Emeryville Berkeley Oakland Transit Study

Final Report

January 2015

City of Emeryville

1333 Park Avenue

Emeryville, CA 94608

This project was completed in coordination with:

City of Berkeley

City of Oakland

Alameda-Contra Costa Transit

Bay Area Rapid Transit

Amtrak Capitol Corridor

Emeryville Transportation Management Association

West Berkeley Transportation Management Association

Alameda County Transportation Commission

Metropolitan Transportation Commission

Caltrans District 4

Federal Transit Administration

Emeryville Berkeley Oakland Transit Study

Final Report

January 2015

Prepared by:

CDM Smith

In association with:

CHS Consulting Group

BAE Urban Economics

MIG Inc.

Nancy Whelan Consulting

Funded by:

Federal Transit Administration

Section 5304 Transit Planning Grant

City of Emeryville

1333 Park Avenue

Emeryville, CA 94608

Project Participants

Technical Advisory Committee

City of Berkeley – Transportation – Matt Nichols, Andrew Heidel, Fatema Crane

City of Berkeley – Planning – Alex Amoroso, Jordan Harrison, Warren Logan

City of Berkeley – Economic Development – Jennifer Cogley

City of Emeryville – Transportation – Michael Roberts

City of Emeryville – Planning – Charles S. Bryant

City of Emeryville – Economic Development – Amber Evans

City of Oakland – Transportation – Jamie Parks

City of Oakland – Planning – Elois Thornton

City of Oakland – Economic Development – Margot Lederer Prado

AC Transit – Planning – Nathan Landau

AC Transit – Operations – Stephen Newhouse

BART – Planning – Duncan Watry

BART – Planning – Hannah Lindelof

Emeryville and West Berkeley Transportation Management Associations – William Gray

Emeryville and West Berkeley Transportation Management Associations – Planning – Trudy Presser

Emeryville and West Berkeley Transportation Management Associations – Operations – Roni Hattrup

Capitol Corridor – Planning – James Allison

Alameda County Transportation Commission – Planning – Kara Vuicich

Metropolitan Transportation Commission – Transit - Kenneth Folan

Policy Advisory Committee

Berkeley Mayor's Office – Calvin Fong

Emeryville Mayor – Jac Asher

Oakland Mayor's Office – Melissa Vargas, Michael Johnson

AC Transit Board Member –Greg Harper

BART Directors– Zakhary Mallett, Rebecca Saltzman

Emeryville Transportation Management Association Board President – Geoff Sears

West Berkeley Transportation Management Association Board President – Trina Ostrander

Berkeley Chamber of Commerce – Erik Holland

Emeryville Chamber of Commerce – Bob Canter

Oakland Metropolitan Chamber of Commerce – Charissa Frank

West Oakland Commerce Association – Steve Lowe

Berkeley Resident – Paula Bradford

Emeryville Resident – John Scheuerman

Oakland Residents – Suzanne Loosen, Ray Kidd

East Bay Housing Organizations – Darin Lounds

Center for Independent Living – Ben NcMullan, Brandon Young

Councils, Boards, Committees and Groups

Berkeley City Council

Emeryville City Council

Oakland City Council

Alameda- Contra Costa Transit Board

Bay Area Rapid Transit Board of Directors

Emeryville Transportation Management Association

Berkeley Transportation Commission

Emeryville Economic Development Committee

Emeryville Planning Commission

Emeryville Transportation Committee

Oakland Community Economic Development Committee

Oakland Planning Commission

Oakland Public Works Committee

West Oakland Business Alert

West Oakland Neighbors

Alliance of Californians for Community Empowerment (ACCE)

Emeryville Staff

Project Manager – Diana Keena

Assistant Planner – Sara Billing

Interns – Brandon Harrell, Maria Bakali

Oakland Staff Coordination

Broadway Transit Study - Zach Seal, Bruce Williams

Consultants

CDM Smith – Bill Hurrell, Brian Soland, Peter Martin, Kelly Clonts

CHS Consulting Group – Bill Lieberman

MIG Inc. – Jamillah Jordan, Joan Chaplick

BAE Urban Economics – Ron Golem, Jessica Hitchcock

Nancy Whelan Consulting – Nancy Whelan, Tina Spencer

Caltrans Staff

Project Manager - Sergio Ruiz

Project Supervisor – Becky Frank

TABLE OF CONTENTS

List of Figures

List of Tables

Appendices

Executive Summary

Background

Beginning in June 2013, the Emeryville-Berkeley-Oakland Transit Study (EBOTS) has focused on engaging numerous stakeholders and experts to develop visions for improving transit access throughout the Emeryville, West Berkeley, and West Oakland corridor. Using a Federal Transit Administration grant through Caltrans, the City of Emeryville has been working with the cities of Oakland and Berkeley, five transit agencies and the Alameda County Transportation Commission as well as a team of transportation and planning experts. A Policy Advisory Committee, which includes elected and appointed representatives from the participating agencies, Chambers of Commerce, disabled and housing organizations, and residents, has met three times, most recently on September 8, 2014. Outreach meetings and community-based engagement has been ongoing, while a Technical Advisory Committee, consisting of staff members of these agencies, is guiding the work.

In the fall of 2013, the team elicited comments about trips people wish to make, problems with transit, and ideas for solutions, through three community workshops and a questionnaire that received 800 responses. Based on this input and comments from various groups including the Emeryville City Council on January 21, 2014, the consultants devised options for review at a round of workshops and meetings and through a questionnaire in the spring of 2014.

Preliminary draft recommendations were discussed at meetings of the Oakland Economic Development Committee, West Oakland Business Alert, Oakland Broadway Transit Study staff, West Oakland Neighbors, Emeryville Economic Development Advisory Committee, EBOTS Technical Advisory Committee, EBOTS Policy Advisory Committee, and Berkeley Transportation Commission.

Discussion

Summarized below are the study's chapters on project background, planning process, transit context, recommended transit improvements, evaluation of improvements, and funding and implementation.

Project Background

The EBOTS project focuses on cultivating an environment within the EBOTS corridor that provides a transit-pedestrian-bicycling oriented environment for people to work, live, shop, and play. Goals to achieve this include:

- Creating an environment where a car is not required for mobility
- Using transit to create a well-connected and cohesive corridor with improved access to jobs, education and recreation
- Coordinating transit improvements with future population and job growth to help spur economic development

- Making near-term transportation improvements including bus route modifications, new shuttle operations, transit reliability and transit frequency increases

- Enhancing long-term mobility within the corridor, including state-of-the-art transit modes such as a modern streetcar or enhanced bus service.

Transit Context

The report assumes that the Emery Go-Round and other shuttles will continue as planned. The report includes a description of AC Transit's potential service improvements (which were the subject of public workshops in October 2014) and Oakland's Broadway Transit Project. Recommended improvements are intended to supplement the current shuttle services.

Planning Process

The report describes the process of developing options, including the identification of major origin and destinations that currently generate high demand for trips, as well as areas with high potential for future job and population growth. Streets linking major destinations, yet also providing fast, safe and efficient service were evaluated. The planning process outlines initial concepts leading to the creation of a north-south trunkline option presented in the second round of meetings that connects West Oakland, Emeryville, and West Berkeley. Several options were evaluated, with focus on future options that would not duplicate, but complement and support existing transit operations.

The draft report was discussed at meetings of the Emeryville Planning Commission and City Council; the Oakland Planning Commission, City Council and Council Public Works Committee; the Emeryville Transportation Management Association Board; the Berkeley City Council; and the BART and AC Transit Boards, and at a community meeting in West Oakland.

Proposed Transit Improvements

Based on the input described above, the team developed a set of preliminary draft recommendations, including short-term improvements; an Enhanced Bus Trunkline route, and two Streetcar Routes.

Short-Term Improvements

Short-term improvements would include shuttle service modifications, recommended changes to current AC Transit routes, as well as bus stop upgrades and amenity improvements. Shuttle improvements include expanding the West Berkeley shuttle and working with major developers to initiate a shuttle in West Oakland. These changes compliment AC Transit's proposed route modifications designed to better connect central Emeryville with downtown Berkeley and transbay service. These include routing the new 48 line from Emeryville Public Market to Shattuck and Bancroft between downtown Berkeley and UC Berkeley.

Enhanced Bus Trunkline (5-10 Years)

The Enhanced Bus Trunkline would be a branded hybrid bus with level boarding, 10-minute frequency during peak periods and 15-minute frequencies during non-peak periods, signal priority for faster travel, shelters with cameras and bike racks, marketing to create a branded image, and real-time arrival information. It would provide bi-directional service from Jack London Square to West Oakland BART and north through Emeryville and West Berkeley, traveling on 3rd, Mandela, Hollis, 7th, 6th and Gilman. This north-south route was chosen over east-west service to ensure that a new route not only provides

connections to destinations with currently low transit access, but compliments rather than duplicates current AC Transit and shuttle service. The report describes route options for the north end including potential service to Downtown Berkeley, as suggested the City of Berkeley and by the Emeryville Economic Development Advisory Committee.

Streetcar Routes (10-20 Years)

The Emeryville Streetcar service would connect Emeryville to MacArthur BART by running in two directions on 40th, Shellmound, 64th, Christie, Powell, Hollis and back on 40th. This "figure 8" route would supplement the Emery Go-Round by adding service where ridership is highest.

The West Oakland Streetcar would connect MacArthur BART, the East BayBridge shopping area, West Oakland BART, and Jack London Square, traveling on 40th, Mandela and 3rd. It would connect two ends of the Broadway transit service, forming the "O" envisioned in the West Oakland Specific Plan. If the Broadway service does not extend on 40th to MacArthur BART, the EBOTS service would need to extend on 40th to Broadway. Broadway Transit Study staff held workshops in October and present the study to the Oakland City Council by January, 2015.

Evaluation of Improvements

The Evaluation of Improvements analyzes projected ridership demand for the new transit lines, reduction in vehicle miles traveled, effects on environmental justice communities, safety and security, costs, compatibility with existing transit, and economic development impact.

Ridership

The report estimates ridership based on current AC Transit demand, comparable system demand, as well as projected population and employment increase. Each of the proposed routes (the Enhanced Bus trunkline route. The Emeryville Streetcar, and the West Oakland Streetcar) are projected to add between 3,000-6,000 new transit riders. When including the estimated number of current riders who switch to the new lines due to improved service and new route options, the total demand for each line is projected to be approximately 4,000-7,000 riders per line.

Reduction in Vehicle Miles Traveled (VMT)

Based on the estimated percentage new transit riders who switch from automobile modes to transit modes, the Enhanced Bus Trunkline would reduce VMT by about 4,700 to 6,200 miles, the West Oakland Streetcar would reduce VMT by about 5,300 to 6,500 miles, and the Emeryville Streetcar would reduce VMT by about 8,300 to 10,200 miles.

Effects on Environmental Justice Communities

Of the communities served with ¼-mile of each route, about 72% are minority communities and 43% low-income communities. Information concerning populations with disabilities was also compiled as additional information about the protected classes of population that are the subject of this environmental justice assessment. Data regarding disabled, transit dependent, and senior populations was considered when looking into the federally-protected environmental justice community areas.

Benefits could include improved access to appropriate education and employment opportunities, and attraction of retail and services that would reduce sales leakage out of the area. Sales leakage is when people have few stores in their neighborhood and have to shop elsewhere, draining their money out of the neighborhood.

Safety and Security

The report points out factors to bear in mind when transit stops are designed, including visibility and effects of bulb-outs on bike lanes. Street design will need to minimize risks associated with tracks, such as bicycle wheels getting stuck in tracks and streetcars not being able to change lanes. Security measures will include lights and cameras at the bus shelters.

Costs

The combined annualized capital cost and annual operations and maintenance cost of the recommendations is estimated as shown below. Both the Enhanced Bus trunkline and the Streetcars would involve extensive street improvements, including full-amenity shelters and curb extensions for level boarding. The Enhanced Bus trunkline route is a longer route, and the lifecycle of the vehicle and transit stop capital costs are estimated at 12 years. The streetcar routes are shorter, and the lifecycle for streetcar tracks and vehicle capital costs are approximately 30 years.

- Enhanced Bus Trunkline (8.1 mile one-way, 12 years): $9-10 million/year
- Emeryville Streetcar (5.3 mile loop, 30 years): $10-12 million/year
- West Oakland Streetcar (4.3 mile one-way, 30 years): $13-15 million/year

Compatibility with Existing Transit

The proposed transit lines are designed to complement, not duplicate, existing transit routes. However, there are service overlaps in several areas, especially those where demand exceeds or nears current transit capacity. The Enhanced Bus trunkline route would overlap Emery Go-Round service on part of Hollis, and would overlap the part of AC Transit's potential rerouted 26 line that would run on Mandela. The Emeryville Streetcar would overlap the part of the Emery Go-Round routes that connect to BART on 40th, and would overlap AC Transit's potential 57 line extension on 40th and Shellmound. The Oakland Streetcar would overlap the Mandela and 3rd Street parts of the Enhanced Bus trunkline, and part of AC Transit's potential rerouted 26 line on Mandela.

Economic Development Potential

The Enhanced Bus trunkline would enhance access to development opportunity sites, promote trips within the study area, and expand access to and quality of transit in West Oakland. The Streetcars would connect West Oakland to Jack London Square and MacArthur BART, and would connect Shellmound to MacArthur BART. Phasing could be done by routes with value capture by each city. The West Oakland Streetcar would complete the "O" envisioned by Oakland. The Emeryville Streetcar could handle increasing ridership in parts of Emery Go-Round routes with the heaviest demand.

Funding and Implementation

The report lists potential funding sources, explains what types of agencies can receive Federal formula funds, and lists funding sources and operator types that could work for the Enhanced Bus trunkline and Streetcar routes. The Enhanced Bus trunkline could be operated by a transportation management association or AC Transit. The streetcars could be operated by a transportation management association, AC Transit, BART, or a tri-city joint powers authority. The report also lists fund readiness strategies that could be used if non-traditional transit funding is to be sought.

1. Project Background

The purpose of the Emeryville Berkeley Oakland Transit Study (EBOTS) is to explore future visions for the study area with respect to transit as it relates to land use in Emeryville, West Berkeley, and West Oakland. This will require an awareness of the roles of various transit providers, including BART and AMTRAK for regional connectivity, AC Transit for subregional connectivity, and shuttles for "last mile" service. Planned population and job growth and increased investment in the area will spur the need for additional transportation investments, including transit, pedestrian, and bicycle improvements. The corridor is a jobs-rich environment with more employment than housing; mobility improvements offer the potential for improved access to jobs for those living in, near, or commuting to the corridor.

This report is organized by discussing the background and planning process, the transit context of the study area, reviewing the proposed improvements, evaluating them, then finally discussing implementation and funding.

- **Section One** describes the project background.
- **Section Two** discusses the planning process, community engagement, and iterative process that led to the development of the proposed routes.
- **Section Three** provides a description of the transit context in the EBOTS study area including planned improvements.
- **Section Four** provides a description of the proposed transit improvements for the EBOTS study area.
- **Section Five** includes an evaluation of the proposed routes based on a range of factors, including: ridership, vehicle miles traveled, environmental justice, safety and security, costs, economic development, and compatibility with existing transit.
- **Section Six** includes a high-level look at the funding and implementation strategy.

Technical Advisory Committee (TAC)

The Technical Advisory Committee (TAC) is made up of representatives from the City of Emeryville, City of Berkeley, City of Oakland, AC Transit, BART, Amtrak Capitol Corridor, Emeryville Transportation Management Association (ETMA), West Berkeley Transportation Management Association, Alameda County Transportation Commission, and Metropolitan Transportation Commission. The TAC met bi-monthly throughout the planning process, providing technical review of materials, ensuring accurate and up-to-date information, and allowing representatives from jurisdictions and agencies to coordinate and discuss improvements. Much of the work presented in this report is a culmination of input received from this committee.

Project Goals

The Technical Advisory Committee has identified the following goals for the EBOTS corridor:

- Creating an environment where a car is not required for mobility;
- Using transit to create a well-connected and cohesive corridor with good access to jobs, education and recreation;
- Coordinating transit improvements with future population and job growth to help spur economic development;
- Making near-term transportation improvements including bus route modifications, new shuttle operations, and transit reliability and frequency increases; and
- Enhancing long-term mobility within the corridor, possibly including new transit service such as streetcar or bus rapid transit.

Study Area and Destinations

The study area is bounded by the San Francisco Bay on the west; San Pablo Avenue, Adeline Street and Market Street on the east; the Berkeley-Albany border on the north; and the I-580 freeway on the south. Major destinations within the area include parks, schools, and shopping (shown in **Figure 1**) and employers.

Figure 1: Study Area and Destinations

2. Transit Context

This section explains the background and context of current transit systems within the EBOTS study area as well as planned improvements for these systems. Further information regarding the existing transportation conditions in the study area can be found in **Appendix A**. Existing conditions as well as current efforts for updating transit systems in a short-term timeframe are included in this section.

Transit Markets

The transit markets served within the study area include "transbay" commuters traveling to and from San Francisco, local travelers traveling between destinations within the study area and nearby destinations outside the study area, and intra-corridor travelers traveling within the study area. While BART is used for transbay and local travel, no intra-corridor travel occurs on BART since there is only one BART station (West Oakland station) within the study area. **Table 1** lists the existing transit markets served by each major transit mode.

Table 1: Existing Transit Markets and Service

Traveler type	BART	Capitol Corridor	San Francisco Bay Ferry	AC Transit Transbay Routes	AC Transit Local Routes	Emeryville & Berkeley Shuttles
Regional/Transbay *Traveling to- and from- San Francisco to study area*	✓	✓	✓	✓		
Local *Traveling to- or from- the study area*	✓			✓	✓	✓
Intra-corridor *Traveling within study area, last-mile connections*				✓	✓	✓

Existing Service

Within the study area, the existing transit context is dominated by shuttles, Alameda-Contra Costa Transit District (AC Transit) bus system, as well as the Bay Area Rapid Transit (BART) light rail system. **Figure 2** shows the existing shuttle, AC Transit, and BART system routes.

Shuttles

Shuttles provide "last mile service" between the study area and BART, and within the study area.

Emery Go-Round

Emery Go-Round is a free shuttle system funded by Emeryville's Property-based Business Improvement District (PBID), and operated by the Emeryville Transportation Management Association (ETMA). The PBID was established in 2006 and has a ten-year time frame. A PBID renewal election is planned for mid-2015. If the PBID is not renewed, it will sunset at the end of 2016. The shuttle system has three routes that provide service seven days per week (weekend service is limited). Emery Go-Round serves as

a transit connection to MacArthur BART station, the Emeryville Amtrak station, and the West Berkeley shuttle system. These routes also serve the large shopping centers and residential complexes in addition to many schools, grocery stores, and other businesses.

Annual ridership for the Emery Go-Round exceeds 1.5 million trips.[1] Approximate number of boardings and alightings for each route are listed below:

- Hollis shuttle line (weekday only): 527,000 trips per year
- Shellmound/Powell line (weekend and weekday): 867,000 trips per year
- Watergate Express (weekday peak-period only): 153,000 trips per year

West Berkeley Shuttle

The West Berkeley Shuttle provides weekday commuter service from Ashby BART station to the area West of Ashby BART station—extending nearly to Berkeley's Aquatic Park on the San Francisco Bay. During the morning commute period, the shuttle runs from 5:40AM-9:11AM; during the evening commute period, the shuttle runs from 3PM-6:17PM. Each of the two lines, serving similar routes, travel east-west on Ashby Avenue and Dwight Way and north-south on San Pablo Avenue and 7th St. The shuttle service is operated by the Emeryville Transportation Management Association under contract to the West Berkeley Transportation Management Association. The West Berkeley Shuttle may add two midday runs between Bayer's main facility on 7th at Dwight in Berkeley and its new facility on Hollis at 59th in Emeryville in 2015.

Other Shuttle Services

Downtown Oakland's Free Broadway Shuttle (not in study area), or the "Free B", connects 12th Street and 19th Street Oakland BART stations, the Oakland-Jack London Square Ferry Terminal, and the Jack London Square Amtrak station. The Free B offers weekday service from 7AM-7PM and weekend night service from 7PM-1AM on Fridays and 6PM-1AM on Saturdays.

Alameda-Contra Costa Transit District (AC Transit)

The Alameda-Contra Costa Transit District (AC Transit) provides bus service to in the East Bay within Alameda and Contra Costa counties as well as to San Francisco's Transbay Terminal. In addition to providing local bus-line connections, many AC Transit routes connect to alternative transit modes, including BART, the Capital Corridor, the Alameda-Oakland Ferry, and the Emery Go-Round.

Several Transbay lines have stops within the project area. Transbay lines are typically represented by letters instead of numbers. Bus lines 800-899 are all-nighter lines, operating from 1AM-5AM. Altogether, 25 routes run through the project area,[2] with 10 of those connecting to the Transbay Terminal in San Francisco. The Routes in the project area include:

- Transbay Routes: F, FS, G, C, H, Z, J, NL, 800

[1] Ridership data calculated with trip data from March 2013 – June 2013. Data provided by the Emeryville Transportation Management Association, personal communication July 19, 2013.
[2] Several routes have limited stops within the study area. The G and FS only have a total of 3 stops in the study area and are not included.

- East Bay Only Routes: 25, 26, 31, 314, 62, 88, 49, 51B, 802, 72, 72M, 72R, 57, 62, 52

Bay Area Rapid Transit (BART)

While only one station, the West Oakland BART station, exists within the EBOTS study area, the BART system has a large impact on transbay and local travel to the study area. Transit patterns within the EBOTS study area are mostly affected by transfers from West Oakland, Downtown Oakland, MacArthur, Ashby, and Berkeley BART stations. Outreach meetings and questionnaires showed that there is strong demand for improved connections and service from these stations. Particular attention in this study is given to the West Oakland station (due to the low quality of current connections and its location within the study area) and MacArthur BART station (due to its high demand as the busiest East Bay station outside Downtown Oakland).

