments in research to advance bike share technology. Bike share operators are also facing increased pressure to provide living wages.

Based on the ridership estimates presented in Chapter 4, below, bikeshare user revenue, including a 50-cent transfer fee and $1.75 per 30 minutes extended use fee, is estimated to total $19.5 million, or approximately 48 percent of total operating cost, through FY21/22.

Figure 26 illustrates the distribution of operating cost contributions among Metro and other jurisdictions, as well as the amount covered by bikeshare user revenue before any sponsorship revenues (see next page) are taken into account.

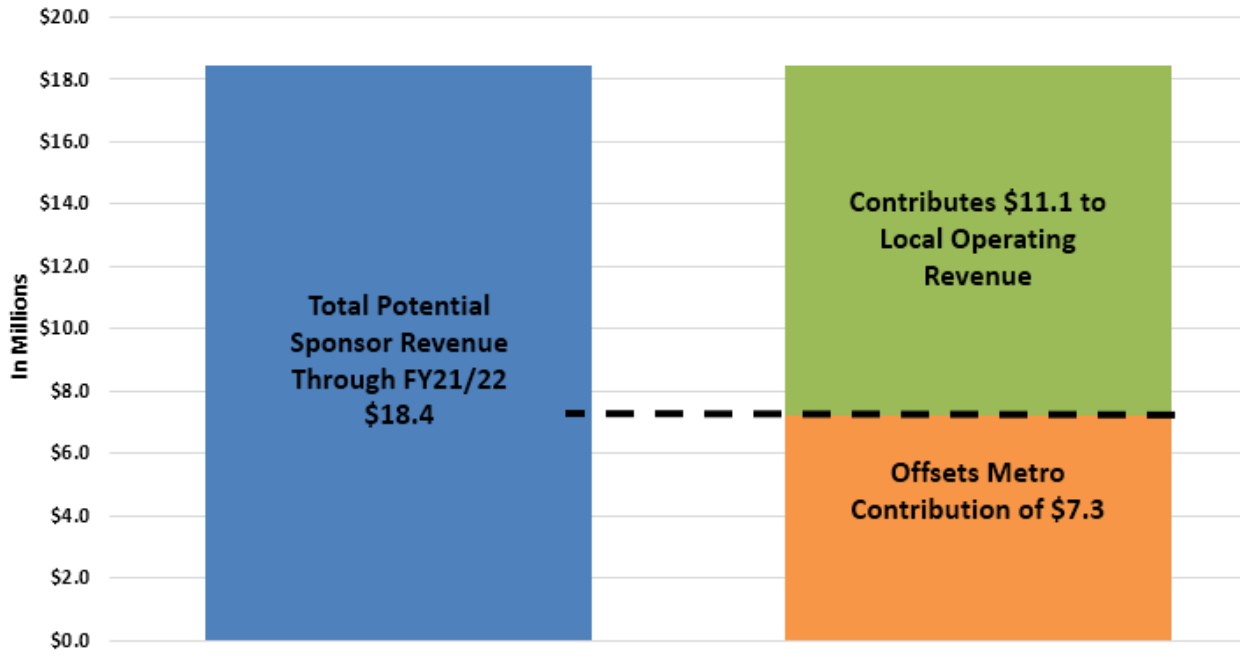
Figure 26 – Operating Contributions



Sponsorship

Although the level of sponsorship revenue that could be expected from the Los Angeles County Regional Bikeshare program is highly uncertain, data from CitiBike, Nice Ride MN, and Denver BCycle suggest that the average annual per-station value of sponsorship could be $11,300, or a total of $18.4 million through FY21/22. **Figure 27** illustrates how this revenue could offset Metro's $7.3 million operating contribution and contribute significantly to offsetting the contributions needed from participating jurisdictions.

Figure 27 – Sponsorship Revenue



BIKESHARE READINESS ANALYSIS

Fehr & Peers developed a Regional Bikeshare Suitability Index based on basic variables associated with high bikeshare ridership. Combining this index with other criteria for financial, political and community support resulted in a ranked list of potential expansion communities. Fehr & Peers then analyzed the effect of the demographic and built environment characteristics on ridership levels in four established bikeshare systems and applied the resulting regression models to estimate ridership for the network of stations proposed for Downtown Los Angeles, Pasadena, and Santa Monica. Comparing the resulting ridership level estimates with the operating characteristics of other established bikeshare systems informed recommendations for the needed number of bikes and docks to support bikeshare demand.

BIKESHARE SUITABILITY INDEX

The Bikeshare Suitability Index combines five broad factors associated with high bikeshare ridership in other major U.S. systems: housing density, population density, employment density, intersection density, and transit frequency. Based on a raster combination of these five variables, the area of Los Angeles County most suitable for bikeshare is generally the crescent of densely developed City of Los Angeles from Exposition Park and Historic South Central Los Angeles north and west through Downtown Los Angeles, Westlake, Koreatown, portions of Echo Park and Silver Lake, East Hollywood, Hollywood, and Beverly Grove/Fairfax, as well as the City of West Hollywood (see **Figure 28**). Portions of the Westside, such as Westwood, Santa Monica, Venice, and Marina del Rey, as well as South Bay cities of Manhattan Beach, Hermosa Beach and Redondo Beach also score well. Smaller clusters of suitability such as North Hollywood, Glendale, Old Town Pasadena, East Los Angeles, Huntington Park, and Downtown Long Beach could also be suitable for bikeshare.

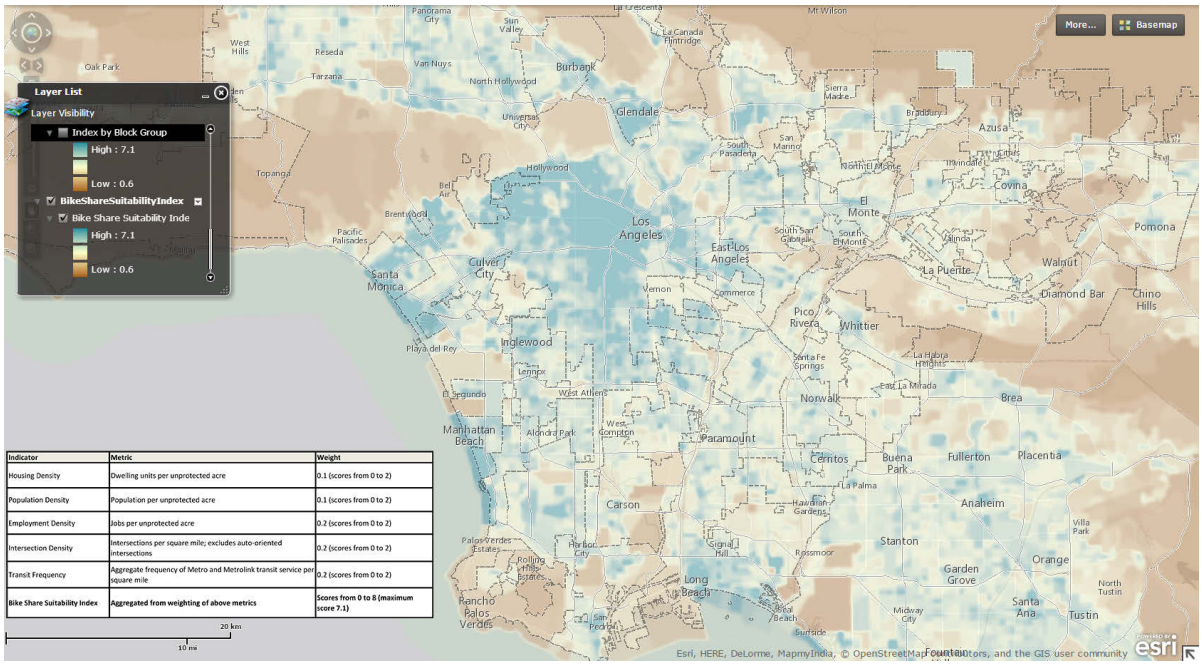


Figure 28 – Bikeshare Suitability Index Web Map

SUITABILITY COMPARISON

Los Angeles County compares favorably to other major metropolitan areas commonly considered to be less sprawling and more conducive to bikeshare. Data available for the Washington, D.C. and San Francisco Bay areas allowed for a direct comparison of the Bikeshare Suitability Index. To help in quantifying the comparisons, areas from each region that scored a 4.0 or above were selected. A quarter-mile buffer (a comfortable walking distance to access a bikeshare station) was then drawn around each high-scoring cluster. In the case of Los Angeles, these buffered areas were further subdivided into cities and communities to aid in selecting and comparing potential expansion areas (see "Expansion Communities," below). The average Suitability Index score for each area was then calculated. Because the quarter-mile buffer reaches beyond areas with a score of 4.0 or above, many area average scores are below 4.0.