Potential Improvements

Shuttles

The following are potential updates to the Emery Go-Round and the proposed Emeryville Bus Hub. The improvements to the "Free B" shuttle are described in the subsequent section discussing the Broadway Streetcar Project.

Emery Go-Round Shuttle

The ETMA plans to add a fourth route in 2015 using a one-year stipend from the City of Emeryville, and hopes to find funding to continue it. The route will connect the Peninsula to shopping. The ETMA also needs to shift from short-lived, high-maintenance "cutaway" buses with time-consuming wheelchair lifts to standard transit coaches, and will need funding to make that shift.

The Emeryville Bus Hub

The Emeryville Bus Hub is a proposed new bus transit hub near the public Market and adjacent to the pedestrian bridge to connect to the Amtrak Station. Many of the potential AC Transit and Emery Go-Round routes connect to this location.

Alameda-Contra Costa Transit District (AC Transit)

AC Transit is conducting an Inner East Bay Comprehensive Operations Analysis (COA). The first step was a consultant study that recommended the route changes described below. The second step was a series of eleven community workshops in October of 2014 wherein participants mapped desired frequent service. AC Transit will use both of those inputs to draft network recommendations for public review in the spring of 2015. The COA consultant's recommendations increase focus and add service to the Emeryville, West Berkeley, and West Oakland areas. In Emeryville and West Oakland, AC Transit routes have proposed changes to provide better east-west connections to Downtown Oakland, Downtown Berkeley and nearby BART stations. **Figure 3** shows an image of the short-term improvements.

These improvements address the concerns identified by the community during the outreach process in regard to improving bus service in the study area. The following key themes identified during the community workshops and through the questionnaire are met by the aforementioned improvements:

- Improved East-West connections;

- Improved connections to Emeryville from West Oakland, Berkeley via Ashby, Berkeley via Alcatraz, Downtown Berkeley and UC Berkeley; and

- Improved frequency of service.

Based on input received during community workshops, from community input and from discussions during TAC meetings some modifications to the COA routes have been identified. These are noted in the new and updated routes below as well as in Section 4 Proposed Transit Improvements.

New and Updated routes

AC Transit is proposing the following service changes. All routes would have a peak frequency of 15 minutes, except 10 minutes for the 72R. The potential changes are:

- Line 12: This line would be revised and no longer extend into downtown Oakland and Piedmont. It would instead connect from West Oakland to Downtown Berkeley directly.

- Route 13: New AC Transit Route would connect the Emeryville Public Market with Berkeley, Rockridge, Piedmont, Lake Merritt, and Downtown Oakland. It would have stops in areas that Line 12 currently covers.

- Line 14: This line would be extended into West Oakland with a loop on 14th, Wood, and 7th. This revised line would cover areas currently served by Line 26 and provide access from West Oakland into Downtown Oakland, Lake Merritt, Fruitvale and other East Oakland neighborhoods.

- Line 26: This line would be streamlined to no longer loop around West Oakland and instead provide direct access into Emeryville via Mandela Parkway, terminating at Emeryville Public Market and a pedestrian bridge to Amtrak.

- Line 48: Line 48 would connect northwest Berkeley to Ashby BART, Elmwood and Claremont in Berkeley via 6th, 7th and Ashby.

    - Proposed change from AC Transit COA recommendation: have line 48 travel north on 6th to extend into West Berkeley to Gilman and not connect to the Emeryville Public Market.

- Line 49: Line 49 would be altered to connect the Emeryville Public Market to portions of West Berkeley, Downtown Berkeley and UC Berkeley via Dwight. At Shattuck, the line would travel north, then loop on Durant, Telegraph and Bancroft to connect to the UC Berkeley Campus.

    - Proposed change from AC Transit COA recommendation: Go north on Shattuck and connect to UC Berkeley Campus on Bancroft and Durant.

- Line 57: This line would be extended into Emeryville and terminate at the Emeryville Public Market. This revised route would provide new East-West access from Emeryville into Oakland.

- Line 72/72R/72M: These lines would be consolidated and revised to streamline service. Line 72 would be eliminated. The number of stops would be increased on 72R.

Retained Routes

- Line 51B: This line has not been altered. Improvements will be identified in the upcoming Line 51 Transit Study.

- Line NL/F/H/Z: These lines would remain the same.

Eliminated Routes

- Line 31: Line 31 currently goes from MacArthur BART to Hollis to West Oakland BART to Alameda, similar to the proposed West Oakland Streetcar Route. This line would no longer serve the study area. Other lines would serve parts of this route.

The Broadway Circulator Study

Planning efforts to replace the "Free B" Oakland shuttle with an enhanced bus or streetcar system are underway. The planning effort is studying alternatives for different streetcar routes, including a streetcar on Broadway and 40th Street to MacArthur BART, or an enhanced bus on Broadway and College Avenue to Rockridge BART. The objectives of this route are to enhance the current transit service, enhance the "Free B" shuttle line service quality and area, and support economic and community development along Broadway and within the MacArthur BART neighborhood. Connections within this service include[3]:

- Jack London Square

- Downtown/Uptown Oakland

- 27th Street ("Pill Hill")

- Upper Broadway and 51st Street

- Oakland Chinatown

- MacArthur BART neighborhood (possibly a later phase)

Capitol Corridor

The Capitol Corridor service is an intercity passenger train system between Auburn and San Jose. It is operated by a Joint Powers Authority, a partnership of the six transit agencies in the eight-county service area. It stops at Amtrak stations in West Oakland and Emeryville and a stop in West Berkeley.

San Francisco Bay Ferry

The San Francisco Bay Ferry is owned by the San Francisco Bay Area Water Emergency Transportation Authority. It stops at Oakland's Jack London Square, Alameda, AT&T Park, the San Francisco Ferry Building, San Francisco's Pier 41, and Angel Island.

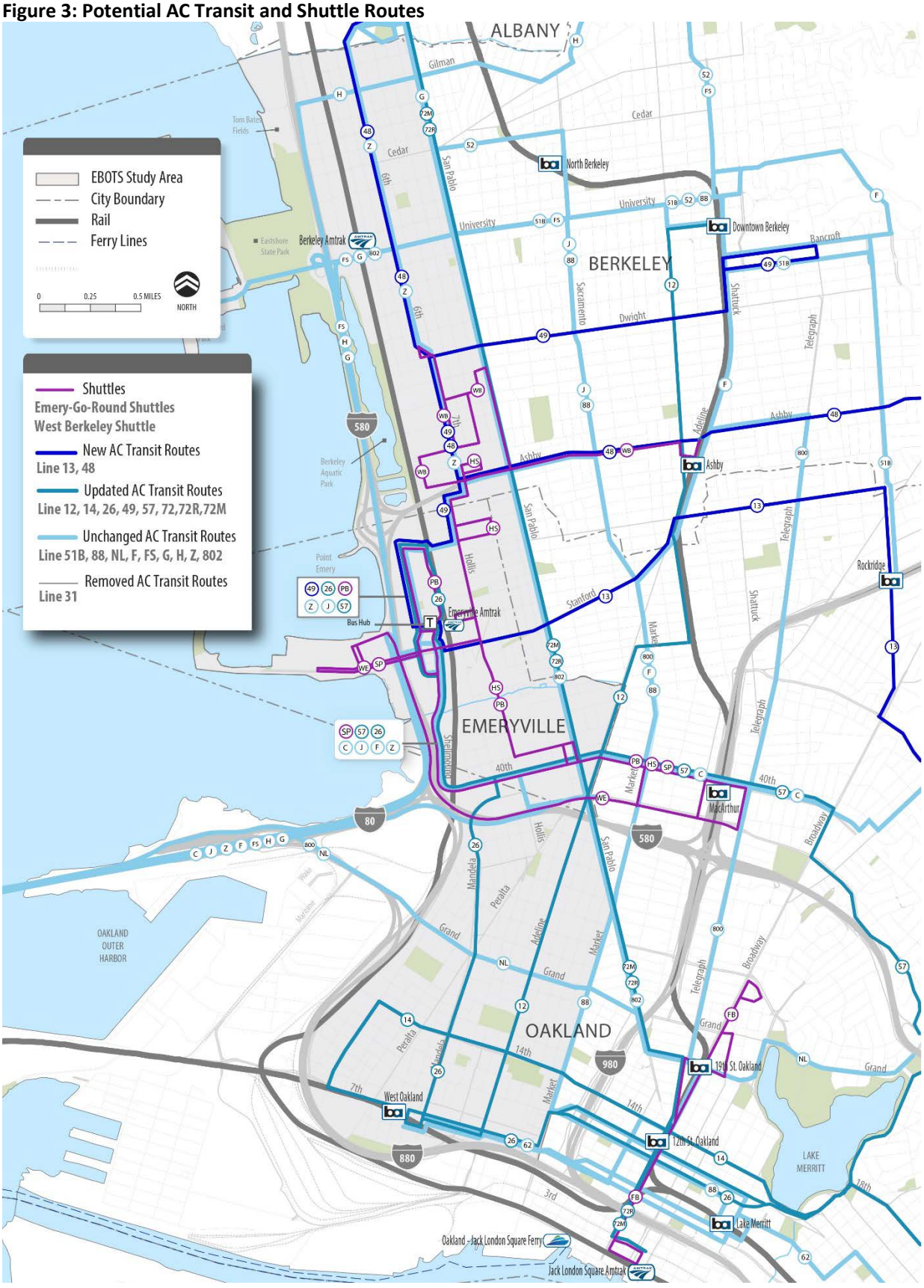
[3] Fehr and Peers (2013). Broadway Transit Urban Circulator Study, Draft Initial Evaluation of Alternatives, City of Oakland.

Bay Area BikeShare

Bay Area BikeShare launched in San Francisco in 2013, and is expected to expand to the inner East Bay in 2015. The Alameda County Transportation Commission will be evaluating its effect on transit needs over the next few years. There is research showing that in Washington, DC, bikeshare replaces some short transit trips.

Figure 2: Current AC Transit and Shuttle Routes

Figure 3: Potential AC Transit and Shuttle Routes



3. Planning Process

The planning process for the EBOTS study began in November 2013 with an analysis of existing conditions and the beginning of the community engagement process. From there transit improvement options were identified and analyzed, reviewed with the community and revised based on their input (see **Figure 4**). During the entire process the Technical Advisory Committee (TAC) provided input and guidance on the project. Below is a thorough description of the process for developing the transportation options and the community engagement process.

Figure 4: Planning Process

Process of Developing Options

On the outset of developing options, it was assumed that future options would complement and support existing transit operations. Initial routes and concepts for transit improvements within the EBOTS study area used a "blank slate" approach, with receptivity to ideas received from the community, as well as existing plans, future land use plans and economic development goals. A wide range of transportation technology options and improvements were screened based on distance, usage and future ridership. Information on technology options is provided in **Appendix A**. Options were evaluated and presented through community meetings, the technical advisory committee, and review by additional local professionals. Several iterations took place before the options and evaluations presented in this document were completed.

The first stage in devising new transit services for the area was to identify those streets with active land uses that would generate transit trips as well as those with potential for future job and population growth. These land uses include multifamily residential buildings, business offices, medical complexes and retail commercial facilities. The streets serving these land uses should be suitable in terms of width and traffic characteristics to be able to accommodate transit vehicles. This first round of service development concentrated on bus and small shuttle vehicles, while also considering the possible implementation of streetcars. Where possible, a series of streets was sought that would form a continuous corridor of travel. Such straight corridors are easier for patrons to understand and allow for more efficient transit operation by reducing the number of turns required.

Several north-south streets were examined as candidates for service. San Pablo Avenue is among the area's busiest thoroughfares, but it lies at the east margin of the study area and has already been the subject of transit service proposals in AC Transit's Comprehensive Operations Analysis (COA). Other streets allowing for north-south continuity in the three cities are:

- Adeline Street (southern portion), Mandela Parkway, and Peralta Street in Oakland;

- Hollis Street, Shellmound Street, and West Frontage Road in Emeryville; and
- 6th and 7th Streets in Berkeley.

East-west streets in the study area (and areas further east) include:

- 2nd/3rd Street couplet, 7th/8th Street couplet, West Grand Avenue and MacArthur Boulevard in Oakland;
- 40th Street, Powell Street/Stanford Avenue, 65th Street in Emeryville and parts of Oakland; and
- Ashby Avenue, Dwight Way and University Avenue in Berkeley.

Connections further north of the study area's border with the City of Albany were examined as well, but discontinuities in the street system made transit routings too circuitous. Moreover, possible termini north of this border, such as the BART stations at El Cerrito Plaza or El Cerrito Del Norte, stretch what can be served by the local transit concepts under consideration in this study. These northern points might, however, be tied to Transbay routes serving the study area. Street connections further west and south of the study area are not possible because the existing street network ends at the freeways and San Francisco Bay shoreline.

Possible terminals and destinations to be served were examined both inside and outside the study area. It is generally desirable to terminate a transit line at a point where significant trips will be generated. Given the emphasis of EBOTS routes as transit collectors and distributors, as well as short-distance connectors, a terminal or way station at a transfer point with other modes or transit lines is especially important. The key transfer points in or close to this study area include:

- Amtrak/Capital Corridor stations at Oakland Jack London Square, Emeryville, and Berkeley;
- BART station at West Oakland, with possible connections to stations outside the study area at 19th Street, MacArthur, Ashby, Downtown Berkeley, and North Berkeley;
- AC Transit Uptown Transit Center at 20th & Broadway; and
- Ferry terminal at Jack London Square (with a possible future terminal in Berkeley).

In addition to these transfer points, transit should serve important destinations in the area. They include numerous employment centers, like Pixar and Bayer, and retail centers such as the Bay Street, Powell Street and East Bay Bridge shopping centers. Major medical facilities are located mostly outside the study area and need to be tied to it, a function now handled largely through independent shuttles from BART stations; these include the Kaiser, Alta Bates Summit, and Children's Hospital complexes in Oakland. Other destinations include schools and parks.

In order to formulate transit service concepts for the EBOTS study area, the study included numerous sources of information. These sources include existing and projected patterns of development, travel desires revealed by those who responded to the study's Community Questionnaires, planning documents from the three jurisdictions, and comments expressed at the three first-round public meetings and three

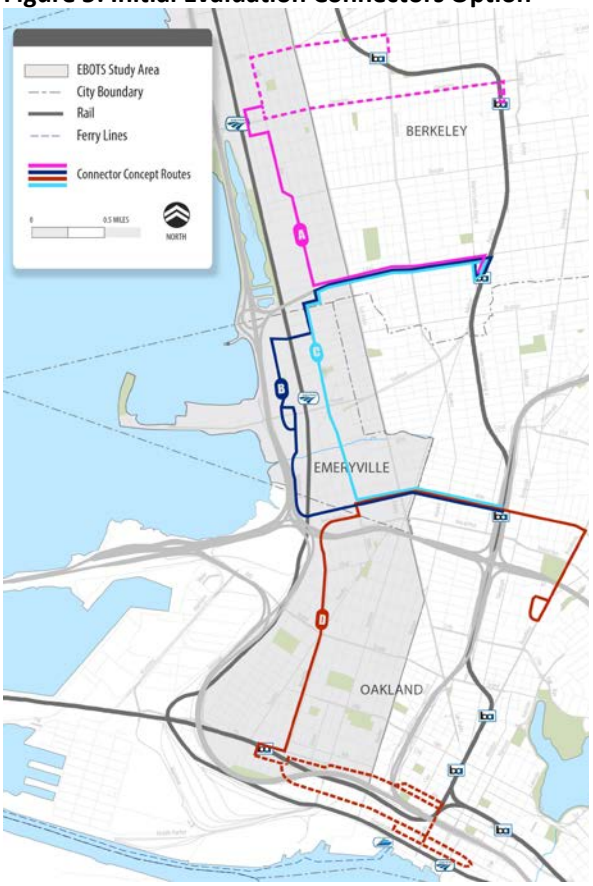
second-round public meetings. Analysis of these data was followed by reconnaissance of the study area through maps, aerial photos, and windshield surveys to better understand its existing street infrastructure and surrounding built environment.

Concepts Studied

Several alternative routes were evaluated for costs, ridership, and demand and reviewed by the TAC and community outreach. These alternatives helped form the basis of developing the transit routes proposed in this report. A wide range of technology options were initially considered based on community input and compatibility with the study area. These transit technologies were initially screened to narrow the consideration to the best technologies given community input, right-of-way and environmental constraints, and political realities in terms of project funding.

A "Connectors" option, shown in **Figure 5**, was considered and was well-regarded by the community and TAC members. However, these routes were ultimately screened out due to overlapping routes with existing and already planned transit routes to BART stations. For example, within Emeryville, the Emery Go-Round served many of the roadways in the proposed Connector option. Additionally, planned AC Transit routes would be duplicated with nearly all the connector routes within the Study Area. This circumstance would reduce route efficiency and cause too much shift in ridership away from the planned AC Transit routes. Furthermore, the planned AC Transit routes provide more extended coverage into other parts of Berkeley and Oakland.

Figure 5: Initial Evaluation Connectors Option



Community Engagement and Review by Cities and Transit Agencies

Round 1 Outreach and Community Feedback

Overview

Between August 2013 and November 2013, the EBOTS project team conducted a variety of outreach activities to inform stakeholders and the public about the project, and to solicit input on future visions for transit in the study area. This outreach effort was part of Phase 1 of EBOTS, which sought to identify both opportunities and constraints associated with improving transit service in the study corridor, in order to assist the partner cities and agencies involved in the TAC with engaging a broad spectrum of stakeholders in the transit study. Specifically, the objectives of the public process were to inform and collect input from the public on transit services and improvements within the study area.

The outreach activities included three community workshops held across the study area (one in each city) and a bilingual (English and Spanish) questionnaire used to collect information regarding how individuals

travel within the study area (i.e., travel method) and to gather feedback on potential transit improvements. MIG, the public engagement consultant, conducted a robust bilingual outreach effort to publicize the community workshops and survey questionnaire, including targeted postcard and flyer distribution, e-blasts, news media articles, and phone calls to key Emeryville-Berkeley-Oakland partners such as community-based organizations, local churches and established civic groups.

Key Findings

Round 1 of the community meetings identified location-specific access needs and identified many locations that are currently difficult to access and improved service in terms of schedule, reliability, hours of service, and frequency. Participants expressed a desire for shuttle/paratransit service in identifying need for last-mile connections and Emery Go-Round service in West Oakland. Participants also expressed interest in bus transit improvements. Some key opportunities for bus transit service identified include:

1. Connect to key locations in West Oakland, Emeryville, and West Berkeley, including:
    - Jack London Square
    - Oakland Army Base
    - Waterfront areas
    - West Oakland BART
    - Mandela Parkway
    - Berkeley Marina
    - Berkeley Bowl West
    - Fourth Street in Berkeley
    - Frontage Road
    - Emeryville shopping
2. Improve service, including:
    - More evening and weekend service
    - Schedule reliability
    - Schedule predictability
    - Better coordination between transit agencies
    - Better connections to West Oakland BART
    - Local circulation
3. Improve amenities, including:
    - Real-time arrival information
    - Lighting at bus stops
    - Vehicle improvements
    - Increased safety measures
    - Level boarding

Round 1 outreach also involved discussions with the Emeryville Transportation Committee, the Emeryville Planning Commission, the Emeryville Transportation Management Association Board, and the Emeryville City Council on desired trips, problems and ideas.

Detailed description of the workshop format, questionnaire and key findings from Round 1 of the Community Engagement and Outreach can be found in the **Appendix B**.

Round 2 Outreach and Community Feedback

Overview

Between March 2014 and May 2014, the EBOTS project team conducted the second phase of outreach efforts to evaluate ideas for improving transit in the study area. Based on public input collected during Phase 1 outreach, the project team developed potential options for better transit in these communities.

The outreach activities included three community workshops held across the study area (one in each city) and a questionnaire used to collect information regarding preferences and priorities for travel within the study area. As in Phase 1, the public engagement process included a range of outreach channels, including communication in local media outlets, the City of Emeryville website, e-blasts, social media communications, bilingual postcards and flyers, information distributed through local officials, regular newsletters, and phone calls to key Emeryville-Berkeley-Oakland partners such as community-based organizations, local churches and established civic groups.

Key Findings

The outreach meetings discussed travel patterns of participants, including destinations of interest. The meetings also focused on reasons for trip difficulty in the study area and discussed specific locations that have inadequate access by transit. Participants expressed desires for similar interest categories as in the first round of community engagement, with particular focus on the following:

1. Connect to key locations
    - Jack London Square
    - West Oakland BART
    - Grocery stores
    - Emeryville shopping
    - Berkeley Marina
    - Berkeley Bowl West
    - Fourth Street in Berkeley
    - Frontage Road
2. Improve service
    - Schedule reliability
    - More off-peak service
    - Schedule frequency
    - Faster service
    - Reduce or eliminate need for transfers
    - Expanded overall service
    - Earlier weekday morning service
3. Improve amenities
    - Improved real-time arrival information
    - Level boarding
    - Dual side doors
    - disabled accessibility
    - Safe, pedestrian-friendly stops
    - Well-lit shelters with benches
    - Additional bicycle racks on buses
    - Clearer bus route information

The Emeryville Transportation Management Association Board, the AC Transit Board, the Berkeley Transportation Commission, the Emeryville Transportation Committee, and Emeryville Planning Commission, and the Emeryville city Council reviewed the options. Their comments helped to shape the draft report.