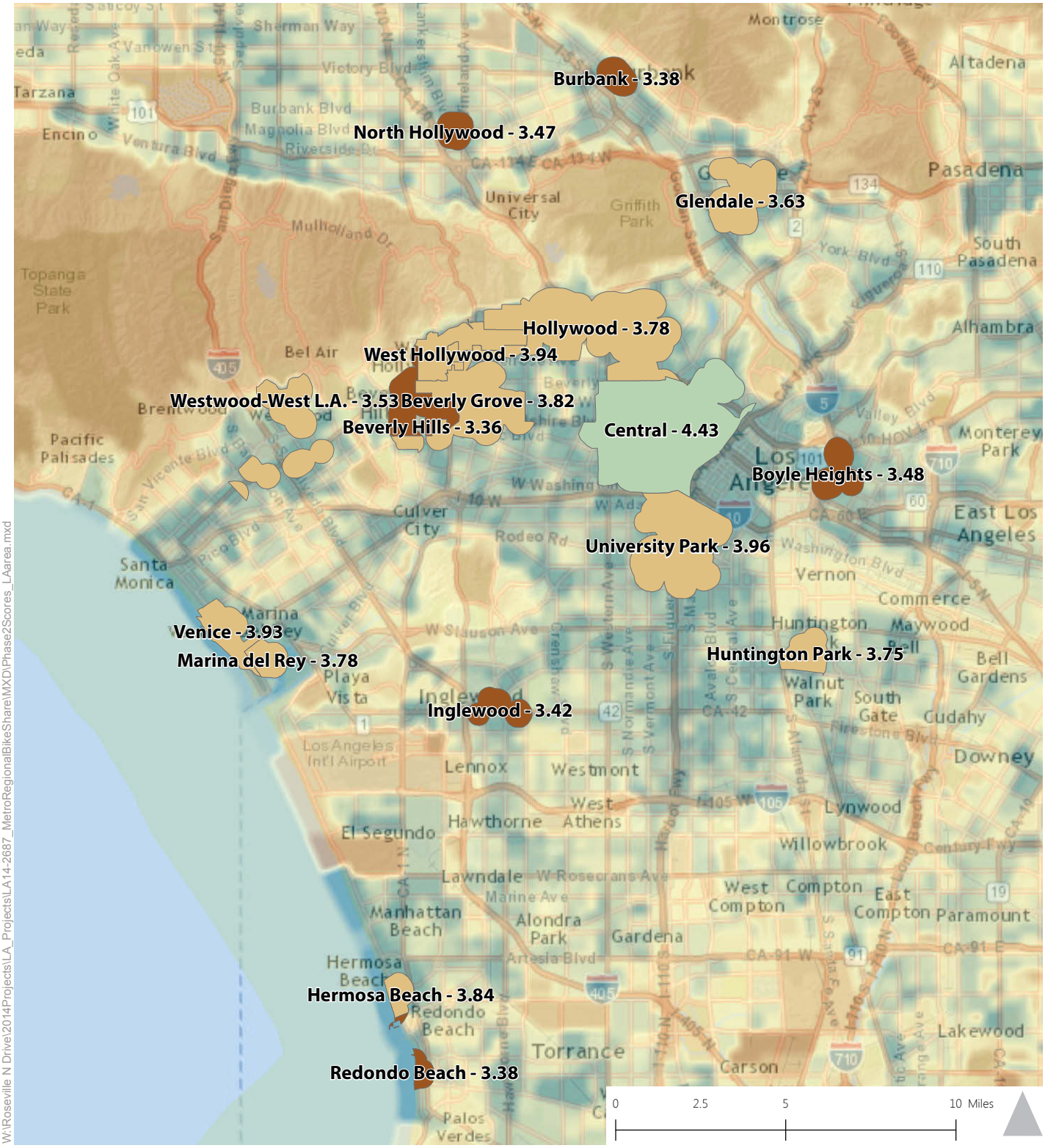
Figures 29 through 31 illustrate the results of the average Bikeshare Suitability Index calculation for these three regions.

The Central expansion community in the City of Los Angeles, which covers an area bounded roughly by the 10 Freeway to the south, Beverly Boulevard and the 101 Freeway to the north, Wilton Place to the west, and the 110 Freeway to the east, receives the highest score in the region: 4.43, which compares

favorably with the highest-scoring parts of San Francisco (4.56) and Washington, D.C. (4.12).[14] Los Angeles also features a large, continuous crescent of relatively high-scoring areas reaching from University Park through Hollywood and West Hollywood to Beverly Hills and Beverly Grove. By contrast, the San Francisco Bay's high-scoring areas, though slightly more suitable than Los Angeles', are concentrated in the City of San Francisco itself. Washington D.C.'s highest-suitability area is concentrated in the urban core of the District of Columbia with a spur to the southwest along the Rosslyn-Ballston corridor along the Orange Metrorail line in Arlington County.

Nevertheless, these two regions are operating bikeshare stations (indicated by red dots) in areas outside the very highest-scoring areas, but in areas of moderate suitability (indicated by light blue on the heat map) or even in areas of relatively low suitability. Los Angeles has large swaths of light blue area that have moderately high suitability and could suggest potential for future expansion. This analysis does not consider the extent or quality of bicycle infrastructure, which is essential for providing a safe, comfortable, and convenient place for bikeshare customers to ride. Bike infrastructure is considered in the comparison of potential expansion communities (see **Table 4**).

[14] The Phase 1 and 2 pilot areas were excluded from this analysis to concentrate on potential expansion communities.



W:\Roseville N Drive\2014Projects\LA_Projects\LA14-2687_MetroRegionalBikeShare\MXD\Phase2Scores_LAarea.mxd