Detailed description of the workshop format, questionnaire and key findings from Round 2 of the Community Engagement and Outreach can be found in the **Appendix C**.

Round 3 – Review of Preliminary Draft Recommendations and Draft Report

Overview

Between July 2014 and December 2014, the EBOTS project team presented preliminary draft recommendations and the draft report to several groups for review. The groups that discussed the preliminary draft recommendations included the Oakland Community Economic Development Committee, West Oakland Business Alert, West Oakland Neighbors, the Emeryville Economic Development Committee, the Berkeley Transportation Commission, and the Emeryville Transportation Committee. These groups' comments informed the draft report.

Outreach for meetings on the draft report included the City of Emeryville website, e-blasts, and bilingual postcards and flyers. The team discussed the Draft Report with the Emeryville Planning Commission, the Oakland Planning Commission, the Emeryville Transportation Management Association Board, the Emeryville City Council, the Berkeley City Council, a West Oakland Community Meeting attended by several members of the Alliance of Californians for Community Empowerment (ACCE) and others, the AC Transit Board, the Oakland City Council, the West Oakland Business Alert, the BART Board, and the Oakland Council Public Works Committee.

Key Findings

The meetings garnered the following comments:

1. Shuttles

    - The fourth Emery Go-Round route is not yet funded and there was interest in emphasizing a new West Oakland shuttle and an expanded West Berkeley shuttle.
    - Add shuttles and Measure BB to the funding table. Shuttles could compete with AC Transit for operating funding from Measure BB and the FTA.
    - Service between Emeryville and West Oakland BART is top priority, and should go to stores on Shellmound. The route should not impede freight transportation. Encourage partnership with AC Transit.

2. AC Transit

    - Add a Transbay bus from downtown Berkeley through the planned Emeryville bus hub.
    - Restore routes cut in 2010 before investing in enhanced buses or streetcars.
    - A Transbay bus should stop at Treasure Island. It is easier to take BART from West Oakland to San Francisco than to take AC Transit's Line 26 to Emeryville.
    - A route to Maritime Street is needed.
    - More Clipper Card outlets and better hours are needed, especially for setting up new cards with discounts.

3. Demand Response Transit

    - Flexible service at West Oakland BART at night is needed. Some participants would support if service does not require smart phones.

4. Enhanced Bus

    - The Enhanced Bus should jog to the Emeryville Amtrak station.
    - AC Transit could set up a route in the proposed area in two years.
    - Retail stores are on Shellmound, but the proposed route is on Hollis.
    - Go to shops on Shellmound.
    - Do not impede freight transportation (especially on 3rd).
    - Partner with AC Transit (similar to Broadway Shuttle).

5. Streetcars

    - Streetcars would be good for West Oakland and Emeryville.
    - Phase the streetcars, starting with West Oakland BART to Emeryville.
    - Streetcar tracks on bridges could be expensive.
    - Generally streetcars are justified if there is an existing bus route with very high ridership.
    - Streetcars are inflexible and can lead to gentrification.
    - The cost of a streetcar could pay for many buses.
    - Streetcars are dangerous to cyclists and problematic for truck freight movement. Do not recommend metal-rail streetcars; they are costly, inflexible, dangerous to cyclists, and problematic for truck freight transportation.

Detailed description of the workshop format, questionnaire and key findings from Round 3 of the Community Engagement and Outreach can be found in the **Appendix D**.

Bilingual outreach materials for all three rounds of community engagement are shown in **Appendix E**.

4. Proposed Transit Improvements

The following proposed transit improvements have been assembled based on input received from the community meetings and from review and coordination with the TAC as well as the city councils in the three cities. The improvements include a set of short-term improvements including expanded shuttle service, a mid-term enhanced bus, and long-term streetcars. The Oakland City Council approved its Public Works Committee recommendation, which began with "Do not recommend metal-rail streetcars." Because the Oakland streetcar concept is in the West Oakland Specific Plan, this report describes and evaluates a streetcar option, in the event that the City of Oakland decides in the future to pursue a streetcar system.

Short-Term Improvements (1 - 5 Years)

Short-term improvements are focused on interim improvements that will help set the stage for the proposed Enhanced Bus trunkline and Streetcar routes described below as well as other near term improvements related to transit access. These improvements focus on improving connections to key destinations where there is a current lack of transit service options or lack of capacity to meet the current and projected demand. These connections include providing additional service to the Berkeley Amtrak Station in West Berkeley, improving connections to West Oakland businesses, as well as increasing the number and capacity of connections between BART stations and several destinations in Emeryville. Additionally, short-term improvements include improving bus stop amenities and infrastructure, expanding opportunities to participate in AC Transit Easy Pass program, and exploring demand-responsive transit opportunities.

Modifications to Planned AC Transit Route Improvements

Planned AC Transit improvements were presented and discussed at community meetings and studied as part of the EBOTS planning process for improving transit in the study area. While planned improvements based on AC Transit's Inner East Bay Comprehensive Operations Analysis (COA) are presented in Section 3 Transit Context, the below are recommendations are modifications those routes based on community input received during the workshops and through discussions with TAC members.

- Line 48: The COA consultant recommendation is to connect Ashby BART to Emeryville Public Market. This report recommends instead connecting Ashby BART to northwest Berkeley, because Line 49 would connect to Public Market and northwest Berkeley lacks service.
- Line 49: The COA consultant recommendation is to connect Emeryville Public Market with Dwight/Shattuck. This report recommends continuing this route up Shattuck to Bancroft to connect to UC Berkeley and three blocks south of Berkeley BART.
- AC Transit should add a direct route between Emeryville and Downtown Berkeley on Stanford Avenue, Adeline Street and Shattuck Avenue.

Shuttle Improvements

Emery Go-Round is currently exploring improvements and expansions of service, as described below:

- Improved coaches: Rolling stock improvements will increase speed of boarding and alighting, improve riding comfort, and increase capacity.

- Expanded service within Emeryville: A fourth shuttle route is being explored within the City of Emeryville.

There is also potential for expanded shuttle service in West Berkeley and new shuttle service in West Oakland. Coordination with AC Transit is recommended to ensure unique, non-overlapping service.

Connection to the Berkeley Amtrak Station

Connection to the Amtrak Station in West Berkeley is currently provided by AC Transit Line 51B as well as one morning and one afternoon connection served by the West Berkeley Shuttle, an indicator of the limited north-south connections to the Berkeley Amtrak Station. One possible solution is increasing the number of trips served by the West Berkeley Shuttle.

Another possible improved connection to the Berkeley Amtrak Station is the new AC Transit Line 48, which will connect to the Ashby BART Station and pass near the Amtrak Station at 6th and University. A possible modification of this route would be a short diversion to provide improved service to the Amtrak Station using Addison Street, 4th Street, and Hearst Avenue. The drawback of this diversion is retaining the continuity and consistency of a more direct route. Regardless, even without the diversion Line 48 would provide a north-south connection within a ¼ mile of the Amtrak Station.

Connection to West Oakland Businesses

While the new AC Transit routes provide improved connections throughout West Oakland, there may be an opportunity to provide shuttle service from West Oakland BART that more closely serves businesses near West Grand Avenue and at the former Army Base. Additionally, an early version of Gateway Park proposal included the idea of potential shuttle routes connecting area residents to the new park at the base of the Bay Bridge. Further study should consider a shuttle service to provide access to businesses and open space in West Oakland.

Improved Bus Stops in Emeryville

Three locations in Emeryville have capacity and need for improved bus stop infrastructure and amenities. Currently under construction, there is a "bus hub" being incorporated into development along Shellmound Street near the Public Market.

Additionally, the City of Emeryville is currently seeking funding for a widening of on- and off-ramps at the I-80 interchange and Powell Avenue. As part of this improvement there would be room for an additional bus stop for AC Transit Transbay service on Powell Street West of the overpass.

San Pablo Avenue and 40th Street offers another location where there is an opportunity for significant improvements to bus stops. Several buses currently stop at this intersection, including the Emery Go-round Shellmound-Powell line and AC Transit lines 26, 31, 57, 72, 72M, 72R, 802, C and F. This location could accommodate improved bus stops including shelters, real-time arrival displays and improved informational and wayfinding signage.

Transit Passes

The desire for incorporating AC Transit Easy Pass purchases into new residential and commercial developments was stated several times at community meetings as a possible way to encourage increased transit use. The Easy Pass program costs a fraction of cost per user—between $4 and $10 per month for unlimited rides depending on the group size purchasing passes. Cities can work with new and existing

developments to encourage use of the Easy Pass program. There are additional opportunities to provide incentives for participation, such as reduced parking requirements or density bonuses.

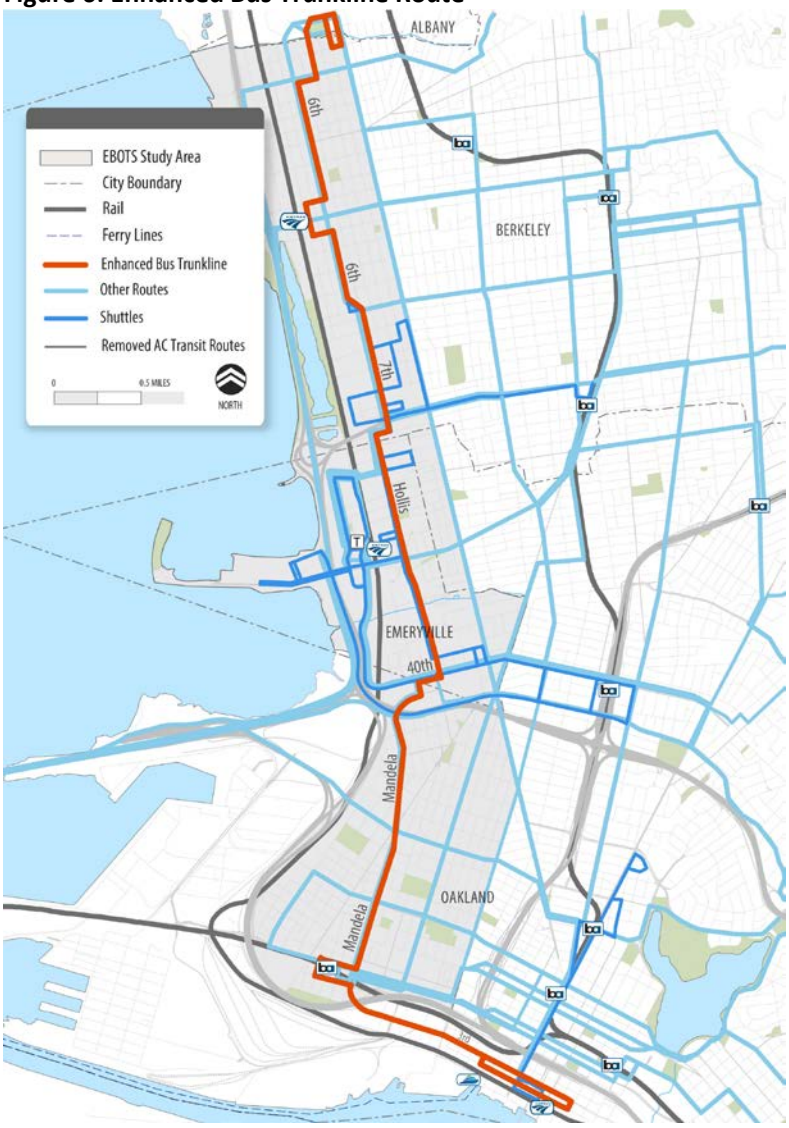
Study Demand-Responsive Transit

New technologies in ridesharing, on-demand cab service, and interactive demand-responsive transit vehicles may become a more viable means of bridging the gap between major transit hubs and local destinations. Historically, demand-responsive transit systems, such as dial-a-ride, have been utilized only in low-density locations. However, some for-profit demand-responsive transit services are beginning to locate in high-density areas. For example a startup called Bridj connects Boston's inner suburbs to downtown and riders can schedule a pick-up at designated locations. While this is not door-to-door service it does provide a level of flexibility for users not seen by typical bus service. Regarding costs, however, Bridj charges about $6 for a 4.5 mile ride, which is more than three times the cost of regular transit in the area.[4]

Vehicle capacity and cost per passenger remain the largest barriers to incorporating demand-responsive transit services. Ridership of highly utilized demand-responsive transit top out at approximately 10 riders per vehicle-hour.[5] Furthermore, because operational costs and salary of drivers for transit vehicles is a significant factor, limited vehicle capacity relates to higher operational costs to meet the needs of high-density areas. This indicates that demand-responsive transit may be a feasible solution for late night coverage when transit is less available and demand is reduced, but would be costly for regular service and would add VMT to the network.

A program by AC Transit is going to pilot flex service at Fremont BART. This service will have two time points, each leaving 30 minutes apart,

Figure 6: Enhanced Bus Trunkline Route



[4] Seelye, K. Q. (June 4, 2014). To Lure Bostonians, New 'Pop-Up' Bus Service Learns Riders' Rhythms. *New York Times*.
[5] Potts, J. F., M. A. Marshall, E. C. Crockett, J. Washington (2010). *TCRP Report 140: A Guide for Planning and Operating Flexible Public Transportation Services*. Washington DC: Transportation Research Board, National Research council.

and can be accessed with a regular phone call or text message. There are a few places that have such a service; these services generally used in low-density areas. Flex service could be tested for feasibility at West Oakland BART station for late night service when other service is not running. Shuttles could also use this concept for non-peak hours. Additional feasibility studies looking at how demand-responsive transit may supplement public transit and utilize new technology could be considered for cities and/or transit providers within the EBOTS study area.

Enhanced Bus Trunkline Route (5 – 10 Years)

The Enhanced Bus trunkline Service Concept is proposed to connect West Oakland, Emeryville, and West Berkeley in the 5 – 10 year timeframe. This concept was developed in response to input that many locations are currently difficult to access using transit in the study area, including Gilman Street in Berkeley, West Oakland BART station, Berkeley Bowl West and other grocery stores, the Fourth Street commercial area in Berkeley, Jack London Square, and waterfront areas. This route is similar to an early route, AC Transit's Line 19, which ran every 30 minutes and was removed in 2010. Due to new development and current demand along this route, it is projected that with improved service quality and frequency this route will now be successful. The line is 8.1 miles in length and would take approximately 41 minutes to traverse in one direction of travel (including service stops), assuming an average speed of 12 mph.[6] **Figure 6** shows the proposed Enhanced Bus trunkline route. The following identifies the key characteristics of this service:

1. **Connect to key locations in West Oakland, Emeryville and West Berkeley**

   - The Enhanced Bus trunkline is designed as a north-south route linking all three cities. It connects residential areas in West Oakland with activity centers like Jack London Square, the West Oakland BART station, the East Bay Bridge shopping center, the retail commercial opportunities along Shellmound Street, and West Berkeley. The line would provide bi-directional service between Jack London Square and University Village via 3rd, Mandela, 40th, Hollis, 7th, 6th, and Gilman.

     - An alternate northern terminus to Downtown Berkeley was discussed instead of going to Gilman Street. However, this alternate route is not shown because it would overlap with frequent AC Transit Route 51B service, and because the connection between Downtown Berkeley and Emeryville would be served by AC Transit's potential Route

[6] AC Transit's average bus speed is 11mph (http://www.actransit.org/customer/transit-glossary/). TCRP Synthesis 110 – Common Approaches for Improving Transit Bus Speeds states average speeds of transit systems ranging from 8.1 to 16.3, with an average of 13.5 (lower for larger systems). However, many improvements in the proposed system have increased speeds in urban bus systems significantly (TCRP Synthesis 110).

49. Regardless, as the enhanced bus trunkline is studied in the future, this alternate northern terminus may also be considered.

  - Another alternative terminus to the North Berkeley BART station was also discussed. This route is not shown due to historic opposition to service on Cedar Street and low ridership on that part of the former Line 19.

- The enhanced bus trunkline provides better connections to the West Oakland BART station and other major destinations. The route would connect several transportation hubs—the Jack London Square Ferry terminal, the West Oakland BART station, the Emeryville Amtrak, and the Berkeley Amtrak.

2. Improve service

- The service would provide frequent service within peak hours as well off-peak daytime hours, evening and weekends. Service would operate every day, from 6:00 am to 10:00 pm Monday through Friday and from 7:00 am to 11:00 pm Saturday and Sunday.

- Service would be offered at 10 minute intervals daily, with the exception of less frequent (15 minutes interval) service in the early or late hours of each day.[7] Stop spacing would be approximately every 0.2 miles, increasing speeds relative to many comparative routes in the area with more frequent stop spacing.

3. Improve amenities

- The service would be operated using a branded hybrid or battery bus and includes (1) marketing, (2) speed enhancing features such as curb extensions, low floors with aisles for faster boarding, and signal priority, and (3) updated bus stops with shelters, lighting, cameras, real-time arrival information, benches, trash bins and bike racks.

These improvements respond directly to the input received from the community workshops by focusing on connectivity to key locations in West Oakland, Emeryville and West Berkeley, increasing the quality of service such as frequency and speeds, and transit amenities such as real-time information, vehicle improvements, and faster boarding.

Streetcar Routes (10 – 20 Years)

The West Oakland streetcar route is described below because it is in the West Oakland Specific Plan; however, the Oakland City Council has requested that this report not recommend streetcars. This is based on concerns regarding cost, route rigidity, and conflicts with bicycles and freight trucks. The description below is provided so that if the City were to change its policy in the future, the information would be available.

The timeline of the proposed Streetcar routes is 10 – 20 years. The routes consist of two lines—the West Oakland and Emeryville lines—designed with the Broadway Circulator in mind, expanding this service

[7] For comparison, routes with projected ridership similar to the Enhanced Bus Route typically have 12-minute headways (such as AC Transit Line 72R with approximately 7,000 riders per weekday).

to connect to West Oakland and Emeryville. There is the need to better tie in MacArthur BART and Jack London Square to West Oakland and Emeryville commercial areas. Two separate lines were developed, but each would serve a mutually exclusive section of the study area (with the exception of some duplication on 40th Street, which allows for increased service in that high demand area).

The West Oakland line is 4.3 miles in length and would take approximately 22 minutes to traverse in one direction of travel (including service stops), assuming an average speed of 12 mph.[8] The Emeryville line is 5.3 miles in length and would take approximately 27 minutes to traverse the entire loop to 64th and back to MacArthur BART (including service stops), assuming an average speed of 12 mph.

A maintenance facility would be needed for a streetcar. It would require several acres of space, and it would need to be near the service alignment. Streetcars on San Pablo Avenue should be studied as a future way to provide transit to these communities. The following identifies the key characteristics of the two Streetcar routes:

- **Connect to key locations in West Oakland and Emeryville**
    - The West Oakland Streetcar route connects the Jack London Square area, West Oakland, Amtrak, and MacArthur BART with the East Bay Bridge shopping areas and the medical complexes in the Mid-Broadway area in Oakland. From its southern terminal at the Oakland Jack London Square Amtrak Station, the system would operate on the 2nd/3rd couplet and 3rd Street to the West Oakland BART Station, where it would circulate around the station, continuing north on Mandela, then Hollis, 40th to the MacArthur BART Station. The route would connect West Oakland along Mandela with major transit terminals.
    - The Emeryville Streetcar route is designed to connect MacArthur BART Station with the employment and shopping areas along Hollis and West Berkeley via 40th, Hollis, Powell, Shellmound and Christie. Adding rails to bridges is problematic because it is not possible to embed rails in the deck. If laying tracks on the bridges is infeasible, an alternative is to keep the streetcar east of the railroad – up Hollis Street to 59th Street, to Amtrak and down Horton Street. That route would connect to the pedestrian-bike bridges to Bay Street and the Public Market west of the railroad.
- **Improve service**
    - The service would provide frequent service within peak hours as well off-peak daytime hours, evening and weekends. Service would operate every day from 6:00 or 7:00 am (depending on day of week) to 10:00 or 11:00 pm.
    - The new line would coordinate with other transit services. Much of the Emeryville line is currently operated as part of the Emery Go-Round Shellmound-Powell shuttle bus route.

[8] Streetcar systems typically have similar speeds as buses, varying widely depending on operator, line, and location. Average speeds for the Portland Streetcar are approximately 15mph (http://www.nycsubway.org/wiki/Portland_Streetcar). However, because sources vary and system speeds are more dependent on location, average speeds were based on AC Transit bus service average speeds with slight speed increases due to service improvements.

Adjustments to that service in coordination with the introduction of the proposed route will be important in order to provide complementary and efficient transit service.

- **Improve amenities**
  - The service is designed to have bulb-outs and level boarding to improve service efficiency and increase travel speed.
  - Stop amenities for the Streetcar concept include well-lit shelters with real-time arrival information. Marketing and clear route information will help make the streetcar a visible and accessible transit option.
- **Improve economic vitality and community development**
  - Due to the visibility of the streetcar mode, routes and service are generally more legible and understood relative to other transit modes. The service investment and visibility has shown to increase economic development and support walkable, transit-oriented development in cities that have recently implemented modern streetcar systems.

Figure 7 shows a simplified image focusing on the Streetcar routes without distinguishing other transit lines. **Figure 8** shows detail of the Streetcar routes including the enhanced AC Transit bus routes, Enhanced Bus trunkline Route, and the Streetcar routes that are proposed for the 10 – 20 year timeframe.