Bike Share Suitability Index

High
- 4.51 - 5.00
- 4.01 - 4.50
- 3.51 - 4.00
- 3.01 - 3.50

Low
- 2.50 - 3.00

High : 7.1

Low : 0.6

Figure 29

Los Angeles
Bike Share Suitability Index

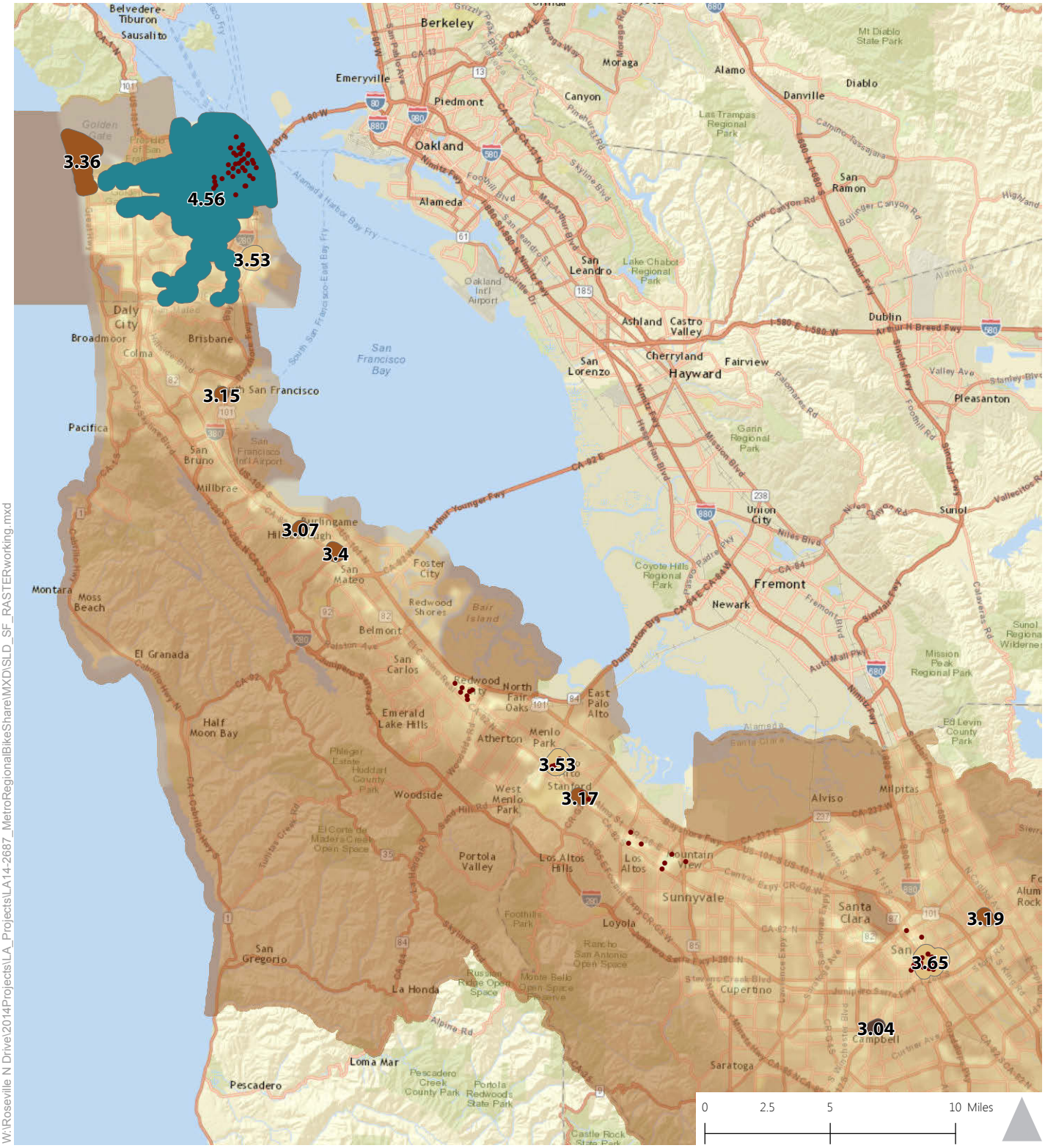


Figure 30

San Francisco
Bike Share Suitability Index

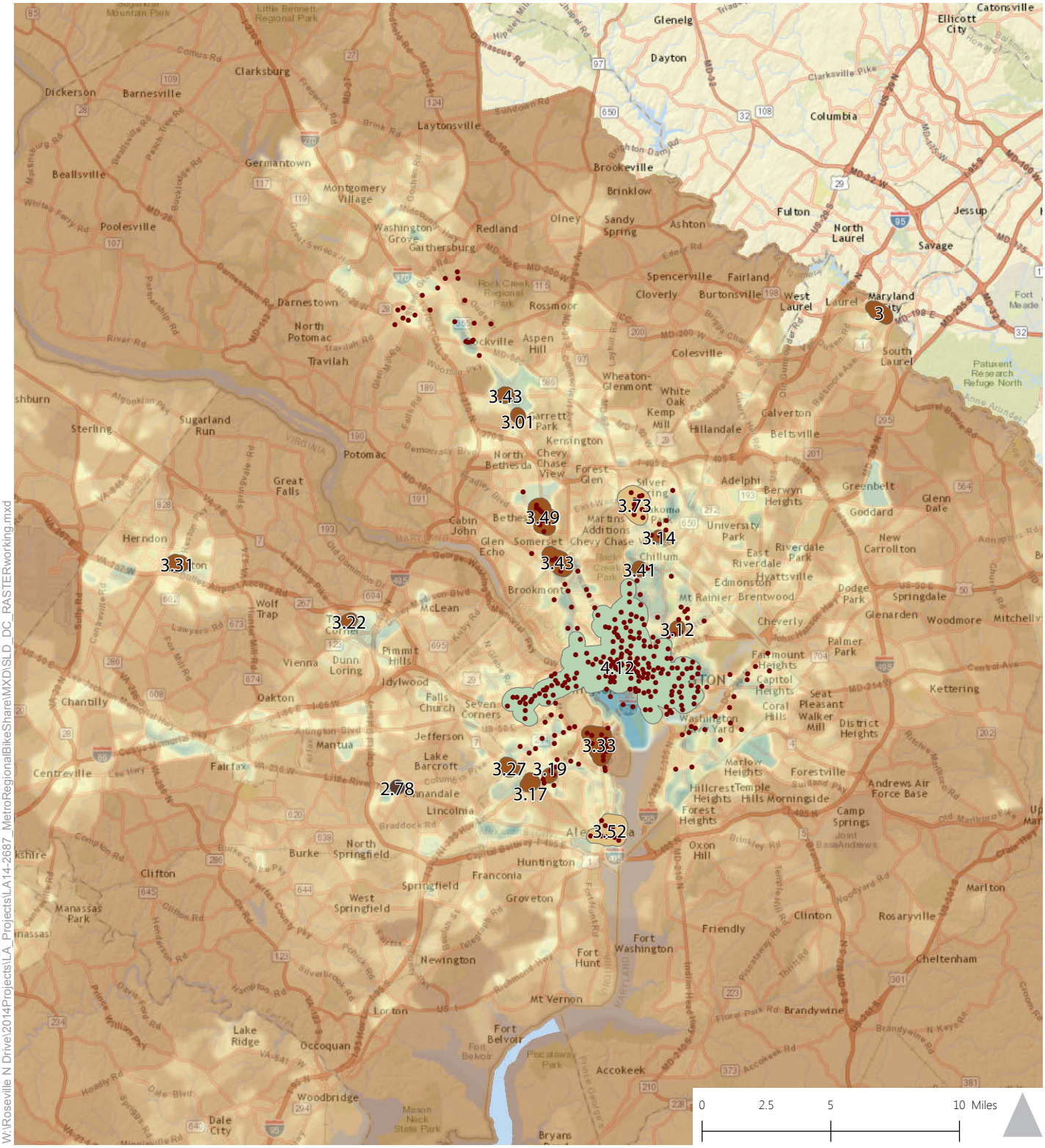


Figure 31

Washington DC
Bike Share Suitability Index

EXPANSION COMMUNITIES

In addition to the quantitative Bikeshare Suitability Index, Fehr & Peers conducted a qualitative assessment of bikeshare system network considerations and financial, community, and political support. Factors considered include:

- **Service area** – size of contiguous area of high bikeshare suitability, according to the Index (see "Suitability Comparison," above)
- **Bike facility coverage –** portion of service area within a quarter mile of a Class 2 (bike lane) or better bicycle facility
- **Connectivity** – proximity of the service area to the pilot service areas and adjacent service areas
- **Active transportation budget** – budget items for walking, bicycling, or transit planning and infrastructure
- **Grants –** current or recent grant pursuits for active transportation or bikeshare projects
- **Programs** – existence of local bike transit services or active transportation programs
- **Advocacy groups** – presence and activity of transportation non-profit or advocacy groups in the community
- **Media coverage** – news and web coverage of local active transportation issues
- **Agenda items** – bikeshare on local government agendas
- **Official support** – expressed support of elected officials or City staff
- **Bicycle plan** – recently updated bicycle plan
- **Bikeshare in plan** – bicycle plan includes planning for bikeshare

Based on these criteria, **Table 4** presents the top-ranking Los Angeles County communities for future bikeshare expansion. Expansion communities include the City of Los Angeles neighborhoods of Central, University Park, Hollywood, Venice, and North Hollywood, as well as the cities of West Hollywood and Huntington Park and the Marina Del Rey and East Los Angeles portions of Los Angeles County. A map of proposed expansion areas is provided in **Appendix D**. **Appendix E** presents suitability scores summarized by city for 88 cities in Los Angeles County. The final schedule and list of participating cities are subject to Metro Board approval and may be adjusted based on Metro Board direction, the outcome of the Phase I Pilot and city readiness of subsequent phases. The cities that participate in the Countywide bikeshare implementation could change based upon a city's desire to participate in the regional program, the availability of funding, and bikeshare readiness, based on community and political support, existing bicycle infrastructure, proximity to transit, land use, and other factors.

	System Network Considerations			Financial, Community, and Political Support								
City / Neighborhood	Service Area	Area within 1/4-Mile of Class 2 or higher Bikeway	Connectivity to Adjacent Service Areas	Budget items for walking, bicycling, or transit planning and infrastructure	Grant pursuits for active transport or bike share	Existence of local bike transit services or active transportation programs	Presence of transport non-profit or advocacy groups	Local media coverage of active transportation issues	Bike share on local government agendas	Expressed support of elected officials or city staff	Updated Bicycle Plan	Bicycle plan includes discussion of/ preparation for bike sharing
Central/University Park	●	●	●	●	●	●	●	●	●	●	●	○
Hollywood	●	●	●	●	●	●	●	●	●	●	●	○
West Hollywood	◒	◒	●	◒	◒	●	●	●	●	●	●	●
Venice	◒	●	●	●	●	●	●	●	●	●	●	○
Marina Del Rey	◒	○	●	●	○	○	○	○	○	●	●	○
Huntington Park	◒	○	○	○	◒	○	○	○	○	○	●	○
North Hollywood	◒	◒	○	●	●	●	●	●	●	●	●	○
East Los Angeles	○	○	○	●	○	○	○	○	○	●	●	○

TABLE 4 – BIKESHARE EXPANSION COMMUNITIES

Key: Suitability	
○	Low
◒	Medium
●	High

RIDERSHIP FORECASTING

Data Collected

Fehr & Peers collected demographic, built environment, and bikeshare system and ridership data on 814 stations in the Divvy (Chicago, IL), CitiBike (New York, NY), NiceRide MN (Minneapolis/St. Paul, MN), and Bay Area Bikeshare (San Francisco / Redwood City / Palo Alto / Mountain View / San Jose, CA) systems to estimate the ridership model. We also collected comparable demographic, built environment, and system structure data to apply the model to 127 proposed bikeshare stations in Los Angeles County: 58 stations in Downtown Los Angeles, 34 stations in Pasadena, and 35 stations in Santa Monica and nearby parts of the City of Los Angeles.

Appendix E provides a complete listing of variables tested in the model. The categories of data collected include:

- Demographic – e.g., population, employment, education, income, race, commute mode; collected in the quarter-mile buffer surrounding each station.
- Built Environment – e.g., transit frequency, configuration of street network; collected in the quarter-mile buffer surrounding each station.
- Station Network Characteristics – e.g., number of stations within a given distance along the street network of each station; collected for each station.
- System Characteristics – e.g., total number of stations, systemwide station density, fee structure, climate variables; collected at the systemwide level.
- Ridership – collected for the first year or season of operation, both as the average monthly number of checkouts at each station and the average monthly number of trips between each pair of stations.

Modeling Structure

The model is organized around pairs of origin and destination stations with demographic, built environment, and station network characteristic data for each origin and destination station, trip data from each origin station to each destination station, and system characteristic data for each system as a whole; total checkout data for each origin station is also available for comparison to the model estimate. The model estimates trips between each pair of origin and destination stations by minimizing the discrepancy between the total estimated trips from the origin station to all other stations and the number of observed checkouts at the origin station. The mathematical form of the model is:

$$\text{Min}\left(S_i - \sum_j F_{ij}\right)^2$$

Subject to:

$$F_{ij} = [\beta_1 * (\text{origin vars.}) + \beta_2 * (\text{destination vars.}) + \beta_3 * (\text{impedance}) + \beta_4 * (\text{System vars.})]$$

Where

$\mathbf{S_i}$ = Average daily number of bikes checked out at each station (observed)

$\mathbf{F_{ij}}$ = Average daily number of trips from station i to station j (estimated)

origin Vars. = demographic, built environment, and station network variables related to the origin station, such as employment, connectivity to other stations, transit frequency, etc.

destination vars. = comparable demographic, built environment, and station network variables related to the destination station

impedance = network-based distance between origin station and destination station

system vars. = variables specific to each bikeshare system, such as density of stations, coverage of service area, weather, membership fee, etc.

The model is solved using a likelihood estimator in Python. This structure provides a more robust estimation of ridership than simple linear regression alone.

Since the stations from the various input systems have different characteristics regarding trip generation and surrounding land use and some stations to be estimated in Los Angeles County are more like stations from some input areas than others, the stations are divided into two clusters based on similar groupings of these characteristics. For example, some parts of Pasadena are more similar to certain parts of Chicago, Minneapolis, San Francisco, and San Jose, while other parts of Pasadena are more similar to other areas of those same cities. More than twenty variables were used to assign stations to clusters; the most distinctive variables were median household income, number of retail jobs, total jobs, high income jobs, and number of residents with bachelor's degree or higher. **Table 5** lists the cluster assignments for stations in Los Angeles and the input systems. Cluster 1 tends to have higher household income, more retail jobs, more total employment, and more residents with bachelor's degrees or higher; however, Cluster 2 has more variability and includes a wider range of these values.

TABLE 5: STATION CLUSTER ASSIGNMENT

Area	*Number of stations in…*			
	Cluster 1	**Cluster 2**	**Other Clusters (not used)**	**Total**
Chicago	153	124	22	299
New York	117	86	128	331
Minneapolis / St. Paul	14	98	3	115
San Francisco	10	11	14	35
Mountain View	7	0	0	7
San Jose	3	12	0	15
Redwood City	0	7	0	7
Palo Alto	3	0	2	5
Los Angeles	0	58	0	58
Pasadena	11	23	0	34
Santa Monica	11	24	0	35
Total	329	443	169	941

Key Factors

Although many factors were considered in developing the ridership forecasting regression equations and assigning bikeshare stations to one of the two model clusters, there are several key factors that drive bikeshare ridership demand. The specific variables and coefficients are different between the two models, but the magnitude and direction of the effects are generally consistent. **Table 6** illustrates the relative importance of these key factors in the two regression equations, ranging from "**+ + + +**" (strongly positive) to "**- - - -**" (strongly negative).

TABLE 6: KEY BIKESHARE RIDERSHIP MODEL FACTORS	
Variable	Effect
Cluster 1 Model	
Percent of Households with No Vehicle Available	+ + + +
Number of bikeshare stations between 1.0 and 1.5 miles from the current station*	+ + +
Total Population over 16 with Bachelor's Degree or Higher*	+
Total Number of Jobs*	+
Total Retail Jobs*	+
Number of bikeshare stations between 2.5 and 3.0 miles from the current station*	- -
Cluster 2 Model	
Total Population over 16 with Bachelor's Degree or Higher*	+ + + +
Number of bikeshare stations between 1.5 and 2.0 miles from the current station	+ + +
Total Retail Jobs*	+ + +
Number of bikeshare stations between 1.0 and 1.5 miles from the current station*	+ +
Total Number of Jobs*	+
Aggregate Transit Frequency	+
Percent of Households with One Vehicle Available	- -
Number of bikeshare stations between 2.5 and 3.0 miles from the current station*	- -

Note: Factors marked with an asterisk appear in both cluster models.