Figure 7: Proposed Streetcar Routes

Figure 8: Proposed Enhanced Bus Trunkline and Streetcar Routes

5. Evaluation of Improvements

This section provides an evaluation of the Enhanced Bus Trunkline and Streetcar routes. Many evaluations are completed at a "sketch" level consistent with the evaluation stage of the proposed routes. The evaluation of transit options included the following evaluation factors:

- Ridership
- Vehicle Miles Traveled (VMT) Analysis
- Effects on Environmental Justice Communities
- Safety and Security
- Costs
- Compatibility with Existing Transit
- Economic Development Impact

Ridership

System ridership includes residents, employees, students and visitors. Riders include those moving into the study area, out of the study area, and within the study area. Ridership forecasts take into account current and future demographics and employment, as well as the amount of travel and time-of-day of travel currently found within the study area. Between 2010 and 2040, the study area is projected to add 24,000 jobs and 13,000 housing units. Job growth in the area is expected to be strongest in professional, scientific, technical and other services, and in clean technology and advanced manufacturing. More information on the kinds of riders can be found in the section of this chapter on economic development.

Ridership forecasts were based on comparative system data, including AC Transit and urban transit systems as reported in the National Transit Database. Average per-stop ridership for comparative AC Transit route segments that run within ¼ mile of the proposed route were used to approximate location-specific transit demand.[9] The average number of riders per stop per day for comparative routes ranged from about 31-39 riders. An elasticity factor was applied to the average per-stop ridership to account for increases in service frequency and mode changes in the improved routes. This enhanced per-stop ridership average was then used to calculate the route ridership by multiplying the average per-stop ridership by the approximate number of total stops per proposed route. Numbers are rounded to the nearest 100. **Table 2** lists the total riders and new ridership projections for the proposed routes.

- **Enhanced bus service:** Enhanced service applies an elasticity factor that accounts for frequency of service increases. While the elasticity factor was only included in the upper range of the estimates, ridership would be expected to increase further for additional enhancements such as branding/marketing, low floor busses for faster boarding, and Intelligent Transportation System (ITS) applications such as real-time travel information and signal priority. Literature states that marketing alone can increase ridership up to 10%; the combination of marketing and

[9] Routes without overlap in transit demand, such as routes running perpendicular, overnight routes or transbay routes with less than 2 stops in the project area, were not included.

passenger information can increase ridership as much as 20%.[10] For the Enhanced Bus Trunkline and Streetcar routes, the upper range estimates includes an elasticity factor to account for such variations.

- **Streetcar ridership**: An additional elasticity factor was applied to account for increased demand generated by streetcar systems relative to bus transit. Within three comparative systems analyzed,[11] it was found that streetcar systems typically have approximately 20%-80% more ridership compared to bus systems in the same area. An average estimated ridership increase of 46% was applied to the proposed Streetcar routes.

- **Population projection:** The increase in ridership for all modes is assumed to increase proportionally to the projected population and job increase in the project area (based on ABAG Travel Analysis Zone projection). In reality, increases in population and job growth will also lead to increases in land use intensity, which will encourage more public transit use, making the lower-range estimated ridership increase by 2020 and 2035 conservative measures. For the Enhanced Bus Trunkline and Streetcar routes, the upper range ridership estimates includes an elasticity factor to account for variations in design as well as increased ridership.

- **Transferred Ridership:** The total ridership for comparative stops adjacent to proposed routes was distributed across the additional proposed stops (based on route stop-spacing) to estimate the number of "transferred riders," or those who would transfer from one bus line to the new route line.

- **New Ridership:** New ridership includes only those riders generated from service improvements, while the remainder of the ridership includes those who transfer from other routes. This is calculated by taking the total ridership and subtracting the "transferred ridership" for each route.

[10] Federal Transit Administration. Bus Rapid Transit Practitioner's Guide. TCRP Report 118; Currie, Graham and Wallis, Ian (2008). "Effective Ways to Grow Urban Bus markets – A Synthesis of Evidence."
[11] Seattle's King County with 82% more, New Orleans with 19% more, and Memphis streetcar system with 37% more. Portland's streetcar has 172% more ridership, but was deemed not comparable because of the much larger extent of the regional Tri-Met bus system.

Table 2: Transit Improvements – Daily Ridership Forecast

Improvement	Daily Weekday Ridership	
	Total Riders	New Riders
Enhanced Bus 2020 Forecast		
Enhanced Bus Trunkline Route *Jack London Square to North Berkeley*	**5,800 – 7,300**	3,800 – 5,300
Streetcar Routes 2035 Forecast		
West Oakland Streetcar Route *Jack London Square to MacArthur BART through West Oakland*	**4,200 – 5,300**	3,100 – 4,200
Emeryville Streetcar Route *MacArthur BART to Emeryville's Shellmound Street*	**5,700 – 7,100**	4,900 – 6,300

The projected ridership based on the above analysis is within the range of comparable bus and streetcar systems. For local comparison, AC Transit has an average of about 1,292 riders per line, per weekday.[12] However, this average is brought down by All Nighter service lines, and supplementary lines to less dense areas. In the study area, most AC Transit lines carry between 2,000-9,000 passengers per day. The 72R has about 7,000 riders per weekday and the 72 has about 4,300 riders per weekday. Line 26 has approximately 2,300 riders per weekday, Line 51B has approximately 8,900 riders per weekday and the popular Line 1R carries about 12,000 riders per weekday.[13]

Current AC Transit lines with the higher ridership—72R, 51B, and 1R—have higher frequencies (typically 12-15 minutes). Higher frequencies will increase the popularity of a line, but also are provided to accommodate the high demand for these routes. The proposed routes take both of these factors into account: high demand due to route location as well as future increases in population and employment, as well as increased demand due to high frequencies.

[12] Daily (weekday) ridership for FY2012-2013 was 192,533 for 149 lines. http://www.actransit.org/about-us/facts-and-figures/ridership/

[13] 1R ridership based on 2011 Line 1R Service and Reliability Study Final Report. Ridership of additional routes based on 2013 AC Transit ridership data.

Vehicle Miles Traveled (VMT) Analysis

Reduction in Vehicle Miles Traveled (VMT) is assumed to be directly related to increases in new ridership, and the vehicle miles per day traveled by each route. VMT was calculated from the new riders, or the ridership that is not generated from passengers who transferred to another bus or shuttle route. Baseline VMT was calculated based on new riders transferring from a previous mode, including drive alone, carpooling/other, and walk/bicycle modes. The proportions for non-transit mode shares were assumed to be consistent with journey-to-work data from the American Community Survey (2012), for U.S. Census tracks within the project area.

Calculations are such that the new VMT produced by the new routes (new route VMT) are compared to the vehicle miles of new riders before they switched modes (baseline VMT). The new route VMT produced by the proposed lines is based on frequency and route length of route. The baseline VMT is based on projected new riders switching from drive-alone (67%), carpool or other (23%), and walk/bike modes (10%). Baseline VMT includes trips by automobiles, producing ranges of VMT based on the assumption that average trip length for riders is between 2.5 and 3 miles long. Bicycle and walk-modes do not contribute to the baseline VMT because they have no vehicle-miles. Therefore, bicyclists and walkers increase the VMT per rider when they switch to the new system. **Table 3** lists the estimated VMT that the proposed route will create as well as the reduction in VMT that is caused by new riders shifting from non-transit modes to transit modes.

Table 3: Daily VMT Reduction by Route

Alternative	Daily Weekday VMT	
	Total VMT for Route	VMT Reduction
Enhanced Bus 2020 Forecast		
Enhanced Bus Trunkline Route *Jack London Square to North Berkeley*	2,700 miles	**4,700 – 6,200 miles**
Streetcar Routes, 2035 Forecast West Oakland		
West Oakland Streetcar Route *Jack London Square to MacArthur BART through West Oakland*	800 miles	**5,300 – 6,500 miles**
Emeryville Streetcar Route *MacArthur BART to Emeryville's Shellmound Street*	1,300 miles	**8,300 – 10,200 miles**

Effects on Environmental Justice Communities

This section provides an analysis of effects on minority and low-income community within the study area. While this impact overview does not obviate the need for further Title VI[14] analyses prior to service improvements, nor does it replace the need for environmental clearance, it does provide an overview of potential effects on protected populations.

The primary evaluation factor for this analysis includes transit access within a ¼ mile of transit routes within the study area. Each set of improvements was evaluated and compared with existing transit service to compare access to transit. Additional considerations include construction impacts, gentrification and reduced sales leakage.

Low-Income and Minority Communities

For purposes of determining minority and low-income concentrations within the EBOTS study area, the following definitions were used:

- "Minority" populations include any non-white individuals or households (including Hispanic or Latino populations, regardless of race);
- "Low-income" populations include households making less than 200% of the federal poverty rate, which is currently at $23,550 for a family of four. This means that households with incomes under $47,100 for a family of four would be considered low-income.

The EBOTS study area is racially diverse; 73% of the population is minority, with the highest concentrations located in West Oakland where some census tracts are greater than 80% minority. Other significant concentrations of minority populations occur in Emeryville, where census tracts are between 60% and 80% minority (excluding the area bounded by 53rd Street and 67th Street, and Shellmound and Vallejo which is approximately 40% to 60%) and in West Berkeley from Dwight Way to Camelia Street. However, concentrations of minority populations still range from 40% to 60% in the remaining tracts within the study area. In fact, no census tracts within the study area are less than 40% minority. Since there are no tracts where the ethnicity is below 40% in the study area, the function of this qualitative analysis will be to provide a highlight of where specific service alternatives may provide a higher or lower level of access for minority populations. **Table 4**, below, presents the percentages of minority and low income populations within the EBOTS study area. **Figure 9** presents a map depicting the concentrations of Minority populations in the study area.

A review of the low-income populations reveals a slightly different picture from the patterns of minority concentrations. Approximately 44% of households in the EBOTS study area would be classified as low-income using the definition of households earning less than 200% of the federal poverty level. However, only one area, West Oakland, has significant populations of low income households. In the census block group bounded by Grand and 5th Street, and Adeline and Mandela Parkway, between 70% and 80% of the households fall within the definition of low-income. The second greatest concentration of low-income households is immediately adjacent, bounded by Grant and 5th Street, and Adeline and Market

[14] Title VI of the Civil Rights Act of 1964 protects people from discrimination based on race, color or national origin, specifically in programs/activities that are federally funded. Source: www.fta.dot.gov

Street. This area has concentrations of 60% and 70% of low income. **Figure 9** presents a map depicting the concentrations of Low-Income populations in the study area.

Table 4 shows the overall minority and low-income population by percentage in the study area.

Table 4: Minority and Low Income Populations in the EBOTS Study Area

Area	% Minority	% Non-Minority	% Low-Income	% Non-Low-Income
EBOTS Study Area	73.0%	27.0%	44.4%	55.6%

Access to Transit

Nearly all areas within the Study area are within ¼-mile of transit, including areas within low-income and minority areas. Since widespread service is being provided by existing transit service (including shuttle services), little change will occur in the numbers of low-income and minority populations served by transit. However, the intensity and quality of service will be improved with the potential transit improvements. **Table 5** shows the percent minority and the percent low income residing within ¼-mile of each route. **Figure 9** and **Figure 10** show the density of minority and low-income residents within the study area.

Table 5: Minority and Low-Income Population within ¼-mile of Routes

Scenario and Routes	% Minority	% Low-Income
Existing Transit Routes within the Study Area (1/4-mile buffer)	71.95%	43.11%
Planned Transit Routes within the Study Area , including AC Transit and Emery Go-round improvements described in Section 3 (1/4-mile buffer)	71.88%	43.01%
EBOTS Transit Improvements • Enhanced Bus Trunkline Route • Streetcar Routes	71.88%	43.01%

*Notes: Includes routes with 30 minutes or less peak frequency. Does not include communities outside of the study area. Because the Enhanced Bus Trunkline and Streetcar route improvements include the AC Transit Updated Bus Routes (covering most of the study area), the percent minority and low-income populations within ¼ mile of routes does not change.

The buffer analysis of the AC Transit updates and the proposed routes identified approximately 71.88% of the population within the ¼-mile buffer as minority, which is slightly lower than the overall minority percentage within the EBOTS study area and slightly lower compared with existing service. This is because the south end of West Oakland is wider than the rest of the study area, and a direct route cannot be within ¼-mile of all the properties there. However, improvements to service and reliability would offset this modest difference and improved transit service would benefit all users, especially in West Oakland where several key improvements are identified.

Potential Construction impacts

The construction impacts due to the potential transit improvements are minimal. Construction of Streetcar routes would not likely result in any displacements of commercial or residential buildings and construction would not likely occur for longer than 18 months and would be phased in segments to minimize disruption to the community including limited road closures and detours. Construction of a streetcar could result in impacts related to noise, dust and detours during construction. These impacts could be mitigated with appropriate best management practices and outreach to the community.

Disabled, Transit Dependent, and Senior Populations

Information concerning populations with disabilities was compiled as additional information about the protected classes of population that are the subject of this environmental justice assessment. Data regarding disabled, transit dependent, and senior populations was considered when looking into the federally-protected environmental justice community areas. **Table 6** shows the percent of transit dependent, disabled, and senior populations within the study area. Disabled populations make up 13% of the population, while elderly populations make up 9.5% of the population within the study area. Transit dependent populations are considered those without access to an automobile, these make up 21.9% of households in the study area.

Table 6: Disabled, Transit Dependent, and Senior Populations

	Total	Percent
Transit Dependent (Zero Car Households)	3,387	21.9%
Disabled Population	4,381	13.0%
Seniors (Age 65 and over)	3,211	9.5%

Source: U.S. Census Bureau. 2008–2012 American Community Survey. Table P12 Age by Sex, Table B25044 Tenure by Vehicles Available, and Table B25044 Tenure by Vehicles Available.

Benefits for Low-Income and Minority Communities

Benefits to low-income and minority communities could include improved access to appropriate educational and employment opportunities and attraction of retail and services that would reduce sales leakage out of the area.

Figure 9: EBOTS Study Area Minority Populations

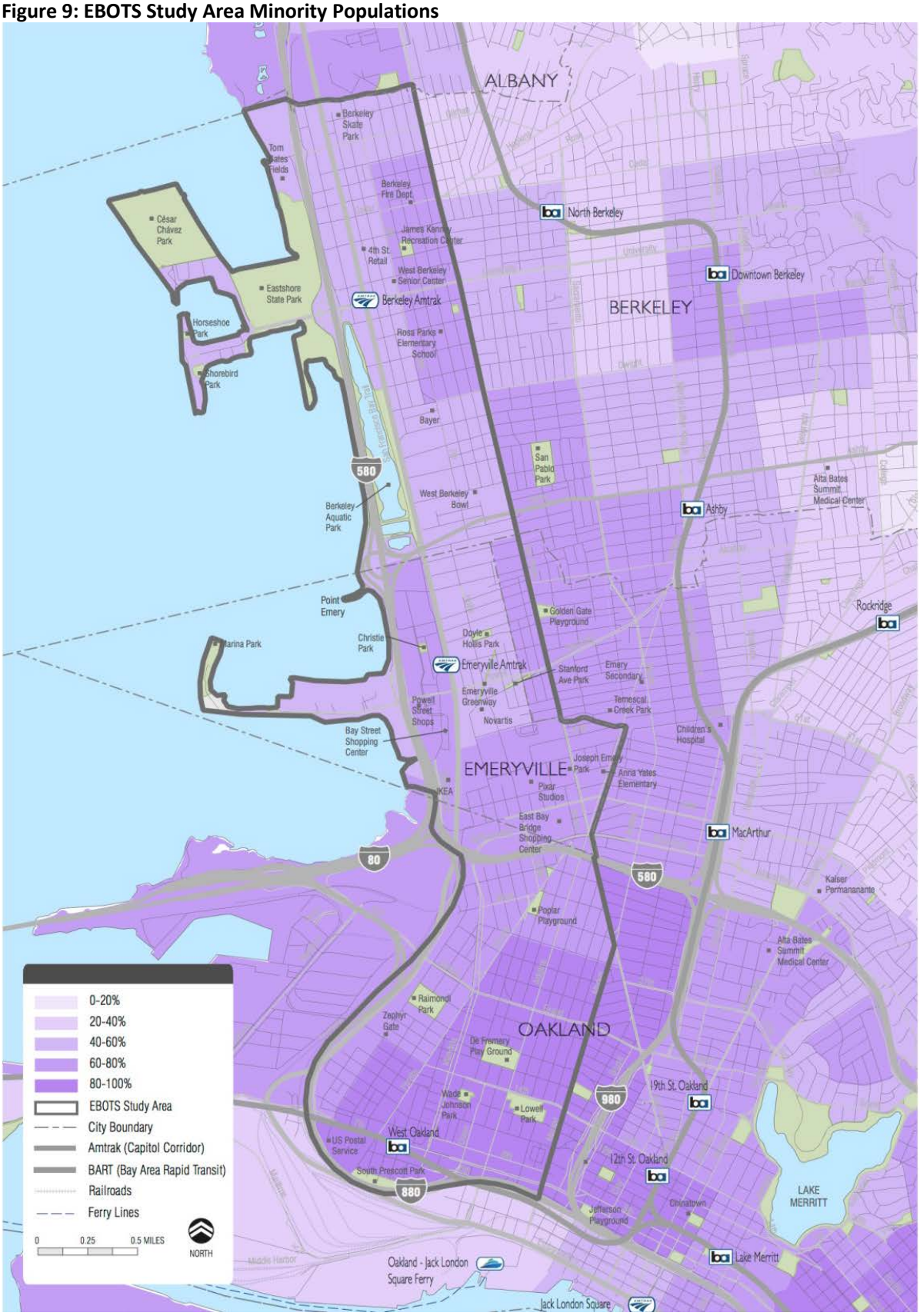
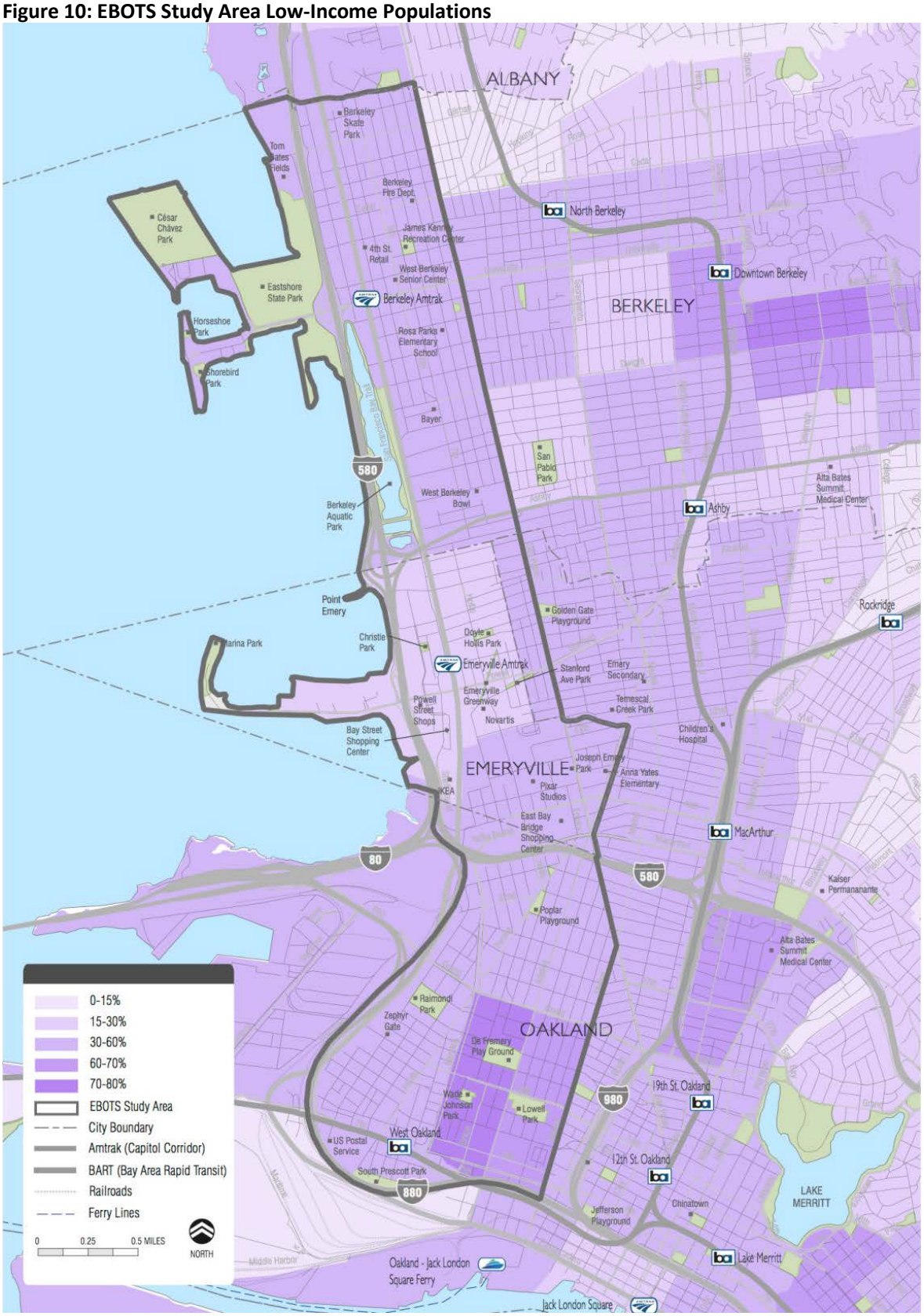


Figure 10: EBOTS Study Area Low-Income Populations



Safety and Security

Safety and security for transit riders, pedestrians, bicyclists, and other vehicles is a concern with the addition of an expanded or new transit line or system. At community meetings and in the surveys community members expressed feeling unsafe when waiting at bus stops and occasionally when riding the bus. Furthermore, participants raised several concerns for street crossings and pedestrian safety. Based on these concerns, safety and security issues addressed here include:

- Security concerns at transit stops and facilities.
- Safety concerns related to increased collisions and multimodal conflicts.
- Additional safety concerns related to streetcars and streetcar tracks.