Results

Daily ridership results for Downtown Los Angeles, and Pasadena are presented in **Figures 32 and 33.**

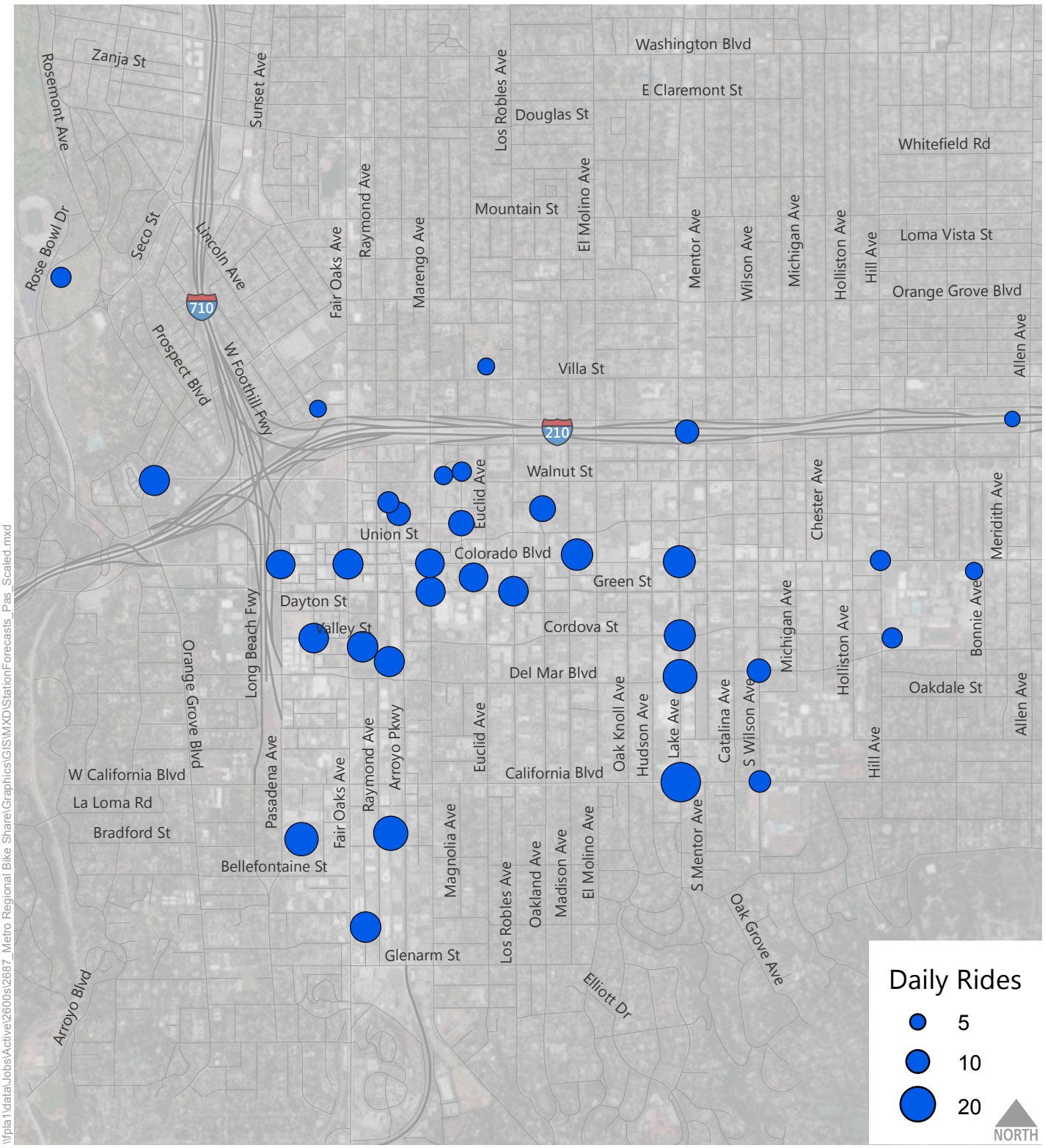
Low, most-likely, and high ridership estimates, based on the confidence bands provided by the model, were developed for each station. Initial model results are based on one year of ridership data, reflecting ridership potential at the six-month mark after system opening. Ridership trends from other U.S. bikeshare systems indicate that ridership increases over time, quickly at first, then leveling off to a stabilized level as new riders familiarize themselves with the system and adopt bikeshare as part of their transportation routine. Six-month, eighteen-month and three-year ridership estimates were also developed to reflect this pattern. Ridership values presented in Figures 27 and 28 represent six-month, most-likely estimates. Values are model estimates only and are subject to significant variation depending on system characteristics such as degree of TAP integration, timing of station roll-out, fare structure and pricing, and level of marketing and promotion.

August 13, 2014

Ridership values represent six-month, most-likely estimates based on ridership patterns in existing U.S. bike share systems. Values are model estimates only and are subject to significant variation depending on system characteristics such as degree of TAP integration, timing of station rollout, fare structure and pricing, and level of marketing and promotion.

Figure 32

Preliminary Station Ridership Estimates
Los Angeles, CA



\\fpla1\data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\StationForecasts_Pas_Scaled.mxd

August 13, 2014

Ridership values represent six-month, most-likely estimates based on ridership patterns in existing U.S. bike share systems. Values are model estimates only and are subject to significant variation depending on system characteristics such as degree of TAP integration, timing of station rollout, fare structure and pricing, and level of marketing and promotion.

Figure 33

Preliminary Station Ridership Estimates
Pasadena, CA

STATION SIZING

Fehr & Peers developed recommendations for the number of needed bikes and docks at each station for the Phase 1 and Phase 2 Pilot service areas of Downtown Los Angeles and Old Town Pasadena to reflect the anticipated level of ridership provided by the model. First, the three-year (stabilized), high ridership estimate (see "Ridership Forecasting," above) was calculated based on model outputs. Because rebalancing stations with full docks is one of the most costly bikeshare operation activities, high-end ridership estimates were used to provide sufficient dock availability for smooth operation.

Next, a review of operations in eight established U.S. bikeshare systems indicates that, on average, each bikeshare bike can serve 2.8 trips per day.[15] Bikes from systems in larger, denser cities like New York and Boston served more trips per day, while bikes in cities like Boulder and San Antonio served fewer trips per day. For calculation purposes in Los Angeles County, each bike was assumed to be capable of serving three trips per day, establishing a need for between 11 and 27 bikes per station.

Finally, interviews with bikeshare operators and the consulting team's experience suggests that providing a ratio of two docks per bike provides opportunities for customers to check in bikes at high-demand locations and reduces the need to constantly rebalance bikes to maintain service reliability; however, not all systems currently use a two-to-one ratio. The recently-implemented Divvy system in Chicago has a ratio of 1.7 docks per bike; the same ratio was assumed for the Los Angeles County system. After calculating the needed number of docks for each station, the station sizes were rounded up to the nearest bin of typical Third Generation (See "Equipment and Technology," below) system hardware. The rounding results in slightly larger stations with an average of 1.8 docks per bike. **Table 7** provides a summary of recommended station sizes for the Phase 1 and 2 systems.

[15] Institute for Transportation & Development Policy. *The Bike-share Planning Guide*. Available: https://www.itdp.org/the-bike-share-planning-guide-2/

TABLE 7: RECOMMENDED STATION SIZES			
Station Size (Docks)	*Number of stations in…*		
	DTLA	**Pasadena**	**Total**
19	2	5	7
23	23	11	34
27	8	10	18
31	8	7	15
35	9	1	10
39	12	0	12
43	1	0	1
47	2	0	2
Total Stations	**65**	**34**	**99**
Total Bikes	**1,090**	**490**	**1,580**
Total Docks	**1,951**	**870**	**2,821**
Docks per Station	**30.0**	**25.6**	**28.5**
Bikes per Station	**16.8**	**14.4**	**16.0**
Docks per Bike	**1.8**	**1.8**	**1.8**

STATION SITING

EQUIPMENT AND TECHNOLOGY

There are two broad categories of bikeshare equipment currently in use. Third Generation ("Smart Dock / Dumb Bike") bikeshare hardware places the bikeshare IT in the docking station and includes minimal electronics on the bike itself. Many currently-operating bikeshare systems in North America, such as Capital Bikeshare, CitiBike, Denver B-Cycle, and Bay Area Bikeshare use Third Generation equipment. Fourth Generation ("Smart Bike / Dumb Dock") bikeshare hardware is an emerging technology that places the bikeshare IT on the bike itself. **Table 8** summarizes key differences in the two technologies.

TABLE 8: KEY BIKESHARE TECHNOLOGY DIFFERENCES

	Third Gen (Smart Dock / Dumb Bike)	Fourth Gen (Smart Bike / Dumb Dock)
Vendors	PBSC, B-cycle, Decobike, Cyclocity, ClearChannel, Bewegen	SoBi, Smoove, Nextbike
Connection	Docks are wired together via plates or top bar. Cell / satellite connection at each station kiosk.	No physical connection. Near-field communication or cell/satellite connection at each bike and kiosk
Power	Solar power via kiosk	Solar power to kiosk; small battery and solar power for each bike
Kiosk	Kiosk must be at every station	Kiosk not necessary
Lock	Via each dock	Via each bike
Arrangement	Different configurable styles (see **Figure 34**)	Hub stations can be arranged in any geometry and in distinct parts

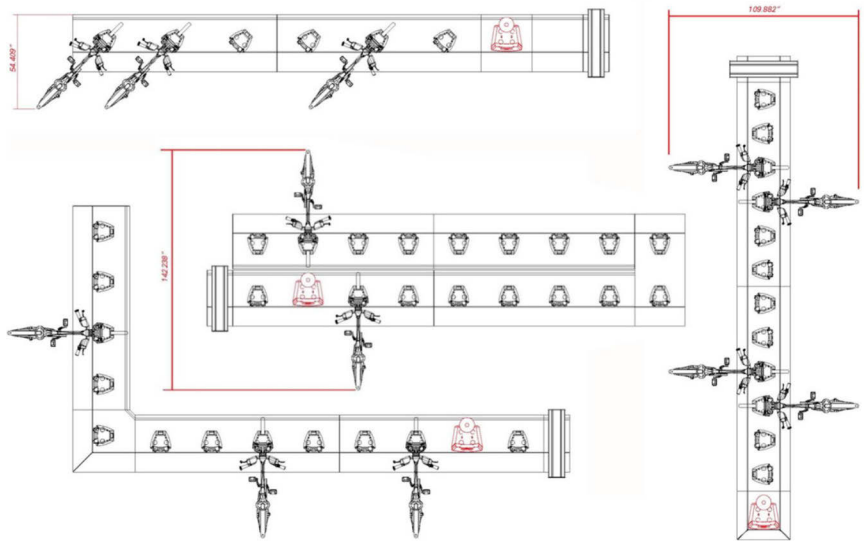


Figure 34 – Example: Smart Docking Station Styles

SITING CONSIDERATIONS

Although Fourth Generation systems allow more flexibility in siting, the consulting team evaluated sites assuming that a vendor using Third Generation technology could be selected. The team considered a variety of factors when evaluating potential bikeshare station sites:

Space

Space is the most basic siting constraint. There must be enough space to accommodate the base plates of the station itself (typically in 6′ by 10′ modules) as well as a clear zone of approximately six feet for backing the bikes out of the station (see **Figure 35**). Clearances around street furniture, curb cuts, high pedestrian volumes, and vertical elements must also be considered. ADA compliance is a key consideration.

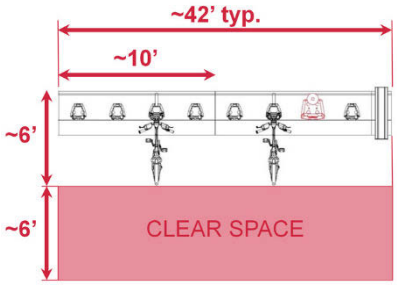


Figure 35 – Typical Modular Station Footprint

Safety

Safety considerations include sufficient clear space to allow users time to check out and return bikes, safety of equipment and users from vehicle collisions, and personal safety (night time lighting and eyes on the street) for users and maintenance staff.

Access

Access is important from multiple perspectives. The station must be easily accessible to users. For station installation and relocation, a crane truck will be needed for approximately half an hour, so the site must be accessible to a larger truck. During operation, vans will need to be able to park briefly to maintain and rebalance bicycles. Maintenance drivers prefer two-way streets so that their routes can be more flexible for quick service; mid-block locations on minor one-way streets where service vans will need to double park are challenging (see **Figure 36**). Locations far from public roadways should be avoided unless easy access for maintenance vehicles is possible.

Figure 36 – Service Van Blocks Right Travel Lane to Rebalance Bikeshare Bike

Visibility

Visibility for users is most important. Stations should be placed in major destinations and transit stations where users will be expecting them. Seeing a station in action is the best way for new users to learn about

the system and visualize themselves using it. Visibility for advertising is a secondary concern. So far, advertisers have valued visibility to automobile traffic more than pedestrian traffic, so street furniture that could block views of the station should be avoided. Not all locations that are highly visible to users will be ideal for advertising.

Property Ownership

Property ownership can affect applicable regulations and the need to negotiate for space. Relationships with major chain stores, universities and hospitals can facilitate station siting in those locations.

Solar Access

Observation and intuition are typically sufficient for ensuring solar access. Bridges, overhangs, and awnings should be avoided. North-facing walls and dense tree canopy can also impair solar access. For essential stations, solar coverage can be sacrificed without the need to hard-wire stations; maintenance crews can replace rechargeable batteries as needed.

Route Planning

Station sites should be evaluated from the perspective of a user who will travel from one station to another. Connections should be established between major transit stations and key destinations; major barriers such as freeway crossings and rivers should be avoided. Midblock locations on one-way streets tempt riders to travel the wrong way to access the station; locating the station at an intersection is better for visibility and allows riders to use crosswalks to access the station if they approach from the opposite side of the street. If possible, stations adjacent to bike lanes should be placed on the same side of the street as the bike lane to reduce the need for street crossings.

Bikeshare Network

A dense, contiguous network of stations is best for attracting and serving riders. Stations located in close proximity provide a backup in case the station is full when the user reaches her destination. Actual station locations should also be checked against planning-level station map to ensure that stations remain well-distributed throughout the siting process. Actual sites can vary from the planned location by as much as a block, so if two adjacent stations are displaced, they could end up being on the same block face.

Street Design Regulations and Guidelines

Bikeshare stations must not cover utility access points. Local guidelines should govern clearances from fire hydrants, crosswalks, driveways, standpipes, doorways, sidewalk widths, and effective widths.

EXAMPLE SITING MATERIALS

The consulting team evaluated each proposed bikeshare site in the field and prepared graphical summaries of candidate sites that were identified. Each proposed station location has multiple candidate sites that could accommodate a bikeshare station. The station siting packet includes an overview aerial image map for each station location with approximate footprints of the candidate sites (see **Figure 37**). Each lettered footprint corresponds to a marked-up photograph further illustrating the conditions at the candidate site (see **Figure 38)**. Finally, an online overview map shows the locations of each proposed station within the region (see **Figure 39)**.