Further analysis of specific sites can help identify areas for mitigation by specific site design to prevent adverse safety impacts. A detailed safety plan could be developed to establish the standards and design, construction, and commissioning of a system's safety elements.

Bus Stops and Facilities

There are several safety concerns for bus amenities; typically amenities increase the efficiency and safety of passengers. Facilities to enhance safety should have good visibility, lighting, grade separation, and clear demarcation of pedestrian and vehicle areas.[15] However, the full extent of a safety analysis depends on several site-specific factors. Landscaping, signage, and other facilities can enhance safety by providing benefits such as lighting and visibility. However, amenities can sometimes cause visual or physical obstructions to vehicles. Site-specific analysis of future stops will need to be conducted in order to fully analyze the safety and security of amenities.

For example, bulb outs can have both positive and negative safety effects. Bulb outs can improve safety by reducing the need for buses to re-enter traffic flow after stopping and improve access and increase space for boarding and alighting passengers. They can also potentially decrease pedestrian-vehicle conflicts by making pedestrians more visible to approaching traffic. Bulb outs can potentially have negative impacts on bike safety as they may be causing breaks in continuous bike lanes, which could lead to increased conflicts. [16] Bus stops will have lights and cameras for security.

Intermodal Collisions

Any increase in transit service increases chances for intermodal (including pedestrian, bicyclist, and other vehicles) conflicts. The impact of the proposed routes on the safety of the corridor is site specific and depends on the design guidelines of the system as well as the site-specific travel characteristics and design of the streets. For example, bus idling and visual obstructions can cause problems for all modes. When idling at intersections, buses can be a visual obstruction limiting drivers' view of pedestrians at crosswalks. Rear-end collisions and accidents from vehicles quickly changing lanes are a large concern with increased transit due to events where buses make abrupt stops within a shared lane to pick up passengers.

---

[15] Accessing Transit – Design Handbook for Florida Bus Passenger Facilities.
[16] Oakland Bus Bulbs Analysis – AC Transit East Bay Bus Rapid Transit Project in Alameda County.

Streetcars

One of the most common streetcar concerns is that the streetcar tracks provide a hazard for bicycle wheels. Bicycle wheels can get stuck in the track ruts, causing injuries from falls and collisions. Some safety and security concerns unique to streetcars include:

- Bicyclists wheels can get stuck or slip on tracks
- Streetcar vehicles cannot change directions to respond to a vehicle conflict
- Streetcars within travel lanes will increase traffic congestion, causing increased conflicts

Costs

All costs were evaluated based on costs of similar systems and guidelines provided by AC Transit. Note that these costs are estimates and actual costs vary widely depending on the specifics of the service and route. Moreover, if routes are operated by a non-profit or under private contract, costs would likely be lower, yet drivers may not be as well compensated. Because of the broad nature of the estimates, all numbers are rounded to the nearest million dollars.

Enhanced Bus Trunkline Route Costs

Capital Costs for the Enhanced Bus Trunkline route are based on the route mileage as well as the number of total vehicles needed. Capital costs were estimated with a range starting at $270,000 per mile in each direction for a total of 16.2 miles as well as $700,000 per vehicle. Per-mile costs (not including vehicles) are based on the San Pablo Avenue BRT (2005) and the Wilshire Ventura Blvd Metro Rapid System (2000) and inflated to 2014 dollars.[17] These costs include stops (accommodating approximately 5 stops per mile) and amenities such as bus arrival information, street furniture, marketing costs, and intersection signal priority costs. Vehicle costs were estimated at $700,000, an estimate based on comparative new 40-foot and 60-foot hybrid vehicle purchases.[18] To account for variations in costs for different types of system vehicles and operators, a range was created based on an additional 15% contingency rate. With these assumptions, capital costs total $11 – 12 million. Based on a 12-year infrastructure lifecycle,[19] annualized capital costs would be approximately $1 million/year.

- Capital Costs: $11 – 12 million
- Annualized Capital Costs: $1 million/year

The operating and maintenance costs for the Enhanced Bus Trunkline is based on an estimated number of annual revenue hours, calculated based on route length, peak and off-peak headways, and turnaround time. According to data reported by the National Transit Database (NTD) in 2010, typical operational and maintenance costs for bus services around the country range from approximately $100/hour to $168/hour (while AC Transit's fully allocated costs are $168/hour). Therefore, the estimate used was $168/hour with a range based on an additional 15% contingency rate to account for variations due to system specifics.

- Operating and Maintenance Costs: $8 – 9 million per year

[17] The San Pablo Avenue BRT study's (2005) costs for traffic, stop improvements and amenities, ridership surveys, marketing and amenity operations was approximately $3.2 million for 26 stops and 14 miles (National Bus Rapid Transit Institute, The San Pablo Rapid BRT Project Evaluation Final Report, 2006). In 2014 dollars, this per-mile cost equals about $270,000. The Wilshire and Ventura Blvd Metro Rapid System (2000) cost approximately $8.2 million for 42 miles for stops and intersection signal priority (Final Report, Los Angeles Metro Rapid Demonstration Program, 2002). In 2014 dollars, this per-mile cost also equals about $270,000.

[18] This estimate is based on several system costs, including: a 2012 purchase of 60-foot articulated hybrid-electric buses at $813,100 for CTTRANSIT Hartford (cttransit.com); 40-foot hybrid bus costs of about $500,000 by King County metro Transit (kingcounty.gov, 2013); and San Francisco new Flyer hybrid bus costs of $752,000 per vehicle in 2013. This value is also consistent with estimates made for Oakland in the Broadway Transit Urban Circulator Study (2013).

[19] U.S. Department of Transportation Federal Transit Administration (FTA): Useful Life of Transit Buses and Vans. Report No. FTA VA-26-7229-07.1

Streetcar Route Costs

The capital costs for the Streetcar Routes were calculated based on the Seattle streetcar system capital costs ($27.6 million per track-mile in 2014 dollars) and rounded to a rate of $30 million.[20] To account for variations in costs for different types of systems, an upper range value was created based on an additional 15% contingency rate. With these assumptions, capital costs total $129 - $148 million for both lines. Based on a 30-year infrastructure lifecycle, annualized capital costs would be $10 – 11 million/year.[21]

- Total Capital Costs: $228 - $331 million
    a. West Oakland Route: $129 - $148 million
    b. Emeryville Route: $159 - $183 million
- Annualized Capital Costs: $10 – 11 million/year
    a. West Oakland Route: $4 - $5 million/year
    b. Emeryville Route: $5 - $6 million/year

Like the operating costs for the Enhanced Bus, operating and maintenance costs for the Streetcar routes were calculated based on the headway times and total route distance in order to calculate the total operating hours. Streetcar operating and maintenance costs were assumed to be 60% higher than bus service based on findings from the NTD where typical streetcar costs are 40 - 60% higher for comparable modern streetcar systems. This total cost was $270 per hour with an upper range created using an additional 15% contingency rate to account for variations.

- Total Operational and Maintenance Costs: $14 - $16 million/year
    a. West Oakland Route: $6 - $7 million/year
    b. Emeryville Route: $8 - $9 million/year

[20] Seattle Streetcar capital costs were $56.4 million for 2.5 miles of track ($22.6 million per track-mile, or $27.6 million per track-mile in 2014 dollars). The Seattle Streetcar systems was constructed from 2005-2007. An additional 25% inflation rate was added to account for increasingly high costs of construction in the Bay Area.

[21] Based on an assumption that Streetcar vehicles last approximately 30-40 years. From: Pittsburg City Planning, Strip District Transportation and Land Use Plan Best Practices – Streetcar Capital Cost Estimate – City of Pittsburg. Alternative source, streetcar lifecycle of approximately 30 year: City of Seattle, Section 10 Asset Class - Seattle Streetcars Report.

Compatibility with Existing Transit

When new transit service begins in the EBOTS study area it would likely supplement existing transit service. The proposed Enhanced Bus trunkline and Streetcar routes provide redundant service along Mandela Parkway and 40th Street, yet connect different key locations. These routes also provide service alongside AC Transit's potential realignments of Route 26 and Route 57. The relative service frequency and redundancy of these routes should be considered along with phasing and future demand needs. Furthermore, how and where Emery Go-Round will operate is an important consideration, especially with the Emeryville Streetcar Route, which has segments similar to the Shellmound and Powell Bridge Emery Go-Round routes. **Table 7** lists factors contributing to each route's compatibility with existing transit.

Table 7: Compatibility with Existing Transit

Service	Compatibility with Existing Transit
Enhanced Bus Trunkline Route	• Emery Go-Round: There would be minimal overlapping service along Hollis Street. • AC Transit: Service would overlap with AC Transit's proposed Line 26 within West Oakland, yet this Route would still provide a more direct connection from the West Oakland BART station to Shellmound. Service would also overlap with AC Transit's proposed Transbay Line Z along 6th Street in West Berkeley. Line 48 would overlap service between Ashby and Gilman along 7th and 6th streets.
Streetcar Routes	Emeryville Streetcar Route • AC Transit: Streetcar service from MacArthur to Shellmound would overlap with AC Transit's proposed line 57. Line 57 could be redundant. • Emery Go-Round: There would be overlapping service connecting BART to locations currently served by the Hollis Emery Go-Round route and the Powell Bridge Emery Go-Round route. West Oakland Streetcar Route • AC Transit: Streetcar service on Mandela would overlap with the Enhanced Bus trunkline as well as AC Transit's proposed Line 26. However, West Oakland Streetcar Route would continue to MacArthur BART station and Line 26 would serve Shellmound. • Emery Go-Round: There would be minimal overlapping service with this route.

Economic Development Impact

Economic Development Potential

Each of the EBOTS cities has a significant existing employment base; Emeryville has the largest, followed by West Berkeley and West Oakland. The existing residential population is considerably smaller, resulting in these areas having a very high ratio of jobs to employed residents when compared to the EBOTS cities overall.[22] West Oakland has the largest number of residents, followed by Emeryville and West Berkeley. For all three EBOTS cities, fewer than 500 residents live and work in the same city within the study area; this results in substantial in-commuting because of the large employment base, combined with substantial out-commuting by EBOTS residents to jobs located in other places.

Each of the EBOTS cities envisions substantial economic development over the next 20 years, to 2035, encompassing a range of new jobs, commercial development, and residential development. West Oakland, through the recently adopted West Oakland Specific Plan, envisions the largest amount of new development as it seeks to preserve its existing economic base and current population, while attracting significant new industrial, Research and Development (R&D), office, retail, and mixed-use development alongside new residential land uses. Emeryville, with the most active current real estate market of the three EBOTS cities, will continue to add a variety of new employment supporting R&D and office uses, and will approach build-out for residential uses. West Berkeley, pursuant to the provisions of the West Berkeley Plan, will see the lowest increase of the three cities in new employment and residential uses, with most activities likely focused on opportunities sited in the M-zoned District west of 6th and 7th Streets. All three EBOTS cities seek to promote commercial and mixed-use development, with multifamily residential, at densities that are supportive of transit.

A comparison of existing conditions and future project development is shown in **Table 8** below. Growth projections are based on Plan Bay Area figures, using travel analysis zones (TAZ's) that approximately correspond to the EBOTS study area. An exception is West Berkeley where the EIR for Measure T, No Project Alternative, was used to reflect existing entitlements and the lesser amount of development that is allowed (the West Oakland figures exclude the former Oakland Army Base and other areas that are included in the West Oakland Specific Plan):

Table 8: Projected Employment and Household Change by EBOTS Subarea, Year 2010 - 2035

Location	2010	2035	Change
West Berkeley			
Employment	16,645	20,945	4,300
Households	7,718	9,369	1,651
Emeryville			
Employment	16,040	22,536	6,496
Households	5,694	10,603	4,909
West Oakland			
Employment	8,786	15,316	6,530
Households	6,795	11,861	5,066

Sources: Plan Bay Area; City of Berkeley; BAE.

[22] A more detailed discussion is contained in BAE's December 20, 2013 memorandum on the Economic Development Inventory and Opportunities Analysis, found in Appendix F.

Emeryville's current development pipeline includes more than 2,000 new residential units, while more than 200 are planned in West Berkeley. New employment-generating development is not currently as active, but is expected to pick up as the economic recovery continues, with the East Bay benefiting from spillover, as the San Francisco, Peninsula, and Silicon Valley areas become increasingly expensive, as has occurred in past cycles. In the near-term (next 5 years or less), current market trends suggest that Emeryville will see the most new development, followed by West Berkeley, and West Oakland. Substantial new development in West Oakland is likely to accelerate in the medium-term (5 years+) and beyond, as the West Oakland Specific Plan is implemented, and fewer available sites remain in Emeryville and West Berkeley.

Transit and Local Economic Development

Appropriately planned and operated local transit can enhance economic development in two primary respects. The first impact is related to mobility, or enhancing the ability of workers and residents to circulate within an area and make connections to the regional transit system. Particularly for built-up areas with a strong economic base, enhanced local transit is critical to accommodate growth without substantial increases in congestion, especially for the EBOTS area with its limited connections to the regional transit system.

The second impact from local transit is its potential to be an attractor for new development and new types of uses. Early in Emeryville's redevelopment as a modern employment center, the establishment of the Emery Go-Round shuttle bus system was critical in attracting office-based employers who have staff that rely on BART to commute to work. Similarly, Oakland is proposing to develop an "O" transit loop that connects West Oakland with BART, Downtown, and the Broadway corridor as part of the West Oakland Specific Plan's vision for attracting new uses and substantial equitable development to the area. The potential for local transit to be an attractor means that it can also increase a local area's share of future growth above what would otherwise occur.

Another consideration for the EBOTS study is the extent to which new residential versus commercial uses generate more transit ridership. A Public Policy Institute of California study, *Making the Most of Transit: Density, Employment Growth, and Ridership around New Stations* (Kolko et al, 2011), points out that while much of the emphasis has been on building residential around transit stations, across the US there is a stronger relationship between employment density and transit ridership than there is for residential density; at a Census tract level high density employment is correlated with 24 percent more ridership than high density residential.

For West Berkeley and Emeryville, with the existing West Berkeley and Emery Go-Round shuttles, and AC Transit service, the expansion of existing service is more likely to generate mobility benefits than attraction benefits. In other words, most, not all projected growth in these two PDA's would still likely occur if there is only limited expansion of transit service, assuming the West Berkeley and Emery Go-Round shuttles remain in operation.

For West Oakland, expansion of existing AC Transit Service and/or the creation of additional new high-quality local transportation options are likely to be important factors in attracting the substantial new development, firms, employees, and residents envisioned in the Specific Plan. The lack of enhanced high-quality transit options for West Oakland is more likely to affect how much growth can be attracted to the area than it is for West Berkeley or Emeryville.

Transit Technology and Economic Development

The success of streetcar systems in attracting new development activity in Portland, OR, Seattle, WA, and in other cities around the US has created tremendous interest. These two streetcar systems in Portland and Seattle operate in mixed flow, rather than dedicated lanes (as many Bus Rapid Transit projects that have contributed to development do). More than 70 US cities are currently in one stage or another of proposed, planned, or under construction streetcar systems. Streetcar systems are often claimed to generate greater economic development benefits because of developer preferences for systems with fixed investments; rider preferences for rail over buses; the higher quality rider experience with an electric streetcar vs. a diesel or alternative-fuel bus; and the greater rider capacity that streetcars can provide. Conversely, streetcar systems are considerably more expensive to develop and operate on a per-mile basis.

The Institute for Transportation and Policy Development Policy (ITDP) recently published a study, *More Development for Your Transit Dollar: An Analysis of 21 North American Transit Corridors,* (Hook, Lotshaw, Weinstock, 2013)[23] that found that of the five transit corridors that generated the most investment in Transit-Oriented Development (TOD), on a dollar of TOD investment per dollar of transit investment, two were bus systems (Cleveland HealthLine BRT and Kansas City Main Street MAX bus), two were streetcars (Portland and Seattle South Lake Union), and one was light-rail (Portland MAX Blue Line). For the 11 transit corridors with "Moderate" TOD Impacts, seven were Bus Rapid Transit (BRT) or bus systems, and four were light-rail transit (and five of the BRT systems met ITDP's definition for high quality transit). Neither this study nor other research has been able to establish a TOD investment potential from regular transit bus operations.

It is challenging and impractical for the EBOTS study to develop useful measures that can relate the amount of transit investment to a certain TOD outcome. This is because transit investment often occurs in conjunction with agency revitalization plans and upzoning that in themselves spur development and increase the value of land, even without transit. Development outcomes are also correlated to current development patterns, current market conditions, and future market potential, all of which vary from place to place. Within the EBOTS subareas there is sufficient variation in these factors that it is not practical to develop measures for how much incremental investment in TOD would result from an incremental investment in transit.

Key Factors Shaping Transit and TOD

ITDP and other studies indicate that the following factors would be most important, in the following order, for determining how transit investment influences economic development:

- Local government plans that allow for denser development and use revitalization techniques, including public investment, to spur development.
- Current development land market conditions, including the availability of opportunity sites.

[23] Available at https://go.itdp.org/display/live/More+Development+for+Your+Transit+Dollar%3A+An+Analysis+of+21+North+American+Transit+Corridors

- Transit quality, defined as frequent service, high quality station design, passenger information systems, and other features (ITDP publishes a "BRT Standard" to score transit quality, much of which is applicable to other modes)[24].

- Current demographic and economic trends.

- The pedestrian orientation of areas around transit stations or stops.

All three EBOTS cities already have or will be implementing plans that have provided a framework for development to allow for substantial new development over the next 20 years and beyond. All three cities have a similar built form and pedestrian orientation. Transit quality is more about a set of design features and operational characteristics that can be applied to rail-based or bus-based transit. Therefore, this factor does not support making distinctions between the concepts.

Therefore, current development land market conditions and local demographic and economic trends are the two remaining factors that can be used to evaluate differences between the EBOTS transit concepts. In the near-term, these factors would favor Emeryville, since this portion of the study area currently has the strongest current market for development, followed by West Berkeley and West Oakland. In the medium-term and beyond, as implementation of the West Oakland Specific Plan would shift the development land market, the greater potential for growth would favor West Oakland, which could also offer the potential for a greater return, measured as TOD investment that results from the investment in transit. To the extent that expanded transit in the EBOTS area is funded as a New Starts or Small Starts project, the federal and local processes for approval, construction, and commencement of operations is likely to be in the medium- to long-term, and take considerably longer than five years.

For transit technology, the variance in TOD outcomes that ITDP identifies between streetcar and bus systems suggests that it should not automatically be assumed that a streetcar will result in a greater amount of new TOD and economic development. With a focus on transit quality as more of a driver of TOD potential than the choice of transit technology, the potential for a streetcar should be evaluated in terms of its ability to move more people at lower cost within a given transit corridor than the bus alternative. The potential for a bus-based system to generate acceptance and interest similar to a streetcar system should be evaluated in terms of the quietness and smoothness of operation of the vehicle (with electric vehicles being ideal), the quality of stops and services, and its branding as a modern transit option.

New Development Value Capture

Another set of criteria to evaluate the economic development potential of the transit concepts involved the extent to which it could be phased to better match development as it occurs, and the extent to which that development could contribute to capital or operating costs through value capture mechanisms. Value capture is an important strategy for generating a portion of the local match required by many grant sources, as well as for generating direct investment and operating funds for new transit. Value capture techniques involve a range of financing tools that seek to generate funds from a portion of the value of new development. Potential strategies specific to new development, and their applicability to EBOTS

[24] The categories for the BRT Standard are: BRT Basics; Service Planning: infrastructure; Station Design and Station-Bus Interface; Quality of Service and Passenger Information Systems; and Integration and Access. The BRT Standard is available at https://go.itdp.org/display/live/The+BRT+Standard

study area improvements, are shown below in **Table 9** (this list excludes general taxes that would apply to all properties, such as parcel taxes, sales tax increase, utility user tax increase, etc.). Some value capture is being done already, including the Property-based Business Improvement District that funds the Emery Go-Round.

Table 9: Value Capture Strategies Overview

Value Capture Strategies Overview		Shuttle Routes	Enhanced Bus Trunkline Route	Streetcar Routes
Category	**Description**			
Tax Increment Finance (TIF)	Allocates a portion of new tax revenue for funding improvements. The current tool available in California is Infrastructure Finance Districts (IFD). These are challenging to establish under current law, and would likely require 2/3 voter approval. As a practical matter only the local city share of new tax revenues would be available. • Annual receipts tied to new development. Can be used for improvements (including bond financing) consistent with IFD legislation.	✓	✓	✓
Assessment Districts	Creation of a district that imposes a surcharge on property tax bills. There are a wide variety of such districts under California law. There are various property owner or voter approval requirements, typically 2/3. A Public Transit Benefit Assessment District (SB142) allows agencies operating transit to create an assessment district through Board action. • Annual receipts that can be used for improvements (including bond financing), or operating costs (depends upon district type).	✓	✓	✓
Parking Assessment Districts	Creation of a new parking assessment district to use revenues from parking fees and fines to support transit operations. A Property-based Business Improvement District funds the Emery Go-Round. • Annual receipts tied to parking meter rates and parking ticket charges.	✓	✓	✓
Developer Impact Fees	Charges levied against new development to offset the cost of improvements to accommodate the impacts of that development. Requires preparation of a	✓	✓	✓

	nexus study to identify the impact from development, cost of improvements to mitigate it (e.g. transit), and formula for appropriate allocation. Emeryville's Traffic Impact Fee projects include street improvements for buses, including signal timing and bus stop amenities. • One-time payments from each new development project into the Capital Improvement Program per the nexus study.			
Density Bonuses	Allows a developer to increase the size of a project for provision of a public benefit, e.g. contribution to transit improvement. This would require modification of existing plans in the EBOTS area. Emeryville has density bonuses for transit passes and real-time arrival displays. • One-time payments from each new development project that uses the bonus.	✓	✓	✓

California laws impose strict approval requirements, and limitations on use of funds, upon local jurisdictions that wish to use the above-listed value capture tools. Experience suggests that most of these tools are more likely to generate property owner, voter, and other public support for new and enhanced transit options (such as an Enhanced Bus trunkline or Streetcar route), and less likely to gain approval for extensions of existing transit options that are seen as being financed by existing federal, state, and local sources (such as AC Transit service).

There are additional challenges tied to use of value capture that would need to be addressed in future studies. These challenges include:

- **Timing**: The amount realized from many value capture tools is tied to development, which is spread over time. By comparison, new transit needs to be build up-front as a system, leading to a mismatch between the timing of costs and revenues. Another challenge is that development is highly cyclical, which means that revenues can vary greatly from year-to-year.

- **Underwriting Financing**: Bond underwriters look to established sources of revenues, rather than projections of potential future revenue. This can make it difficult to use value capture tools, aside from assessment districts, as a fund sources to repay bonds.

- **Implementation**: There should be consistency between the three cities in the EBOTS area in how value capture tools are used, which requires a greater than usual level of coordination.

These challenges can be addressed through phasing of improvements and obtaining loans from local cities' other funds, among others. The challenges of creating an integrated transit system that spans and

benefits three cities in the EBOTS area may justify the creation of revenue-sharing arrangements between the three cities to allow more effective use of value capture tools to help fund transit.

Potential Value of Development and Value Capture

This section provides an estimate of the potential value of new development in the EBOTS area from 2015 through 2035. Such a discussion is highly conceptual at this stage of planning, and these figures should be considered an indication of the potential magnitude of funds for discussion, rather than a projection of expected receipts. Much more detailed study would be needed to come up with figures that could be used for a financing strategy to fund project costs.

The first step to projecting value capture is to identify the amount of development to which value capture tools could be applied. The projections of EBOTS area future household and employment growth previously prepared were reviewed, and pro-rated for the amount of development that is yet to occur in the EBOTS area, as shown in the **Table 10**.

Table 10: Projected New Development Measures in the EBOTS Area, 2015-2035

Projected New Development, EBOTS Area, 2015-2035				
	West Berkeley	Emeryville	West Oakland	Total
Housing Units	679	3,014	4,053	**7,746**
Non-residential – sq. ft.	812,000	1,617,124	1,417,692	**3,847,616**

Note: The above table is based on the lesser of Plan Bay Area projections or individual City estimate of maximum build-out allowed per existing plans

Sources: Plan Bay Area Final Forecast, July 2013; Cities of Berkeley, Emeryville, and Oakland; BAE, 2014.

Over the 20-year period from 2015 to 2035, assuming value capture tools can be put in place in the near-term, these could be applied to up to approximately 7,700 new dwelling units and 3.8 million square feet of all types of new commercial development.

The value of this amount of new development was calculated based on the real estate market values identified in **Appendix F**. These values are considered to be "mid-point" values in the economic cycle, and thus represent an appropriate average as well as a conservative approach to calculating value creation. As shown in the **Table 11** below, new development in the EBOTS area would have a potential value in excess of $3.5 billion through 2035, and would generate more than $35 million in new annual property tax revenues by 2035 (with revenues starting at $0 in 2015 and growing as development occurs). Cities only collect a share of property tax revenues, with the rest going to school districts, counties, and other special districts. Using a conservative assumption that the local city share would average 20 percent, by 2035 there could be a total of just over $7 million in new annual property tax revenues combined from new development throughout the EBOTS area.

Table 11: Potential New Property Tax Increment, EBOTS Area, 2015-2035

Potential New Property Tax Increment, EBOTS Area, 2015-2035			
	Quantity	Average Value per du/sq.ft.	Total
Residential			
Multifamily Residential	5,422	$294,000	**$1,594,000,000**
Multifamily For-Sale	2,324	$410,000	**$973,600,000**
Commercial			
All Uses	3,847,616	$260	**$1,000,400,000**
Projected Value of New Development			**$3,568,000,000**
Annual New Property Taxes at 1%			**$35,680,000**
City Share at Average 20% of New Increment			**$7,136,000**

Source: BAE, 2014

Cities will look to set aside a large part of this new increment, likely at least half or more, to fund the increased cost of new public services to serve new development. However, the above figures do suggest the following magnitude of potential value capture for discussion:

- Tax Increment Financing (TIF)/Infrastructure Finance District (IFD) financing, assuming property owner/voter approval, and based on 50 percent of the local city share of available increment, and using general bond underwriting principles, could support up to $30 million or more in bond financing by 2035 – if credit guarantees or other solutions are found to meet the challenge of available increment being much lower in early years.

- Assessment districts, if they can obtain property owner approval at a level equal to 0.1 percent of assessed value, could generate approximately $3.5 million in annual revenues by 2035, and support up to $30 million or more in new bond financing.

Further study, and evaluation of policy, political, and other considerations, would be needed to quantify the revenues that could be generated from impact fees, density bonuses, parking districts or other tools. For discussion purposes, it would be reasonable to consider that a combination of these other value capture techniques could potentially generate funds comparable to TIF or assessment districts.

Comparison of EBOTS Transit Options

The preceding discussion addressed the relationship between transit and local economic development and the factors that are likely to shape the impact of the transit alternatives in the EBOTS subareas. Each alternative would have different implications for economic development, with no one of them being clearly superior. The advantages and disadvantages associated with each option in terms of local economic development and implementation tied to economic development are summarized as shown in **Table 12** below:

Table 12: Economic Development Impact by EBOTS Transit Project

Service	Advantages	Disadvantages
Enhanced Bus Trunkline Route	• Enhanced access to Emeryville development opportunity sites	• No connection to MacArthur BART, busiest East Bay station outside Downtown Oakland and Downtown Berkeley

Service	Advantages	Disadvantages
	• North-South orientation promotes trips between destinations in EBOTS area • Further expands access to and quality of transit in West Oakland	• Enhanced access to Emeryville is limited to Hollis Street, and does not provide a direct connection to the Emeryville Shops • East-West connection carried by limited capacity of Emery Go-Round
Streetcar Routes	• Provides a connection from Jack London Square through West Oakland as well as from MacArthur BART to West Oakland • Gives direct access from MacArthur BART station to Shellmound • Phasing can be done by route; value capture by each city • Oakland alignment covers the "O" loop envisioned by City • Could handle increasing ridership in parts of Emery Go-Round routes with heaviest demand	• No additional West Berkeley or North Oakland connectivity • Service to Shellmound is not enhanced to/from destinations north of this area. • Because Emeryville has the most active market for new development in the Inner East Bay, enhanced service to Emeryville is not likely to generate significant additional development

In addition to the advantages and disadvantages that each transit option would offer in total, it is important to also consider the impact that each individual EBOTS subarea may experience for each option.

West Berkeley

- Routes through this subarea exhibit only modest potential to spur economic development due to new transit service, primarily because there is greater market demand than available sites and allowable development pursuant to the West Berkeley Plan. This reduces the ability of new transit to spur additional transit-oriented investment. The Enhanced Bus trunkline could be advantageous because it provides more service to West Berkeley destinations and extends its northern reach closer to opportunity areas at the northern end of the Priority Development Area (PDA).

Emeryville

- Routes through this subarea exhibit only modest potential to spur economic development due to new transit service, primarily because Emeryville has the most active market for new development in the Inner East Bay and as long as the Emery Go-Round continues to provide service, additional transit service is not likely to generate significant additional development (although current service does not have the capacity for future growth). Both the Enhanced Bus and Streetcar proposed routes are advantageous because they provide service through this area from West Oakland and MacArthur BART stations.

West Oakland

- Routes through this subarea exhibit substantial potential to spur economic development due to new transit service. This is because new modern transit, in conjunction with implementation of the strategies, including public investment, outlined in the West Oakland Specific Plan, has the potential to accelerate market interest in new development in West Oakland. The Enhanced Bus trunkline service and West Oakland Streetcar service proposed routes would both provide a high level of service along Mandela Parkway, and provide direct access to the largest number of opportunity sites for new development. The Streetcar two-route concept is functionally the same as the "O" transit loop proposed in the West Oakland Specific Plan.

6. Funding and Implementation

The purpose of this initial inventory is to identify sources of funds that might be available for the construction, operation, and maintenance of the transit service options being considered for the EBOTS study area and provide a real world roadmap for positioning potential projects for funding. The scan of sources will provide a basis from which fund sources can be further analyzed for applicability, availability, and requirements and timelines for obtaining funding for specific elements of a recommended EBOTS transit service alternative.

Potential Funding Sources

The potential funding sources described below take into account certain capital costs for the proposed new Enhanced Bus Trunkline Route and the proposed West Oakland and Emeryville Streetcar routes. However, to take advantage of traditional sources of operating and capital funds, projects must be included in local and regional transportation planning documents. Some potential funding sources described below specify they are for operating and maintenance costs as well, specifically the Transportation Development Act (TDA) and the State Transit Assistance (STA) and fare revenues. **Table 13** lists which funding sources would be possible options for each improvement type. State Cap and Trade funds are not included because they have high VMT reduction requirements, which limit those funds to places denser than the study area.

Table 13: Summary of Potential Funding Sources by Project

Potential Funding Sources		Shuttles	Enhanced Bus Trunkline Route	Streetcar Routes
Source	**Description**			
Federal Transit Administration (FTA) Section 5312 Research: Low or no Emission Vehicle Deployment	For projects in nonattainment or maintenance areas, funding for capital projects for low or no emission vehicles, facilities and related equipment. • Must be a federal section 5307 eligible recipient • The Metropolitan Transportation Commission (MTC) would need to submit application.		✓	
Section 5339 Bus and Facilities Program	Can be used for vehicles and to construct bus related facilities. These are relevant to new bus and facility capital costs. • Regional distribution on a formula basis annually		✓	
Congestion Mitigation and Air Quality Improvement (CMAQ)	Funds can be used for transportation projects and programs that help meet the requirements of the Clean Air Act. Projects must be in the local Transportation Improvement Program (TIP). The Metropolitan Transportation Commission (MTC) has a three year programming cycle for the funds it manages and the local Congestion Management	✓	✓	

Potential Funding Sources		Shuttles	Enhanced Bus Trunkline Route	Streetcar Routes
Source	**Description**			
	Agency (CMA) administers its share through the One Bay Area Grant Program (OBAG) for projects that are consistent with OBAG priorities. MTC develops a regional framework on how to allocate the region's funds roughly every three years. • Next availability would be FY 15/16 for projects that are consistent with new priorities			
Section 5309 New Starts Funding	This funding is administered and competed for nationally. It is the main source of significant funding for streetcar improvements, although matching funds will need to be found. Must have on-going operating sources confirmed prior to federal full funding grant agreement. • The process needs to be in a full funding grant agreement, which often takes years and can only take place after the environmental document has been certified.			✓
Transportation Development Act (TDA)/State Transit Assistance (STA)	Funds allocated to transit operators for use on operating and capital expenditures. They are fully subscribed. These are relevant for capital costs as well as operations and maintenance costs. • Annual distribution	✓	✓	✓
Senate Bill 142 (SB142)/Public Transit Assessment District	Transit District, municipal operator, or other public agency operating transit, commuter rail, or intercity rail services to approve, by a two-thirds majority, to issue bonds and levy a fee on the special district for bond repayment. To be implemented, the levy may not be opposed by a majority of the properties affected. Funds may only be used for capital costs. • The area in the benefit district must be within a half mile of the center point of the transit station. • Projects must provide special benefits to the parcels of land and improvements to land within the vicinity of the rail station.			✓
Transportation Fund for Clean Air (TFCA)	The Bay Area Air Quality Management District's TFCA can be used for clean air vehicles only. Can fund shuttle service connecting to train stations. • Ongoing collections	✓	✓	

Potential Funding Sources		Shuttles	Enhanced Bus Trunkline Route	Streetcar Routes
Source	**Description**			
Alameda County Measure BB Sales Tax – Community Development Investments	Half cent sales tax for transportation in Alameda County. Community Development Investment funds may include shuttles.	✓	✓	
State Transportation Improvement Program (STIP)/Regional Transportation Improvement Program (RTIP)	These funds are at historical lows and significant amounts of them are currently programmed to AC Transit for the East Bay Bus Rapid Transit (BRT) through 2028. • Programmed for multiple years		✓	
Fare Revenues	Fares only cover a percentage of the cost of operating service. While these revenues can be used for operations and maintenance as well as capital costs, they tend to be used for operations and maintenance because the cost of operations far exceeds the fare revenue received. • Ongoing collections	✓	✓	✓
Property-Based Business Improvement District	One is in place already in Emeryville and supports the Emery Go-Round shuttle. Business owners in a specific area pay a fee to fund improvements and/or improve the quality of the area paying the fee.	✓	✓	✓
Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER)	Can help fund electric buses that use batteries.	✓	✓	

Federal Funding Recipients

In some cases there may be issues receiving Federal funding depending on the applicant and operator of the transit route. Since the operator has not yet been defined for the Enhanced Bus trunkline or Streetcar routes, this information will be important in understanding the types of funding available and who could be the operator.

For urbanized areas with 200,000 and greater in population, funds are apportioned and flow directly to a designated recipient selected locally to apply for and receive Federal funds. Funding is made available to recipients that must be public bodies with the legal authority to receive and dispense Federal funds under 49 U.S.C. 5307. It is important to note that becoming a direct recipient can be difficult. In addition to the legal authority that is required to become a recipient, applicants may also fall under the federal compliance requirements such as having a ½ fare for senior/disabled passengers; providing complementary paratransit service; complying with federal procurement regulations; and fulfilling transit related Title VI anti-discrimination requirements.

Additionally, funding is allocated on the basis of legislative formulas. In the Bay Area, it is based on a combination of bus revenue vehicle miles, bus passenger miles, fixed guideway revenue vehicle miles, and fixed guideway route miles as well as population and population density. That means that a fixed dollar amount comes to the region and is divided among the direct recipients (transit agencies). Because the 5307 and 5339 funds are overprescribed, as indicated, an applicant would need to first become a legal entity that can access the funds, while convincing the regional partners that funds should be allocated.

Section 5312 funds can be available to non-transit operators. Eligible recipients are determined for each competition, and may include: universities, public transportation systems, state Department of Transportation (DOT), non-profit and for-profit entities, amongst others. However, this year's competition is limited to existing direct recipients of Federal Transit Administration (FTA) grants.

Enhanced Bus Trunkline Route

Funding Sources

For the Enhanced Bus trunkline route, the operator and the specific enhancements making up the bus route need to be identified. Many of these improvements also need to be specified in regional planning documents, as well as in the planning documents of the sponsor agency. The funding strategies do not take into account the need for replacement of vehicles after initial purchase, which increases the total capital cost at the time the vehicles and other infrastructure need to be replaced (approximately 12 years for buses).

Bus Capital Cost Funding Sources (all costs including a new bus line and bus stops):

- Transportation Development Act (TDA)/State Transit Assistance (STA) funds (annual distribution)
- Alameda County Measure B Sales Tax (ongoing collections)
- State Transportation Improvement Program (STIP)/Regional Transportation Improvement Program (RTIP)

Clean Air Vehicle Capital Cost Funding Sources:

- Federal Transit Administration (FTA) Section 5312 Research: Low or no Emission Vehicle Deployment (funds are programmed in cycles)
- Section 5339 Bus and Facilities Program (regional distribution on a formula basis annually to federal recipients)
- Congestion Mitigation and Air Quality Improvement (CMAQ) Section 5307 Funds (programmed in cycles; currently programmed through the One Bay Area Grant program)[25]

[25] Hybrid vehicles must meet certain requirements http://www.epa.gov/fedrgstr/EPA-AIR/2007/May/Day-24/a9821.htm

- Transportation Development Act (TDA)/State Transit Assistance (STA) funds (annual distribution)
- Bay Area Air Quality Management District's Transportation Fund for Clean Air (ongoing collections)
- Alameda County Measure B Sales Tax (ongoing collections)

Operation and Maintenance Funding Sources:

- Transportation Development Act (TDA)/State Transit Assistance (STA) funds (annual distribution)
- Fare revenues (ongoing collections)

Operator Options

Many aspects of the system, particularly costs, will be dependent on the operator of the proposed system. Additionally, many funding options require the operator to be specified in advance of the project start. The options below should be considered for choosing an operator:

- **ETMA as Operator**. A new association could be formed or the Emeryville Transportation Management Association could expand, if property owners in West Oakland and West Berkeley (and Emeryville if it is a second association) vote to join an improvement district. Someone would have to initiate the formation or expansion and conduct the election.
- **AC Transit as Operator**. AC Transit receives Federal funding. Or a new transit agency could be formed, but Federal Transit Administration (FTA) allocates funding to AC Transit and BART by formula for some of its programs.

Streetcar Routes

Funding Sources

If the City of Oakland changes its policy in the future to support streetcars, a full analysis needs to identify the project sponsor for the streetcar service. Certain improvements also need to be included in regional planning documents, as well as in the planning documents of the sponsor agency, in order to take advantage of new funding sources not currently contemplated such as a regional gas tax. The funding sources do not take into account the need for replacement of vehicles after initial purchase, which increases the total capital cost at the time the vehicles and other infrastructure need to be replaced (approximately 30 years for streetcar infrastructure and vehicles).

Capital Costs (all elements of the streetcar infrastructure):

- Federal Transit Administration (FTA) Section 5309 New Starts Funding
- FTA Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER)

Operation and Maintenance Funding Sources:

- Transportation Development Act (TDA)/State Transit Assistance (STA) funds (annual distribution)

- Fare revenues (ongoing collections)

Operator Options

There are several options for choosing an operator for the proposed Streetcar routes. These options are closely related to how the system is funded. Several options include:

- **ETMA as Operator**. A new association could be formed or the Emeryville Transportation Management Association could expand, if property owners in West Oakland and West Berkeley (and Emeryville if it is a second association) vote to join an improvement district. Someone would have to initiate the formation or expansion and conduct the election.

- **Current or New Transit Agency as Operator**. AC Transit and BART receive Federal funding. If they were interested, they could add the new service – perhaps BART for streetcars. Or a new transit agency could be formed, but Federal Transit Administration (FTA) allocates funding to AC Transit and BART by formula for some of its programs.

- **Three-City Joint Powers Authority (JPA)**. The three cities, with or without AC Transit and/or BART, could form a Joint Powers Authority (JPA), but a JPA would have a hard time competing with existing transit agencies for funding.

Fund Readiness Strategies

It is not sufficient to simply identify potential capital and operating sources to build and operate expansion projects. A successful funding strategy will be based on sound project planning, and will require a good deal of political will. Because major capital investments are costly and almost always require a variety of funding sources from all levels of government, it is important for project sponsors to understand what is needed to take advantage of new funding that may become available. For projects that are not yet a part of regional and local planning documents, it can be a challenge to access traditional transit funding resources, which are generally committed in advance to projects that have been in the queue for several years. Therefore non-traditional funding might be available more quickly, such as Business Improvement Districts (BIDs), or transit benefit assessment districts.

In the event that funds can be identified through BIDs, Developer fees, or other non-traditional transit related funding, projects may be able to be forwarded at a much quicker pace. This can be helpful for accessing project development funds that would help advance the project in order to take advantage of traditional federal and state transportation funds. **Table 14**, below, represents the timeline and strategies if projects can find "Independent Means" to implement portions of the project sooner. Due to the cost of the Streetcar Alternative, it is assumed that some level of federal funds would be sought.

Some of these steps are similar to the Fund Readiness Strategies in order to ensure that projects are included in required planning documents should they wish to qualify for federal, state or local fund

programs. Additionally, even though the list is numbered, some tasks can occur concurrently (such as procuring vehicles at the same time as local decision making process for the alignment of the streetcar).

Table 14: Independent Means Fund Readiness Strategies

Independent Means Fund Readiness Strategies	
Time Frame	**Action**
1 - 5 years	1. Establish project sponsors 2. Determine priority for improvements for future study 3. Confirm priority with project sponsors 4. Ensure AC Transit projects are included in AC Transit's Short Range Transit Plan 5. Obtain funds for Project Development for capital investments (Enhanced Bus trunkline and/or Streetcar service) 6. Conduct process to establish local decisions on mode and alignment for major capital investments, including alternatives analysis for Enhanced Bus trunkline and Streetcar routes 7. Complete required environmental and Plans, Specifications & Estimates (PS&E) for Enhanced Bus trunkline bus alternatives (includes Title VI minority and low-income anti-discrimination analysis)
5 - 10 years	8. Secure funds for vehicle expansion (bus alternatives) 9. Secure operating funds for Enhanced Bus trunkline alternative 10. Procure vehicles for bus alternatives 11. Ensure projects are included in local and regional transportation plans (Countywide Transit Plan, RTP, Countywide Plan) 12. Complete required environmental documentation for streetcar 13. Secure operating funds in order to secure federal 5309 funds 14. Secure local match funds for federal program 15. Secure federal funds for major capital investments 16. Preliminary Engineering for Streetcar routes
10 - 20 years	17. Design and Construction of Streetcar routes

Other Potential Sources

Other potential funding sources exist, but in some cases the projects will need to have more fully developed scopes before it can be determined whether these sources are potential matches or not. In other cases, the funding sources are dependent on new development, or the adoption of additional fees or taxes, and therefore are more speculative or have longer lead times. The additional potential sources are listed in **Table 15**.