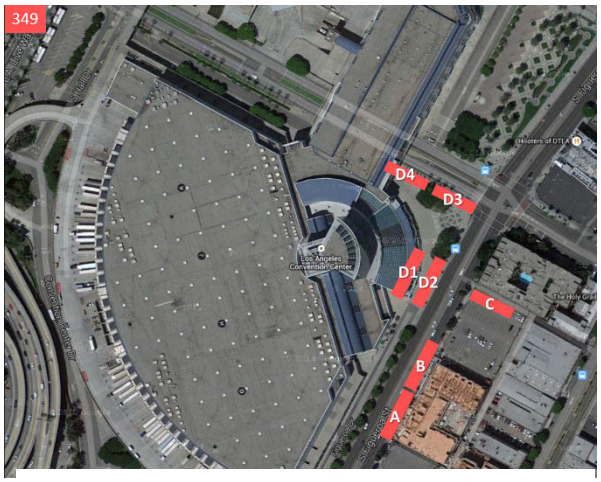


Figure 37 – Aerial Image with Station Footprint Options

Figure 38 – Photograph Illustrating Footprint Option

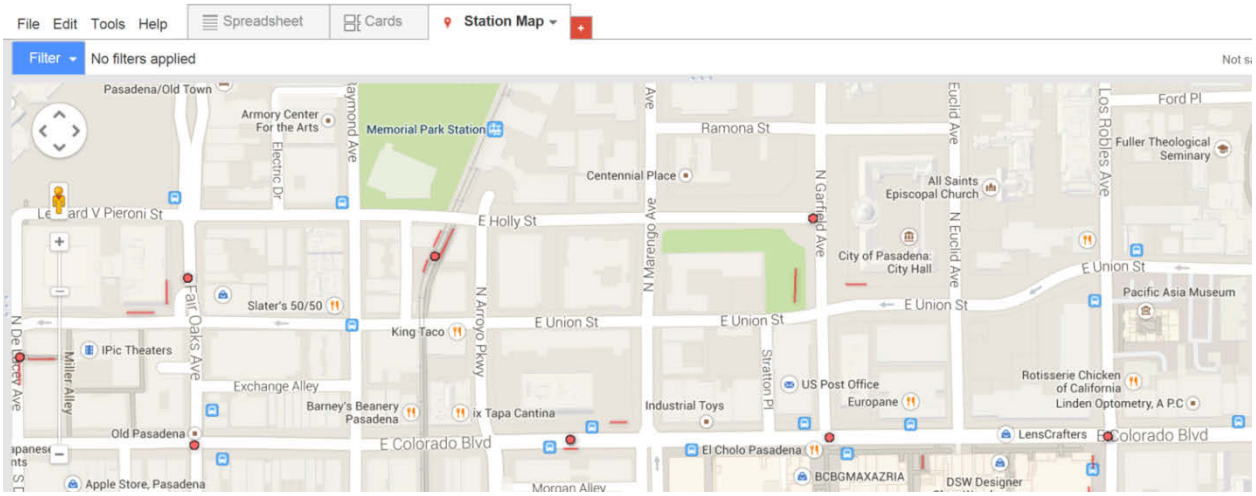


Figure 39 – Overview Map Illustrating Proposed Stations

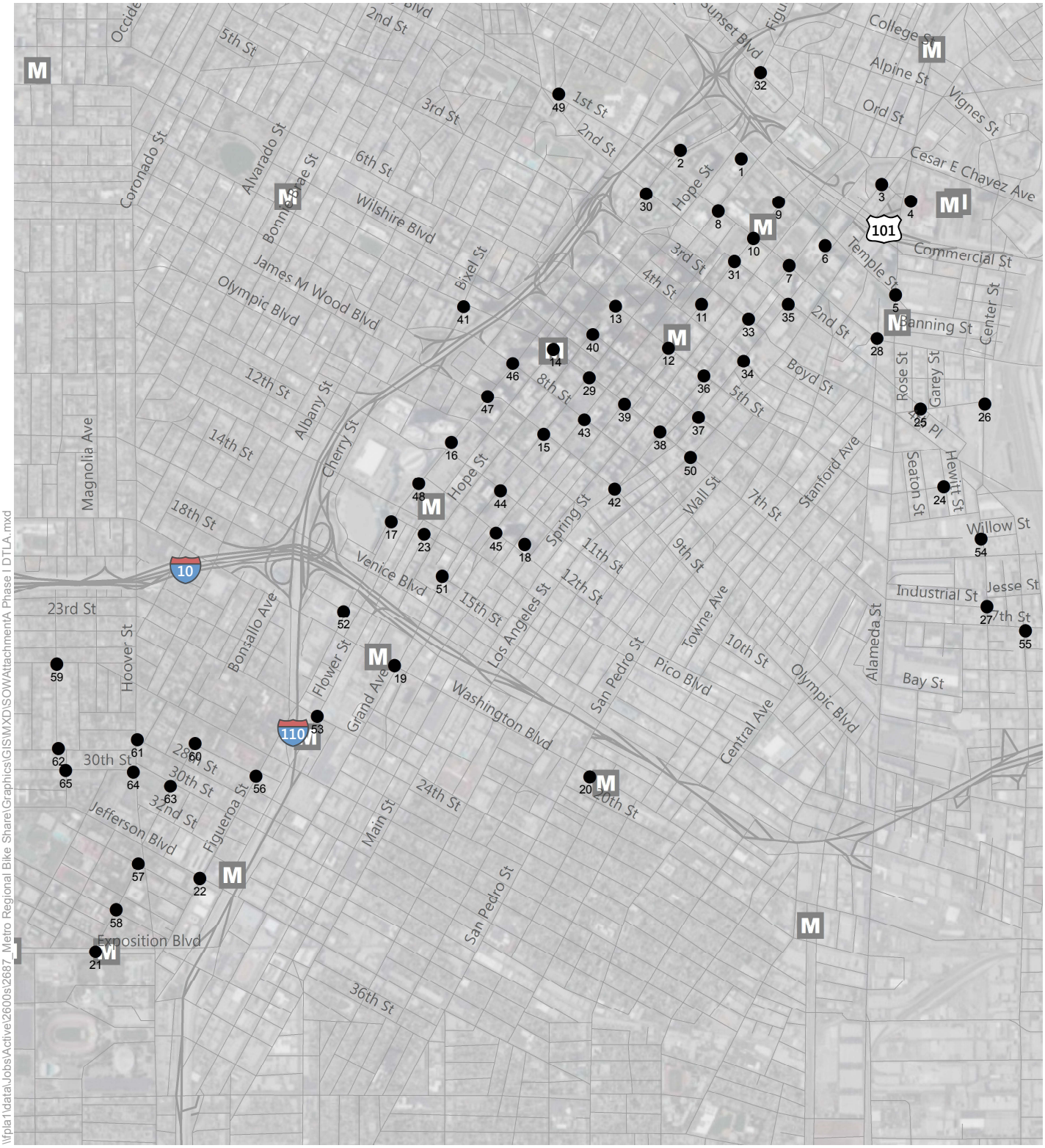
CONCLUSION

A bikeshare system that is accessible to Los Angeles County residents, workers and visitors, and that integrates with existing Metro services can provide a seamless passenger experience and improve the reliability, efficiency and usefulness of Metro's transportation system. With continued investment in bicycle infrastructure, Los Angeles County has several areas that are well-suited for bikeshare ridership, enabling an expansion from 99 stations and 1,580 bikes in the Phase 1 and 2 pilot areas of Downtown Los Angeles and Old Town Pasadena to a total of 254 stations and 3,800 bikes in multiple communities around Los Angeles County that become bikeshare-ready.

Table 9 provides a preliminary timeline for key bikeshare implementation milestones.

TABLE 9: PRELIMINARY BIKESHARE IMPLEMENTATION SCHEDULE

Fiscal Year	Milestone	New Bikes / Stations	Total Bikes / Stations
FY 14/15	Award of Operator Contract	—	—
FY 15/16	Phase 1: Downtown L.A. Pilot	1,090 / 65	1,090 / 65
FY 17/18	Phase 2: Old Town Pasadena Pilot	490 / 34	1,580 / 99
FY 18/19	Phase 3: Central / University Park	936 / 65	2,516 / 164
FY 19/20	Phase 4: Hollywood and West Hollywood	763 / 53	3,279 / 217
FY 20/21	Phase 5: Venice, Marina Del Rey, Huntington Park, North Hollywood, and East L.A. / Boyle Heights	533 / 37	3,812 / 254

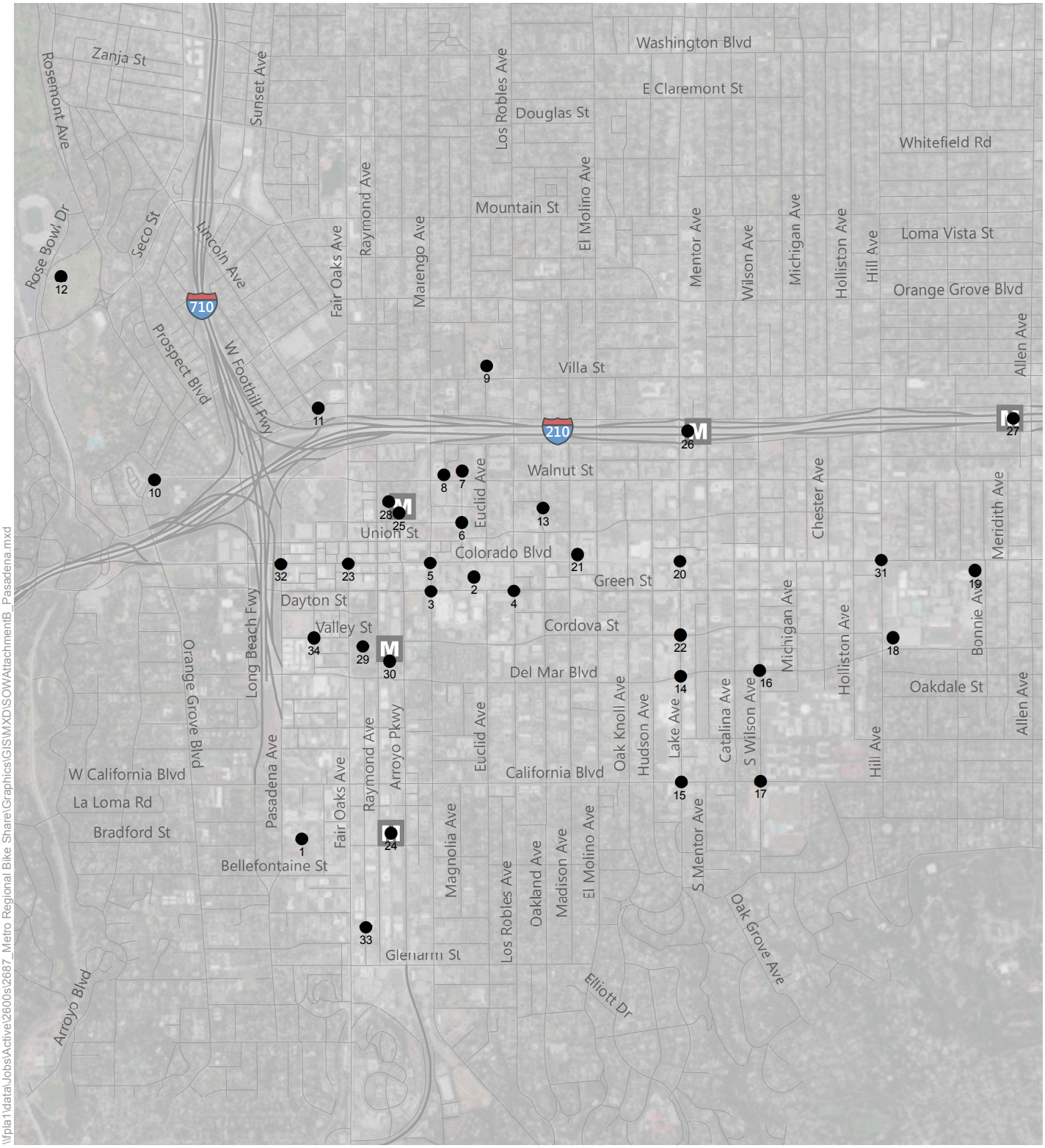

\\fpla1data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\SOWAttachmentA Phase I DTLA.mxd
Metro Rail Station
Recommended Regional Expansion Stations
Phase I - 65 Stations

Recommended Regional Expansion Stations

Phase I Pilot: Downtown Los Angeles

ID	Station	ID	Station
1	Hope / Temple	34	4th / Main
2	Figueroa / Diamond (Figueroa Plaza)	35	2nd / Main
3	North Main / Olvera	36	5th / Spring
4	Alameda (Union Station)	37	6th / Main
5	Alameda / Temple	38	7th / Spring
6	Main / Temple (City Hall)	39	7th / Hill
7	1st / Spring	40	6th / Hope
8	1st / Grand	41	7th / Bixel
9	Hill / Temple (Grand Park)	42	9th / Main
10	1st / Hill	43	8th / Olive
11	Hill (Angel's Flight)	44	11th / Grand
12	5th / Hill (Pershing Square)	45	12th / Olive
13	5th / Hope stairs (Library)	46	8th / Figueroa
14	7th / Flower (Metro Center)	47	9th / Figueroa
15	9th / Grand	48	12th / Figueroa
16	11th / Figueroa	49	1st / Toluca
17	Pico / Figueroa (Convention Center)	50	7th / Los Angeles
18	12th / Hill (DPW)	51	14th / Grand
19	Washington / Grand (Grand Station)	52	18th / Figueroa
20	Washington (San Pedro Station)	53	23rd / Flower
21	Exposition (Expo Park/USC Station)	54	Willow / Mateo
22	Jefferson / Figueroa (Jefferson/USC Station)	55	7th / Santa Fe
23	Cameron / Flower (Pico Station)	56	27th / Figueroa
24	5th / Hewitt	57	34th / Trousdale
25	3rd / Traction	58	36th / Trousdale
26	3rd / Santa Fe	59	W Adams Blvd / Ellendale Pl
27	Industrial / Mateo	60	W 27th St / University Ave
28	1st / Central	61	W 28th St / Hoover St
29	7th / Grand	62	Ellendale Pl / W 29th St
30	2nd / Figueroa	63	University Ave / W 30th St
31	2nd / Hill	64	McClintock Ave / W 30th St
32	Cesar E Chavez / Figueroa	65	Orchard Ave / W 30th St
33	3rd / Spring		

Note: Tentative locations are for planning purposes only and are subject to relocation based on policy and physical constraints.



\\fpla1\data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\SOWAttachmentB_Pasadena.mxd

M Metro Rail Station

Recommended Regional Expansion Stations

- Phase II - 34 Stations

Recommended Regional Expansion Stations

Phase II: Pasadena

ID	Station
1	Huntington Hospital
2	Garfield (Paseo Colorado)
3	Green / Marengo
4	Green / Los Robles
5	Colorado / Marengo
6	Garfield / Holly (Pasadena City Hall)
7	Pasadena Library
8	Garfield / Walnut (Library west)
9	Villa / Euclid (Villa Park)
10	Orange Grove / Walnut
11	Lincoln / Eureka / Maple
12	Arroyo (Rose Bowl)
13	Union / Oakland (Fuller Seminary)
14	Del Mar / Lake
15	California / Lake
16	Del Mar / Wilson
17	California / Wilson
18	Del Mar / Hill (Pasadena Community College)
19	Colorado / Bonnie (Pasadena Community College)
20	Colorado / Lake
21	Colorado / Madison
22	Cordova / Lake
23	Colorado / Fair Oaks
24	Raymond / Filmore (Fillmore Station)
25	Holly (Memorial Park Station)
26	Lake (Lake Station)
27	Allen (Allen Station)
28	Memorial Park
29	Central Park
30	Del Mar / Arroyo (Del Mar Station)
31	Colorado / Hill
32	Colorado / Pasadena
33	Edmondson Alley
34	Valley / DeLacey

Note: Tentative locations are for planning purposes only and are subject to relocation based on policy and physical constraints.

APPENDIX C – PRELIMINARY BIKESHARE FINANCIAL ESTIMATES

Integrated as Muni Fare Structure; Net Operations Funding

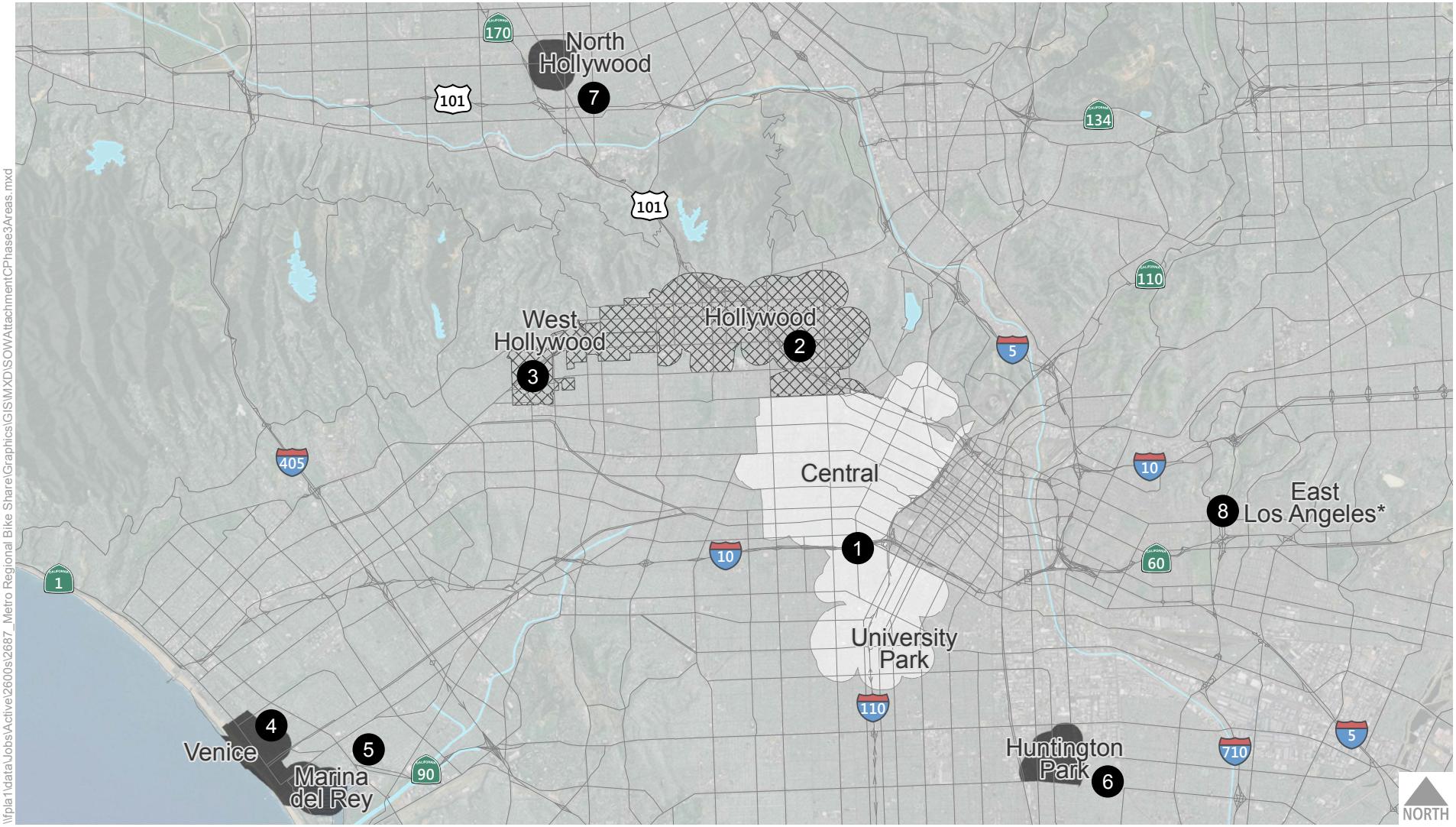
			Cost Per station:*	$ 77,539	$ 69,584	$ 69,584	$ 69,584	$ 69,584	$ 69,584	$ 69,584	$ 69,584	$ 69,584
				FY 15/16	**FY 16/17**	**FY 17/18**	**FY18/19**	**FY 19/20**	**FY 20/21**	**FY 21/22**	**FY 22/23**	**FY 23/24**
Bikes and Docks				**Phase 1: DTLA Pilot +65 Stations & O&M (1.5 yrs)**		**Phase 2: Pasadena +34 Stations**	**Phase 3: +65 Stations**	**Phase 4: +53 Stations**	**Phase 5: +37 Stations**	**Full System O&M**	**Full System O&M**	**Full System O&M**
	Total Bikes			1,090	1,090	1,580	2,516	3,279	3,812	3,812	3,812	3,812
	Total Stations			65	65	99	164	217	254	254	254	254
Capital*												
Costs	***Bikes***			1,090		490	936	763	533	0	0	0
	Stations	Bikes per /Station Ratio**	16.7 for DTLA , 14.4 for others	**65**		**34**	**65**	**53**	**37**	0	0	0
				5,040,035	-	2,365,856	4,522,960	3,687,952	2,574,608	-	-	-
	Rebalancing Vans	*Provided by Operator as part of O&M agreement*		-		-	-	-	-			
Funding/Revenue	***Metro Contribution (50% Capital)***			2,520,018	-	1,182,928	2,261,480	1,843,976	1,287,304			
	Los Angeles Contribution (50% Capital)			2,520,018			2,261,480	1,461,264	487,088			
	Pasadena Contribution (50% Capital)					1,182,928						
	Other Cities Contribution (50% Captial)							382,712	800,216			
O&M*												
Costs	***Annual Per Bike $***	$ 2,900	**Total:**	**1,580,500**	**3,161,000**	**3,161,000**	**4,582,000**	**7,296,400**	**9,509,680**	**11,054,800**	**11,054,800**	**11,054,800**
	Phase 1 - DTLA			1,580,500	3,161,000	3,161,000	3,161,000	3,161,000	3,161,000	3,161,000	3,161,000	3,161,000
	Phase 2 - Pasadena			-	-	-	1,421,000	1,421,000	1,421,000	1,421,000	1,421,000	1,421,000
	Phase 3			-	-	-	-	2,714,400	2,714,400	2,714,400	2,714,400	2,714,400
	Phase 4			-	-	-	-	-	2,213,280	2,213,280	2,213,280	2,213,280
	Phase 5			-	-	-	-	-	-	1,545,120	1,545,120	1,545,120
Funding/Revenue	*Estimated User Revenue - DTLA*			748,749	1,552,219	1,606,940	1,669,526	1,669,526	1,669,526	1,669,526	1,669,526	1,669,526
	Estimated User Revenue - Pasadena			-	-	-	402,819	441,053	462,890	462,890	462,890	462,890
	*Estimated User Revenue - Phase 3****			-	-	-	-	1,536,814	1,649,130	1,713,359	1,713,359	1,713,359
	*Estimated User Revenue - Phase 4****			-	-	-	-	-	1,160,730	1,201,650	1,248,451	1,248,451
	*Estimated User Revenue - Phase 5****			-	-	-	-	-	-	413,695	452,961	475,388
	Total Estimated User Revenue			**748,749**	**1,552,219**	**1,606,940**	**2,072,346**	**3,647,393**	**4,942,276**	**5,461,120**	**5,547,187**	**5,569,614**
	as % of operating cost			47%	49%	51%	45%	50%	52%	49%	50%	50%
	- plus -											
Net	*Metro Contribution (35% Net O&M) - DTLA*			291,113	563,073	543,921	522,016	522,016	522,016	522,016	522,016	522,016
	Metro Contribution (35% Net O&M) - Pasadena			-	-	-	356,363	342,981	335,338	335,338	335,338	335,338
	Metro Contribution (35% Net O&M) - Phase 3			-	-	-	-	412,155	372,845	350,364	350,364	350,364
	Metro Contribution (35% Net O&M) - Phase 4			-	-	-	-	-	368,392	354,071	337,690	337,690
	Metro Contribution (35% Net O&M) - Phase 5			-	-	-	-	-	-	395,999	382,256	374,406
	Los Angeles Contribution - DTLA			540,638	1,045,708	1,010,139	969,458	969,458	969,458	969,458	969,458	969,458
	Pasadena Contribution - Pasadena			-	-	-	661,817	636,966	622,771	622,771	622,771	622,771
	Los Angeles Contribution - Phase 3			-	-	-	-	765,431	692,426	650,677	650,677	650,677
	Los Angeles Contribution - Phase 4			-	-	-	-	-	684,157	657,560	627,139	627,139
	Other Cities Contribution - Phase 5 (includes some areas of City of Los Angeles)			-	-	-	-	-	-	735,426	709,904	695,326
Total cost/yr (cap + exp)				**6,620,535**	**3,161,000**	**5,526,856**	**9,104,960**	**10,984,352**	**12,084,288**	**11,054,800**	**11,054,800**	**11,054,800**
				TOTAL PHASE I	9,781,535				**TOTAL ALL Years**	**58,536,791**	**69,591,591**	**80,646,391**
			Total Metro Contribution (Net)	2,811,130	563,073	1,726,849	3,139,859	3,121,128	2,885,895	1,957,788	1,927,665	1,919,815
			Total Cities Contributions (Net)	3,060,656	1,045,708	2,193,067	3,892,755	4,215,830	4,256,116	3,635,892	3,579,949	3,565,371

Phase 3,4 & 5 Neighborhoods			
Cities	**Neighborhood**	**Stations**	**Installation**
City of LA	Central / University Park	65	FY 18/19
City of LA	Hollywood	42	FY 19/20
West Hollwywood	West Hollywood	11	FY 19/20
City of LA	Venice	4	FY 20/21
City of LA/ County	Marina Del Rey	3	FY 20/21
Huntington Park	Huntington Park	10	FY 20/21
LA City	North Hollywood	10	FY 20/21
LA County	East L.A. / Boyle Heights	10	FY 20/21

* The per-station capital costs and per-bike operating costs are based on Econmic Planning Systems Inc.'s case study research on Capital Bikeshare, Boulder B-Cycle, Denver B-cycle and Nice Ride Minnesota. We assumed capital costs of $55,000 per station We assumed per-bike annual operating costs of $2,500. Inlcudes kiosks, docking, hardware/software and installations.