Table 15: Additional Potential Sources of Funding for Proposed Routes

Funding Source	Element
Highway-Rail Grade Crossing Program	For elements at railway-highway crossings including signing and pavement markings at crossings, active warning devices (e.g. lights and gates), crossing surface improvements, sight distance improvements, grade separations (new and reconstructed), and the closing and consolidation of crossings.
Transit Oriented Development Planning Pilot	For new fixed-guideway and core capacity improvement projects that focus growth around transit stations to promote ridership, affordable housing near transit, revitalized downtown centers and neighborhoods, and encourage local economic development. • Pilot program funding may not be available in future.
Federal Transit Administration (FTA) Section 5310 Enhanced Mobility Seniors and Individuals with Disabilities	This source is applicable if any of the service benefits the target populations.
Developer Fees	Fees that can be used to pay for public facilities necessitated by development. Generally, a nexus study must demonstrate that the development dictates the need for the facilities.
OneBayArea Grant Program	Program administered by the Alameda County Transportation Commission (ACTC) and the Metropolitan Transportation Commission (MTC) that combines many sources of funding in support integrating the Federal Transportation Program with California's climate law.
New Transportation Sales Taxes	Cities have the ability to put a tax for transportation on the ballot depending upon their identified need.
Prop 1B Traffic Light Synchronization	This funding can be used in support of traffic light synchronization projects.
Parcel Taxes	Through a two-thirds vote of property owners, the imposition of a tax for a specific purpose. • Can be put on the ballot by cities, counties, AC Transit or BART.

Funding Source	Element
Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Program	Administered by the federal government, this program funds rail and transit projects which promise to achieve critical national objectives.
Parking Taxes and Revenues	Parking taxes and revenues may be allocated for funding transit-supportive infrastructure improvements.

Owners and Operators

If a non-operator, such as a tri-city Joint Powers Authority, owns a shuttle, bus or streetcar system, then that owner should contract with an existing operator.

Evolution and Phasing of Routes and Services

The routes shown in this report are adaptive. As transit evolves, routes can be adjusted. Several decisions will be made in 2015, including AC Transit's restructuring of routes and a vote on renewal of Emery Go-Round's Property-based Business Improvement District. Based on those decisions, the enhanced bus routes and shuttle routes may adjust to accomplish service that does not exist today. We have made the best recommendations possible at this point, but it is impossible to say how things will shape up in the next three to five years. The Enhanced Bus Trunkline may require modification to AC Transit routes. When the Enhanced Bus Trunkline and potential Streetcar routes are implemented, it will likely require revision to AC Transit and Emery Go-Round service to make them complementary. For example, AC Transit's potential rerouting of its Line 26 and a new shuttle service could complement each other, and if a street car is built there may be no need for the Enhanced Bus Trunkline to go to West Oakland. Routes are adaptable as new routes are implemented.

EMERYVILLE BERKELEY OAKLAND TRANSIT STUDY

FINAL REPORT

Appendices

Appendix A

Transit Context – Additional Information

EBOTS

Transit Context - Existing Transit Conditions

BART (Bay Area Rapid Transit)

Bay Area Rapid Transit (BART) is the a rapid transit, heavy-rail system that covers 104 miles and serves 44 stations throughout the San Francisco Bay Area. Within the project area, BART serves West Oakland station, connecting this station to the larger heavy-rail network as well as serving as a connection point for many AC Transit bus routes. The West Oakland station sits at the eastern-end of the "Transbay Tube"—connecting Oakland to San Francisco. It is located within a residential and industrial area that saw increased development in recent years; further development of a "Transit Village" surrounding this station is currently in planning.

Users were surveyed to determine the travel mode distribution for accessing the West Oakland BART Station. Zero taxi and motorcycle modes were recorded, out of 178 respondents. The distribution of modes for the 100 West Oakland respondents, as well as for nearby stations, is represented below.[1] Compared to the comparative mode shares of nearby stations (19th Street Oakland, 12th Street Oakland, MacArthur, and Lake Merritt stations), West Oakland has a relatively low walk- and transit-share and high personal automobile mode shares.

Table: Transit mode to BART

HOME ORIGIN STATIONS	Walked	Bicycle	Transit	Car	Drove Alone	Car-pooled	Dropped Off
12th St. / Oakland City Center	45%	3%	31%	21%	7%	3%	11%
19th St. / Oakland	70%	6%	11%	13%	2%	2%	9%
Lake Merritt	45%	8%	5%	42%	23%	4%	15%
MacArthur	35%	8%	15%	40%	27%	5%	8%
West Oakland	16%	5%	1%	78%	51%	9%	18%

AC Transit

The Alameda-Contra Costa Transit District provides bus service to in the Easy Bay within Alameda and Contra Costa counties as well as to San Francisco's Transbay Terminal. In addition to providing local bus-line connections, many of the routes served by AC Transit serve routes that connect to alternative transit modes, including BART, the Capital Corridor, the Alameda-Oakland Ferry, and the Emery Go-Round.

[1] Corey, Canapary & Galanis, BART Marketing and Research Development. How did you get to this BART station for this trip? West Oakland.

Several Transbay lines have stops within the project area. Transbay lines are typically represented by letters instead of numbers. Bus lines 800-899 are all-nighter lines, operating from 1AM-5AM. Altogether, 25 routes run through the project area, with 10 of those connecting to the Transbay Terminal in San Francisco. The table below shows the number of stops in the project area that each bus line offers.

TRANSBAY		EAST BAY ONLY	
Route	**Number of Stops in Project Area**	**Route**	**Number of Stops Within Project Area**
F	7	25	4
C	4	26	13
H	4	31	10
Z	8	314	6
J	6	62	5
G	4	88	2
FS	2	49	3
NL	2	51B	4
SB	1	802	5
800	9	72	9
		72M	9
		72R	4
		57	1
		62	5
		72M	9

Shuttles

Emery Go-Round

Emery Go-Round is a free shuttle system funded by the City of Emeryville's Business Improvement District. The shuttle system has three routes that provide service seven days per week (weekend service is limited). Emery Go-Round serves as a transit connection to MacArthur BART station, the Emeryville Amtrak station, and the West Berkeley shuttle system. These routes also service to the large Powell Street Plaza Shopping Center in addition to many schools, grocery stores, and other businesses.

Annual ridership for the Emery Go-Round exceeds 1.5 million trips.[2] Approximate number of boardings and alightings for each route are listed below:

- Hollis shuttle line: 527,000 trips per year
- Shellmound/Powell line: 867,000 trips per year
- Watergate Express (commute hours only): 153,000 trips per year

[2] Ridership data calculated with trip data from March 2013 – June 2013. Data provided by the Emeryville Transportation Management Association, personal communication July 19, 2013.

West Berkeley Shuttle

The West Berkeley Shuttle provides weekday commuter service from Ashby BART station to the area West of Ashby BART station—extending nearly to Berkeley's Aquatic Park on the San Francisco Bay. During the morning commute period, the shuttle runs from 5:40AM-9:11AM; during the evening commute period, the shuttle runs from 3PM-6:17PM. Each of the two lines, serving similar routes, travel east-west on Ashby Avenue and Dwight Way and north-south on San Pablo Avenue and 7th St. The shuttle service is operated by the Emeryville Transportation Management Association.

As of December 2007, the West Berkeley Shuttle had an average of 100 boardings per weekday in the study area alone (Existing Conditions Report, Wilbur Smith Associates).

Free Broadway Shuttle (not in study area)

Downtown Oakland's Free Broadway Shuttle, or the "Free B", connects 12th Street and 19th Street Oakland BART stations, the Oakland-Jack London Square Ferry Terminal, and the Jack London Square Amtrak station. The Free B offers weekday service from 7AM-7PM and weekend night service from 7PM-1AM on Fridays and 6PM-1AM on Saturdays.

Amtrak (Capitol Corridor)

Amtrak's "Capitol Corridor" passenger-train route runs from Auburn to San Jose and passes through Sacramento, as well as Berkeley, Emeryville, and Oakland. The majority of the line runs parallel to Interstate-80, traveling along the Western-edge of the study area. The service runs approximately once per hour, seven days per week. All trains allow bicycles and in 2012, the Capital Corridor began offering free Wi-Fi to all passengers. The average number of boardings and alightings per day for each station within the project area are shown below.

Averaged for months of March 2012 - March 2013			
Station	Boardings/day	Alightings/day	Total/day
BKY	209	207	416
EMY	493	496	989
OKJ	412	427	839
OAC	34	38	71

The system also offers the San Francisco Motorcoach connections to the Transbay Terminal from the Emeryville station. The Motorcoach connection, called Route 99, carries approximately 20-25,000 passengers per month in both directions.

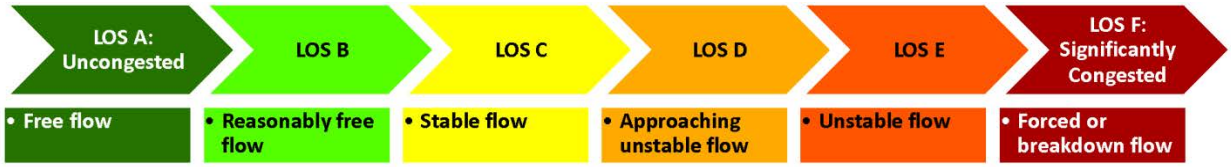
Route 99 Motorcoach Connection – Ridership numbers for April 2012 – March 2013			
	Eastbound (SF to EMY)	Westbound (EMY to SF)	Total
Yearly Total	143,939	147,446	291,385
Daily Average	394	404	798

San Francisco Bay Ferry

The San Francisco Bay Ferry (SFBF) provides passenger ferry service from Oakland and Alameda to five points in San Francisco, Oyster Point in South San Francisco, including special event service to San Francisco's AT&T Park for baseball games. Year-round weekday service, as well as seasonal weekend service is provided nearly once per hour from about 6AM to 9PM. The service is owned by the San Francisco Bay Area Water Emergency Transportation authority.

Roadway System and Traffic Conditions

The roadway network within the EBOTS study area includes a hierarchical system of freeways, arterial and collector streets, and residential streets. Level of Service (LOS), as defined by the Highway Capacity Manual 2000, is defined for many intersections throughout the study area. LOS is used as a measure to represent the overall performance of a roadway and based on the number of seconds of delay within an intersection. LOS can range from LOS A (excellent conditions and short delays) to LOS F (congested conditions and long delays).



Hierarchical Street Network

Freeways

Interstate 80/580 borders the Western edge of Berkeley and Emeryville, and also defines the border between Emeryville and Oakland. This freeway provides connection to San Francisco via the San Francisco-Oakland Bay Bridge and connects the study area to Sacramento and Marin County. Interstate 880 borders the Oakland-region of the study area on the Western and Southern side.

Arterial and Collector Streets

Arterial Streets are urban roads, but have higher capacity and speeds than local streets. They serve to collect traffic onto freeways and between urban centers. These streets also carry the majority of the bus routes. Major arterial and collector streets within the study area include:

- San Pablo Avenue (North-South)
- Peralta Street (North-South)
- Mandela Parkway (North-South)
- Adeline Street (North-South)
- Market Street (East-West)
- Gilman Street (East-West)
- University Avenue (East-West)
- Dwight Way (East-West)
- Ashby Avenue (East-West)
- 40th Street (East-West)
- West Grand Avenue (East-West)
- 14th Street (East-West)
- 7th Street (East-West)

The majority of signalized intersections exist within arterial and collector streets. Many of the signalized intersections within the study area are actuated, responding to approaches from the minor-roadway approach within the intersection.[3] San Pablo Avenue's signals operate with transit signal priority, allowing buses and emergency vehicles to extend green phases and trigger early green phases when approaching; this system uses cameras mounted above each traffic signal (West Berkeley Circulation Master Plan 2009, page 10).

Local Streets

A network of local streets exists within the project area, most often serving single- and multi-family communities and some industrial areas. Speed limits within residential areas are typically 25mph and traffic calming measures are frequently taken to discourage through-traffic within neighborhoods. Traffic calming measures are used throughout the study area within residential streets to encourage vehicles to use arterials and collector streets rather than cutting through residential neighborhoods. Traffic calming measures implemented in the area include diverters preventing traffic from continuing through a street, speed bumps, and traffic circles.

West Berkeley

Street Network

The major arterial and collector streets within West Berkeley include San Pablo Avenue, 6th Street, and 7th Street running North-South as well as Gilman Avenue, University Avenue, Dwight Way, and Ashby Avenue running East-West. Interstate 80/580 runs North-South on the Western side of the project area. Ashby Avenue, University Avenue, and Gilman Street all provide access to the interstate.

Level of Service Analysis

The 2009 West Berkeley Circulation Master Plan found low LOS along several arterial and collector streets in West Berkeley, including single-direction flows on Gilman Street, University Avenue, Ashby Avenue, Dwight Way, and San Pablo Avenue. Several intersections were also found to have very low LOS in the 2009 West Berkeley Circulation Master Plan, particularly at major intersections long Gilman Street and University Avenue.

Emeryville

Street Network

The City of Emeryville Alternative Transportation Plan (Nelson Nygaard, 2009) notes that the roadway network within Emeryville is designed to provide service to motor vehicles, but does not provide good service to non-automobile modes. Primary North-South corridors within Emeryville include San Pablo Avenue, Hollis Street, Horton Street, Shellmound Street and Interstate-80/580. Primary East-West corridors include 40th Street, Powell Street, and 65th Street. Within Emeryville, the railroad tracks that carry the Capital Corridor passenger train limit travel to areas west of these tracks. Powell Street is the only direct access to the freeway within Emeryville (City of Emeryville, Alternative Transportation Plan 2009).

Level of Service Analysis

Much of the traffic within Emeryville is generated due to trips that are generated by surrounding cities as well as those generated by nonresidents for employment and shopping destinations (Emeryville General Plan Draft EIR, 2009).[4] Data collected in 2007 (PM peak hour only) shows that LOS is lower along Powell Street and 40th Street, especially within the intersection of the I-80 Eastbound Ramps and Powell Street.

[3] West Berkeley Circulation Master Plan (2009). Available at: http://www.ci.berkeley.ca.us/uploadedFiles/Planning_and_Development/Level_3_-_Redevelopment_Agency/Chapter%203%20Traffic%20Conditions.pdf Last accessed August 2013.

[4] Emeryville General Plan Draft Environmental Impact Report, 2009. Available at: http://www.ci.emeryville.ca.us/DocumentCenter/Home/View/665 Last accessed August 2013.

West Oakland

Street Network

Major arterial and collector streets within the project area include Market Street, Mandela Parkway, Adeline Street, Peralta Avenue, and Wood Street traveling North-South and West Grand Avenue, 14th Street, and 7th Street traveling East-West. These collector Streets are surrounded by Interstate 880 to the South and West, Interstate 80/580 to the North, and Interstate-980 located just east of the project boundary.

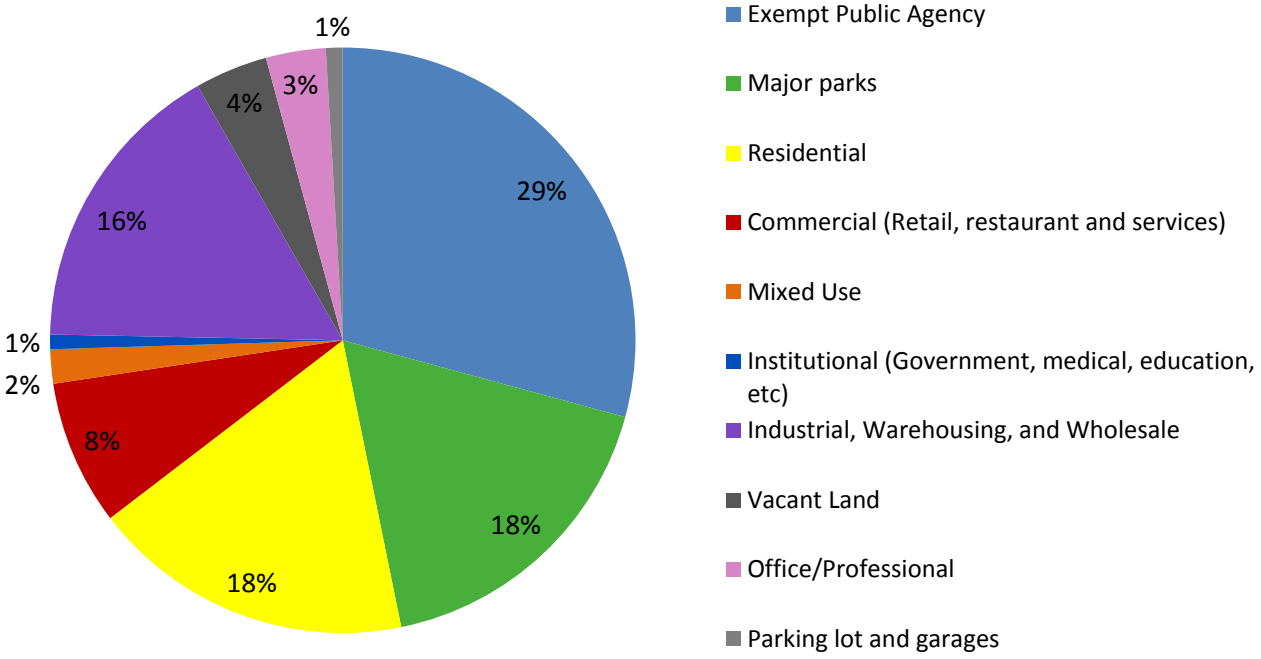
West Grand Avenue is the primary arterial carrying heavy commercial traffic to and from the Downtown area, the Port of Oakland and the San Francisco bay Bridge. Wood Street, Peralta Street and Mandela Parkway serve as the major collector streets connecting Emeryville to Oakland, via Hollis Street. Mandela Parkway bisects 7th Street, connecting West Oakland on the south and continuing to Emeryville's major shopping district (City of Oakland, Infrastructure Report, 2011).[5]

Level of Service Analysis

Despite the large amount of heavy truck use, West Oakland's traffic network operates at a higher LOS compared to Emeryville and West Berkeley's. According to the West Oakland Specific Plan EIR, Level of Service along West Grand Avenue is high, with the exception of LOS C for both AM and PM peak hours within the intersection of West Grand Avenue and Interstate-880. Similarly, Adeline and Market operate mostly at LOS A and LOS B. Overall 7th Street, 5th Street, and Interstate connections appear to operate at the lowest LOS. However, arterial and connector streets connecting West Oakland to Emeryville appear to be operating at a higher LOS. Additionally the Emeryville General Plan EIR (2009) shows LOS E at the intersection of Mandela Parkway and Horton Street located along Oakland's northern border.

[5] City of Oakland Industrial district Strategy support Public Infrastructure Report. March 1, 2011. Available at: http://www2.oaklandnet.com/oakca1/groups/ceda/documents/report/oak030539.pdf Last accessed August 2013.

Land Use Profile - EBOTS Study Area



Land Use Type	Acres
Exempt Public Agency & Public Utilities	994.55
Major Parks	597.82
Residential	606.09
Commercial	272.77
Mixed Use	64.14
Institutional (Government, medical, education, etc)	27.43
Industrial, Warehousing, and Wholesale	559.12
Vacant Land	136.82
Office/Professional	112.51
Parking lot and garages	31.52
Total	**3402.77**

Detailed Land Use Profile – EBOTS Study Area

Public Agency & Utility	
Exempt Public Agency	1483.23
Major Parks	597.82
Property leased to or owned by a public utility	109.14
Subtotal	***1592.37***
Residential	
Single Family Residential	257.41
Multi-Family Residential	158.79
Condominiums, 5 or more unit residential & cooperatives	189.89
Subtotal	***606.09***
Commercial	
Shopping Center, Restaurants, and Supermarkets	200.58
Car wash, repair garage & service stations	17.72
Automobile dealership	4.78
Hotel/Motel	18.76
Other recreational activity, e.g. rinks, stadiums	30.93
Subtotal	***272.77***
Industrial, Warehousing, and Wholesale	
Warehouse	215.30
Terminals, trucking and distribution	9.71
Other Industrial	334.11
Subtotal	***559.12***
Vacant Land	
Vacant residential land	34.27
Vacant commercial land	34.82
Vacant industrial land	67.60
Vacant government owned property	0.13
Subtotal	***136.82***
Mixed Use	
Condominium or townhouse with mixed use	44.21
Store on 1st floor, with offices, apts/lofts 2nd/3	19.62
Subtotal	***64.14***
Institutional (Government, medical, education, etc)	
School	7.69
Church	15.45
Other institutional property	4.29
Subtotal	***27.43***
Office/Professional	
Bank	2.34
Medical - Dental building	4.35
Office building	105.82
Subtotal	***112.51***
Parking lot and garages	
Parking lot	26.47
Parking garage	5.05
Subtotal	***31.52***

EBOTS – Transit Context – Additional Information

Destinations, Routes and Connections

The first stage in devising new transit services for the area was to identify those streets with active land uses that would generate transit trips. These land uses include multifamily residential buildings, business offices, medical complexes and retail commercial facilities. The streets serving these land uses should be suitable in terms of width and traffic characteristics to be able to accommodate transit vehicles. This first round of service development concentrated on bus and small shuttle vehicles, but the possible implementation of streetcars was also considered. Where possible, a series of streets was sought that would form a continuous corridor of travel. Such straight corridors are easier for patrons to understand and allow for more efficient transit operation by reducing the number of turns required.