**Bikes/Station Ratio was estimated by Fehrs and Peers to 16.8 for LA, 14.4 for Pasadena. We are using 14.4 ratio for all phase 3 cities

***Revenue for Phases 3, 4, and 5 is estimated in proportion to estimated ridership for the stations anticipated in each phase.



\\fpla1\data\Jobs\Active\2600s\2687_Metro Regional Bike Share\Graphics\GIS\MXD\SOW\AttachmentCPhase3Areas.mxd

* A specific boundary for the East Los Angeles Expansion Area has not yet been identified.

Preliminary Regional Expansion Areas

- Phase III - 65 Stations
- Phase IV - 53 Stations
- Phase V - 37 Stations

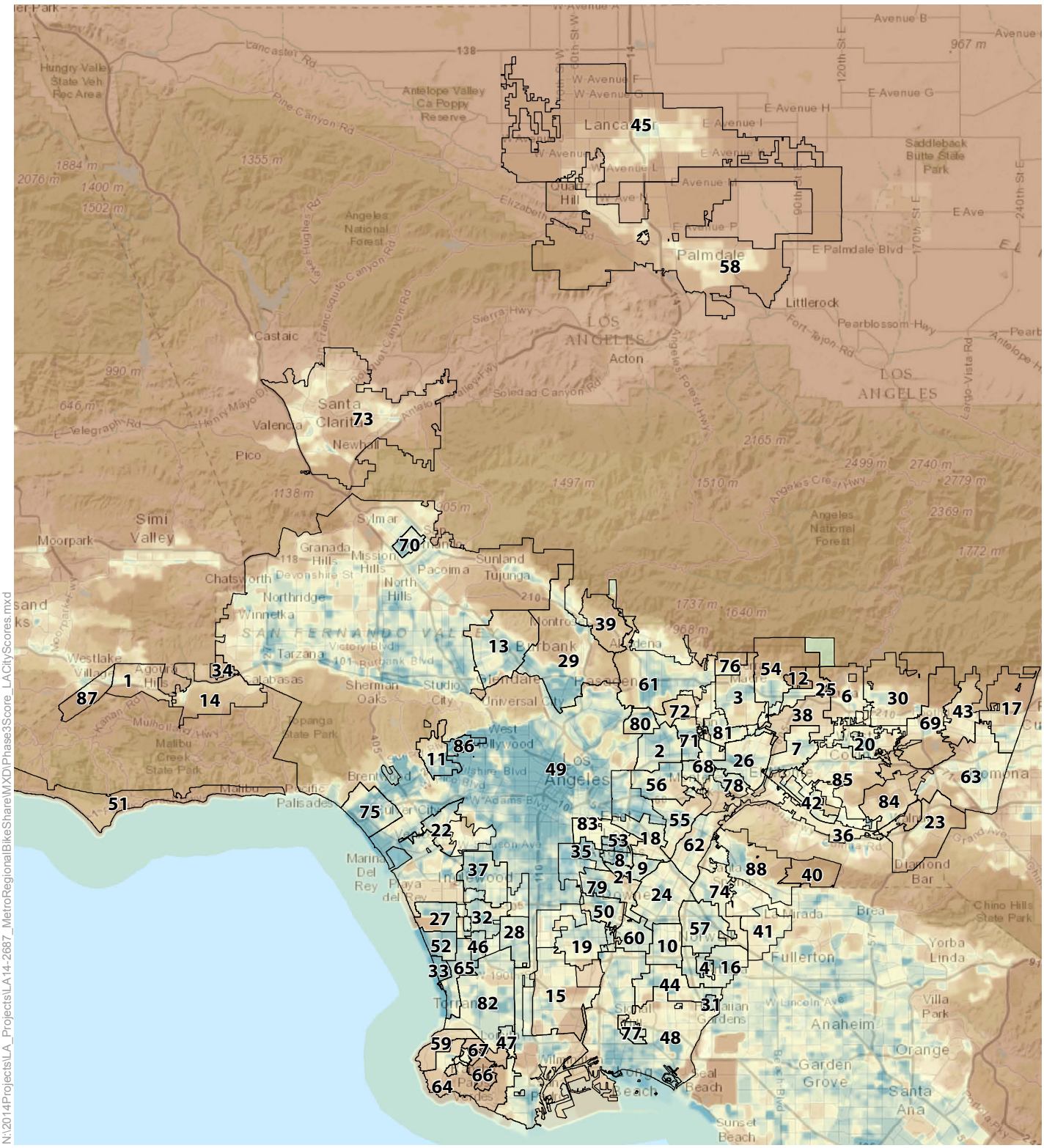
1 Expansion Area

Preliminary Regional Expansion Areas

Phase III, IV, and V Communities

#	Community
Phase III – 65 Stations	
1	Central / University Park
Phase IV – 53 Stations	
2	Hollywood
3	West Hollywood
Phase V – 37 Stations	
4	Venice
5	Marina Del Rey
6	Huntington Park
7	North Hollywood
8	East Los Angeles*

Note: A specific boundary for the East Los Angeles Expansion Area has not yet been identified.



Appendix E

Los Angeles Regional Bike Share Suitability Index Los Angeles Cities

Bike Share Expansion Communities

City/Neighborhood	Suitability Index Score	City/Neighborhood	Suitability Index Score
Central	4.43	Marina Del Rey	3.78
University Park	3.96	Huntington Park	3.75
Hollywood	3.78	North Hollywood	3.47
West Hollywood	3.94	East Los Angeles	n/a - area not yet defined
Venice	3.93		

Los Angeles Regional Cities Bike Share Suitability Index

Map ID	City	Suitability Index Score	Map ID	City	Suitability Index Score
1	Agoura Hills	1.34	45	Lancaster	0.89
2	Alhambra	2.47	46	Lawndale	2.16
3	Arcadia	1.88	47	Lomita	2.23
4	Artesia	2.46	48	Long Beach	2.15
5	Avalon	2.05	49	Los Angeles	2.05
6	Azusa	1.42	50	Lynwood	2.38
7	Baldwin Park	2.54	51	Malibu	0.92
8	Bell	2.45	52	Manhattan Beach	2.05
9	Bell Gardens	2.33	53	Maywood	2.95
10	Bellflower	2.18	54	Monrovia	1.21
11	Beverly Hills	2.27	55	Montebello	1.98
12	Bradbury	0.68	56	Monterey Park	2.19
13	Burbank	2.01	57	Norwalk	2.28
14	Calabasas	1.20	58	Palmdale	0.85
15	Carson	1.77	59	Palos Verdes Estates	1.43
16	Cerritos	2.26	60	Paramount	2.31
17	Claremont	1.20	61	Pasadena	1.65
18	Commerce	2.14	62	Pico Rivera	1.93
19	Compton	2.14	63	Pomona	1.73
20	Covina	1.97	64	Rancho Palos Verdes	1.36
21	Cudahy	2.34	65	Redondo Beach	2.55
22	Culver City	2.38	66	Rolling Hills	0.83
23	Diamond Bar	1.31	67	Rolling Hills Estates	1.35
24	Downey	2.20	68	Rosemead	2.18
25	Duarte	1.95	69	San Dimas	1.16
26	El Monte	2.19	70	San Fernando	2.55
27	El Segundo	2.37	71	San Gabriel	2.35
28	Gardena	2.40	72	San Marino	1.69
29	Glendale	1.81	73	Santa Clarita	1.14
30	Glendora	1.20	74	Santa Fe Springs	1.99
31	Hawaiian Gardens	2.55	75	Santa Monica	2.76
32	Hawthorne	2.59	76	Sierra Madre	1.49
33	Hermosa Beach	2.81	77	Signal Hill	2.23
34	Hidden Hills	1.02	78	South El Monte	2.18
35	Huntington Park	3.03	79	South Gate	2.28
36	Industry	2.10	80	South Pasadena	2.19
37	Inglewood	3.50	81	Temple City	2.10
38	Irwindale	1.47	82	Torrance	2.31
39	La Canada Flintridge	1.20	83	Vernon	2.04
40	La Habra Heights	0.83	84	Walnut	1.36
41	La Mirada	1.91	85	West Covina	1.72
42	La Puente	2.07	86	West Hollywood	3.91
43	La Verne	1.45	87	Westlake Village	1.07
44	Lakewood	2.10	88	Whittier	1.81

APPENDIX F:

Variables Considered in Ridership Forecasting Model

- Total Stations within 3200 Meters
- Average Median Household Income
- Total Population
- Percent of Population Aged 20-34
- Percent of Population Aged 35-54
- Percent of Population by Race: Latino
- Percent of Population by Race: White
- Percent of Population by Race: Black or African American
- Percent of Population by Race: American Indian
- Percent of Population by Race: Asian
- Percent Non-White Population
- Percent Bike Commuters
- Percent Alternative Commuters (Bike + Walk + Public Transit)
- Percent of Workers Who Commuted by Car, Truck or Van
- Percent of Households with No Vehicle Available
- Percent of Households with 1 Vehicle Available
- Percent of Households with 2 Vehicles Available
- Percent of Households with 3 or More Vehicles Available
- Total Population over 16 with less than a High School Diploma or Equivalent
- Total Population over 16 with High School Diploma or Higher
- Total Population over 16 with Some College or Associates Degree or Higher
- Total Population over 16 with Bachelor's Degree or Higher
- Percent of population between the ages of 16 and 64 who worked 35 or more hours per week 40 or more weeks per year (Full-Time Employed)
- Percent of Population Ages of 16 and 64 who worked 1 to 34 hours
- Total number of jobs
- Total Number of jobs with earnings greater than $3333/month
- Total Number of jobs in NAICS sector 44-45 (Retail Trade)
- Aggregate Transit Frequency
- Number of bikeshare stations within 0.5 mile of the current station
- Number of bikeshare stations between 0.5 and 1.0 miles from the current station
- Number of bikeshare stations between 1.0 and 1.5 miles from the current station
- Number of bikeshare stations between 1.5 and 2.0 miles from the current station
- Number of bikeshare stations between 2.0 and 2.5 miles from the current station
- Number of bikeshare stations between 2.5 and 3.0 miles from the current station
- Number of bikeshare stations more than 3.0 miles from the current station
- Total Stations in the system
- Station Density (per SqMi) in the system
- System Area Covered (1/2 mile buffer)
- Member Free Trip Time Period (mins)
- Walk-Up Free Trip Time Period (mins)
- Annual Membership ($)
- Day Membership ($)
- Annual Precipitation Days
- Heating Degree Days (below 60)
- Cooling Degree Days (above 80)