Several north-south streets were examined as candidates for service. San Pablo Avenue is among the area's busiest thoroughfares, but it lies at the east margin of the study area and has already been the subject of transit service proposals in the COA. Other streets allowing for north-south continuity in the three cities are:

- Adeline Street (southern portion), Mandela Parkway, and Peralta Street in Oakland;
- Hollis Street, Shellmound Street, and West Frontage Road in Emeryville; and
- 6th and 7th Streets in Berkeley.

East-west streets in the study area (and areas further east) include:

- 2nd/3rd Street couplet, 7th/8th Street couplet, West Grand Avenue and MacArthur Boulevard in Oakland;
- 40th Street, Powell Street/Stanford Avenue, 65th Street in Emeryville and parts of Oakland; and
- Ashby Avenue, Dwight Way and University Avenue in Berkeley.

Connections further north of the study area's border with the City of Albany were examined as well but discontinuities in the street system made transit routings too circuitous. Moreover, possible termini north of this border, such as the BART stations at El Cerrito Plaza or El Cerrito Del Norte, stretch what can be served by the local transit concepts under consideration in this study. These northern points might, however, be tied to Transbay routes serving the study area. Street connections further west and south of the study area are not possible because the existing street network ends at the freeways and San Francisco Bay shoreline.

Possible terminals and destinations to be served were examined both inside and outside the study area. It is generally desirable to terminate a transit line at a point where significant trips will be generated. Given the emphasis of EBOTS routes as transit collectors and distributors, as well as short-distance connectors, a terminal or way station at a transfer point with other modes or transit lines is especially important. The key transfer points in or close to this study area include:

- Amtrak/Capital Corridor stations at Oakland Jack London Square, Emeryville, and Berkeley;
- BART station at West Oakland, with possible connections to stations outside the study area at 19th Street, MacArthur, Ashby, Downtown Berkeley, and North Berkeley;

- AC Transit Uptown Transit Center at 20th & Broadway; and
- Ferry terminal at Jack London Square (with a possible future terminal in Berkeley).

In addition to these transfer points, transit should serve important destinations in the area. Many of these have been discussed in other study memoranda. They include numerous employment centers, like Pixar and Bayer, and retail centers like the Bay Street, Powell Street and East Bay Bridge shopping centers. Major medical facilities are located mostly outside the study area and need to be tied to it, a function now handled largely through independent shuttles; these include the Kaiser, Alta Bates Summit, and Children's Hospital complexes in Oakland.

EBOTS

Transit Technology Options

A wide range of technology options were initially considered based on community input and compatibility with the study area.

The Transit Technology Matrix in the figure below outlines the potential transit technologies that were considered for this evaluation.

Transit Technology Matrix

TECHNOLOGY	DESCRIPTION		CAPITAL COST (Per mile)	OPERATIONS AND MAINTENANCE COST (Per year)	CAPACITY (Passengers per vehicle hour)	SPEED and RELIABILITY	RIGHT OF WAY REQUIREMENTS	TRANSIT SUPPORTIVE DENSITY (Dwelling units per Acre)	SQ FT OF NON-RESIDENTIAL FLOOR SPACE (millions)
Demand Response Shuttle (Dial-a-Ride)	Shuttles serve specific locations and typically operate in mixed traffic		--	--	Very low capacity	Low to moderate speed and reliability	Mixed flow, no dedicated ROW requirements	--	--
Shuttle Bus	Shuttles serve specific locations and typically operate in mixed traffic		$50,000 to $100,000	$0.5 to $1.5 million	Low capacity 300 to 1,000	Low to moderate speed and reliability	Mixed flow, no dedicated ROW requirements	--	--
Conventional Bus	Typical single unit and articulated transit buses, operate in mixed traffic		$1 to $2 million	$1 to $2 million	Low to moderate capacity 300 to 1,200	Low to moderate speed and reliability	Mixed flow, no dedicated ROW requirements	4 to 15	2.5
BRT / BRT Lite	BRT - Typical single unit and articulated transit buses, with exclusive lanes, signal priority, and station improvements BRT Lite - May include signal priority or exclusive lanes with fewer station features		BRT $7 to $20 million BRT Lite $2 to $4 million	$1 to $2 million	BRT - Moderate to High capacity 500 to 2,500 BRT lite - Low to moderate capacity 500 to 1,500	Moderate speed and reliability. Improved speed and reliability with exclusive lanes and signal priority	BRT - 22 to 40 feet BRT lite - 0 to 22 feet	4 to 15	7
Streetcar	Steel rail-based vehicles that can operate in mixed traffic or in exclusive ROW		$15 to $30 million	$1.5 to $2.5 million	Moderate to high line capacity 500 to 4,000	Moderate speed and reliability Improved speed and reliability with exclusive lanes	Mixed flow - no ROW requirements Dedicated ROW - 25 to 40 feet	9	21
Light Rail (LRT)	Steel rail-based vehicles that typically operate in exclusive ROW		$30 to $70 million	$1.5 to $2.5 million	High capacity 1,000 to 9,000	Moderate to high speed and reliability	25 to 40 feet	9	21
Automated Guideway Transit (AGT)	Automated vehicles that operate on an exclusive guideway		--	--	Moderate to high capacity 500 to 4,000	Moderate to high speed and reliability	Elevated, minimal ROW needed	--	--
Personal Rapid Transit (PRT)	A technology that uses small, automated vehicles on exclusive guideways that provide direct service between a passenger's origin and destination		Estimates vary widely. No modern constructed systems.	--	Moderate to high capacity	Moderate to high speed and reliability	Elevated, minimal ROW needed	--	--

Sources: Transit-Supportive Density Levels adapted from Pushkarev and Zupan (1977); TCRP Predicting Fixed Guideway Transit Success (2013)

These transit technologies were initially screened to narrow the consideration to the best technologies given community input, right-of-way and environmental constraints, and political realities in terms of project funding. The following transit technologies, shown in the table below, were screened for further evaluation.

Transit Technologies under Further Evaluation

Technology	Description
Shuttle Bus	Shuttles are an efficient method and proven transit technology for meeting the needs of transit riders, particularly commuters and shoppers in the study area, connecting high-demand land uses with transit stations and transfer points. They currently provide service to certain parts of the study area.
Conventional Bus	Conventional buses provide traditional route-based service, giving mobility and access to residents, visitors, and commuters throughout all parts of the study area. Buses are able to provide moderate-capacity/moderate-frequency access and can be rerouted as needed. They currently provide service to most of the study area.
Streetcar	Streetcars operate in either mixed-flow or exclusive right-of-way, yet they provide substantial infrastructure improvements that help spur economic development.

The table below shows the transit technologies that were removed from consideration based on the initial screening.

Transit Technologies Not Evaluated

Technology	Description
Demand Response Shuttle	On-demand shuttles, also known as "Dial-a-Ride" vehicles, have very low capacity (five passengers per vehicle hour); their application would be cost prohibitive, based on the number of vehicles and drivers needed to meet peak-hour demand.
Bus Rapid Transit (BRT)	Bus Rapid Transit has moderate potential in the study area, but requires dedicated right-of-way, which has limited application on the constrained roadways in the study area. BRT may be considered in the future but is not evaluated in this report.
Light Rail	Light Rail typically has moderate potential in the study area, but requires dedicated right-of-way, which has limited application on the constrained roadways in the study area. It may be considered in the future but is not evaluated in this report.
Automated Guideway Transit	An Automated Guideway Transit network is one of the more expensive transit technologies in use today. It requires exclusive right-of-way and is typically elevated. This transit technology was screened from consideration due to cost, visual impacts and right-of-way constraints
Personal Rapid Transit	Personal Rapid Transit offers an innovative, yet largely untested, method of public transit. While it has the potential to serve as a connector system to BART, the technology is unproven, and a modern system has yet to be constructed. It also requires elevated structures, which are controversial and would require a separate planning study to consider appropriate applications in the EBOTS study area.

Phasing

The technology screening evaluation summarized above indicates that several transit technologies are currently more appropriate for providing mobility options to the EBOTS study area. Depending upon how land uses and travel patterns change in the long term, it is important to consider technologies that are adaptable to the area from a feasibility, cost effectiveness, and reliability standpoint. Moreover, transit technologies must be flexible enough to absorb emerging travel demand to reduce the dependence of travel by motor vehicle when such demand comes. As a result, phasing of transit technologies needs to be considered through this evaluation. For instance, current demand may indicate that only a shuttle-based transit service is feasible in the area, but projections show that a streetcar or BRT option may be more feasible in the future. In this case, routing and amenities should be carefully selected to allow these technologies to be phased in later. The EBOTS Consultant Team focused on determining transit technologies that could both modestly enhance existing transit service in the short term and lay the groundwork for future infrastructure-based transit options.

Appendix B
Round 1 Community Engagement - Additional Information

EBOTS
Emeryville-Berkeley-Oakland
Transit Study

EBOTS
Phase 1 Outreach Summary

Introduction

Between August 2013 and November 2013, the Emeryville-Berkeley-Oakland Transit Study (EBOTS) project team conducted a variety of outreach activities to inform stakeholders and the public about the project, and to solicit input on future visions for transit in the study area. The outreach effort was part of Phase 1 of EBOTS, which sought to identify both opportunities and constraints associated with improving transit service in the study corridor.

The outreach activities conducted included three community workshops held across the study area (one in each city) and a bilingual questionnaire used to collect information regarding how individuals travel within the study area (i.e., travel method) and to gather feedback on potential transit improvements. Over 820 questionnaires were collected from the public including current transit riders, residents, employers and employees in the study area.

This report summarizes the EBOTS outreach efforts and results in five sections:

I. Public Outreach Activities
II. Community Workshop Format
III. Key Findings from Community Workshops
IV. Community Questionnaire Results
V. Next Steps

I. Public Outreach Activities

The public outreach strategy assisted the partner cities including Emeryville, Berkeley, and Oakland and partner agencies (AC Transit, Amtrak/ Capital Corridor, BART, Berkeley Gateway Transportation Management Association and the Emery-Go-Round) with engaging a broad spectrum of stakeholders in the transit study. Specifically, the objectives of the public process were to inform and collect input from the public on transit services and improvements within the study area.

MIG, the public engagement consultant, conducted a robust outreach effort to publicize the community workshops and the questionnaire including targeted postcard and flyer distribution, e-blasts, news media articles, and phone calls to key Emeryville- Berkeley-Oakland partners such as community-based organizations, local churches and established civic groups. MIG publicized the outreach activities in both Spanish and English.

To promote the community workshops and questionnaire, MIG used the following outreach channels:

- City of Emeryville website
- Communications via Facebook and Twitter
- Regular newsletters distributed through the partner cities and partner agencies
- Targeted communications with local media outlets (e.g., Berkeleyside, Oakland Local)
- Information distribution through elected officials (e.g., City Council)
- Partnerships with community-based organizations and local businesses
- Intercept questionnaires at and near transit hubs
- Bilingual postcards to stakeholders within the study area
- Bilingual flyers posted at and near transit hubs

The bilingual outreach flyer and postcard are included in Appendix A at the end of this summary.

II. Community Workshop Format

For the first phase of EBOTS outreach, the community workshops were designed to present information on the EBOTS study and why it's being done, as well as to collect public feedback on the identification and definition of transit options. The table below lists the EBOTS community workshops including details on activities and attendance.

Event	Activities	Attendance
West Oakland Workshop November 7, 2013 6:30 pm - 8:30 pm West Oakland Senior Center	• Open House gallery walk of presentation boards • Map-based exercise • Small group discussions with participants • Questionnaires	• 23 participants
West Berkeley Workshop November 9, 2013 11:00 am - 1:00 pm James Kenney Community Center	• Open House gallery walk of presentation boards • Map-based exercise • Small group discussions with participants • Questionnaires	• 14 participants
Emeryville Workshop November 12, 2013 6:30 pm - 8:30 pm Emery Unified School District Office	• Open House gallery walk of presentation boards • Map-based exercise • Small group discussions with participants • Questionnaires	• 32 participants

During the workshops, participants were invited to walk around the meeting venue in an Open House style gallery walk to view the presentation boards. The presentation boards provided an overview of the EBOTS project, including the vision for the study corridor, population and demographics within the study area, transit services within the study area, as well as potential transit improvements and technologies.

The workshops also featured an interactive mapping exercise in which participants were asked to place a pin on the map of a starting point and ending point of a transit trip that they already make or would like to make. The participants then used string to connect the two points.

Following the gallery walk, participants were divided into small groups facilitated by members of the EBOTS project team. Participants were asked a standard set of questions, including the following:

- What are the locations within the study area that are difficult to access using transit?
- What types of transit improvements would help you travel within the study area without a car?
- What types of transit improvements would you like to see made in the next 1 to 3 years within the study area?
- What type of long-term transit improvements do you think are needed in the next 10 years within the study area? Consider acceptable financing and taxes to pay for improvements.
- Consider bus rapid transit or streetcar on local streets. What trade-offs would be acceptable to accommodate these modes, including potentially removing travel lanes or removing on-street parking?

III. Key Findings from Community Workshops

The following themes emerged most frequently across input gathered from the small group discussions. Based on the close relationship between the questions, there is some overlap in the responses. The overlap reinforces the synergy between the needs, solutions and opportunities identified to improve transit in the study area.

Difficult Locations to Access Using Transit in the Study Area

- Berkeley Marina
- West Oakland BART station
- Berkeley Bowl West
- Fourth Street in Berkeley
- Frontage Road
- Shopping and entertainment venues in Emeryville

- Anywhere at night (limited transit service in the evening)
- Jack London Square
- Oakland Army Base
- Waterfront areas
- Grocery stores (e.g., Pak N Save)
- Mandela Parkway

Transit Improvements in the Study Area

- More evening and late night transit service
- More weekend transit service
- Better connections to West Oakland BART station
- More local, neighborhood-level circulators
- Emery-Go-Round service in West Oakland
- Next bus information at bus stops
- Demand-response transit service
- Expansion of paratransit service
- Better schedule reliability
- Improved last mile connectivity
- Improved connections to Emeryville shopping center
- Better lighting at bus stops
- Improvements to transit vehicles (e.g., wider aisles, low floors for boarding)
- More North/South transit routes
- More East/West transit routes
- Increased safety measures for transit riders
- More AC Transit connections to Emeryville
- Improved bikeability within the study corridor

Short-term Transit Improvements (1-3 years)

- Schedule reliability and predictability
- Next bus information at bus stops
- Better coordination among the local transit agencies
- Increased safety measures for transit riders
- Expansion of Emery-Go-Round service in West Oakland
- More transit connections to Emeryville
- Transit to support development in West Oakland
- More night and weekend transit service
- Ferry service to Jack London Square and San Francisco
- Improved bikeability within the study corridor (e.g., along West Grand and Market Street)
- Development of “complete networks” rather than “complete streets”
- Bikesharing programs

Long-term Transit Improvements (8-10 years)

- Streetcars to improve local circulation (e.g., San Pablo Avenue)
- Non-polluting transit vehicles
- Coordinated ferry service
- Water taxi service
- Bus Rapid Transit on San Pablo
- Bike connections from Emeryville to Bay Bridge
- Buffered bike lanes on San Pablo
- Land use planning tied closely to transit planning
- Thoughtful parking polices that support alternative transit modes
- Wi-Fi on local buses

Acceptable Transit Trade-offs

- Bus Rapid Transit on San Pablo
- Removal of on-street parking for buses and bikes (e.g., Hollis Street)
- Removal of travel lanes on certain streets (e.g., Mandela and Adeline)
- One-way streets with angled parking
- Parking removal negotiations with business owners
- Residents pay for expanded Emery-Go-Round service

IV. Community Questionnaire Results

A community questionnaire, developed in collaboration with members of the EBOTS Technical Advisory Committee, was used to collect information regarding how individuals travel within the study area and to gather public input on desired transit improvements.

Approximately 827 questionnaires were collected from members of the public including current transit riders, residents, employers and employees in the study area. The questionnaire was closed on November 22, 2013. The key findings from the questionnaires will be available in December 2013.

V. Next Steps

During the second phase of outreach in May 2014, the community workshops will focus on the evaluation of transit options and the level of community acceptance for the options.

Appendix C
Round 2 Community Engagement - Additional Information

EBOTS
Emeryville-Berkeley-Oakland
Transit Study

EBOTS
Phase 2 Outreach Summary

Introduction

The Emeryville-Berkeley-Oakland Transit Study (EBOTS) project team conducted several outreach activities between March 2014 and May 2014 to evaluate ideas for improving transit in the study area. Based on public input collected during Phase I outreach, the project team developed potential options for better transit in these communities.

The outreach activities conducted included three community workshops held across the study area (one in each city) and a questionnaire used to collect information regarding preferences and priorities for travel within the study area. This report summarizes the EBOTS Phase II outreach efforts and results in five sections:

I. Public Outreach Activities
II. Community Workshop Format
III. Key Findings from Small Group Discussions
IV. Interactive Display Board results
V. Community Questionnaire Results
V. Next Steps

I. Public Outreach Activities

MIG, the public engagement consultant, conducted a robust outreach effort to publicize the community workshops and the questionnaire including targeted postcard and flyer distribution, e-blasts, social media posts and phone calls to key Emeryville- Berkeley-Oakland partners such as community-based organizations, local churches and established civic groups. MIG publicized the outreach activities in both Spanish and English.

To promote the community workshops and questionnaire, MIG used the following outreach channels:

- Targeted communications with local media outlets (e.g., E'ville Eye, Berkeleyside, Oakland Local)
- City of Emeryville website
- E-blasts to residents, community-based organizations and local schools
- Social media communications via Facebook and Twitter
- Bilingual postcards to stakeholders within the study area
- Bilingual flyers posted at and near transit hubs

- Regular newsletters distributed through the partner cities and partner agencies
- Information distribution through elected officials (e.g., City Council)
- Partnerships with community-based organizations and local businesses

II. Community Workshop Format

The Phase II community workshops were designed to present information on the EBOTS study and why it's being done, the outcomes of the Phase I public outreach, as well as to collect public feedback on the evaluation of transit options. The table below lists the EBOTS community workshops including details on activities and attendance.

Event	Activities	Attendance
Emeryville Workshop May 8, 2014 6:30 pm - 8:30 pm Emery Unified School District Office	• Open House gallery walk of presentation boards • Interactive display board exercises • Small group discussions with participants • Questionnaires	• 14 participants
West Oakland Workshop May 10, 2014 11:00 am - 1:00 pm DeFremery Recreation Center	• Open House gallery walk of presentation boards • Interactive display board exercises • Small group discussions with participants • Questionnaires	• 18 participants
West Berkeley Workshop May 13, 2014 6:30 pm - 8:30 pm James Kenney Community Center	• Open House gallery walk of presentation boards • Interactive display board exercises • Small group discussions with participants • Questionnaires	• 11 participants

During the public workshops, participants were invited to walk around the meeting venue in an Open House style gallery walk to view the presentation boards. The presentation boards provided an overview of the EBOTS project, transit services within the study area, and an evaluation of transit options. The Open House style gallery walk also included several interactive display board exercises in which participants were asked to rank transit amenities, share ideas to improve potential AC transit and connector routes, and to identify strategies to fund new service.

Following the gallery walk and interactive display board exercises, participants were divided into small groups facilitated by members of the EBOTS project team. Participants were asked a standard set of questions, including the following:

- What do you think about the Potential AC transit routes? Do they meet your transit needs?
- Will the Connectors linking BART stations assist you in getting around? Do you have suggestions on preferred routes?
- Of the transit modes just discussed, which do you think would receive the most support and/or opposition from the public? From elected officials?
- What transit features are most important to you?
- What are your ideas for funding new service?

III. Key Findings from Small Group Discussions

The following themes emerged most frequently across input gathered from the small group discussions. Based on the close relationship between the questions, there is some overlap in the responses. The overlap reinforces the synergy between the needs, solutions and opportunities identified to improve transit in the study area.

Potential AC Transit Routes

- Improve the alignment and timing of connections between Lines 12 and 13
- Enhance the frequency of Line F and make the route more direct
- Develop a direct route for Line F along Stanford and Powell
- Expand Line 26 to link Hollis with Jack London Square
- Improve connectivity between the Amtrak, Transbay and the Jack London Square Ferry
- Consider the Emeryville Amtrak station as a future Transbay hub to allow Lines F and Z to function solely as local lines
- Improve Transbay service to West Grand Avenue
- Consider full bus rapid transit service on San Pablo
- Develop a streetcar for Mandela Parkway, Peralta Street and/or Adeline Street
- Maintain the extension of Line 57
- Expand Line 48 to the Berkeley BART station
- Re-establish transit service north of Dwight Way and connecting to the Emeryville Market Place
- Provide a shuttle between Lake Merritt and Wood Street along 14th Street and 18th Street
- Create safer, pedestrian-friendly AC Transit route stops, particularly for children and seniors
- Utilize corridors other than San Pablo to improve service
- AC Transit route changes are an overall improvement, but the routes still need minor tweaks to be effective and convenient for riders

Connectors Linking BART Stations

- Extend hours of service
- Provide connector routes that reflect the needs of weekday commuters as well as regular and weekend riders
- Design connectors to serve grocery stores (e.g., Whole Foods, Pak N Save, Berkeley Bowl)
- Consider the importance of timed transfers for connectors
- Connect 4th Street to the North Berkeley BART station, Jack London Square and West Oakland BART station
- Connect Emeryville to the West Oakland BART station
- Relieve congestion on 40th Street at Macarthur BART
- Relieve congestion on Ashby with connector service
- Modify Route D (West Oakland Connector) to link Hollis Street, Shellmound Street, Powell Street, Stanford Street and Ashby BART station
- Consider how overlapping AC Transit routes and non-AC transit routes can reduce or eliminate transfers
- Develop express buses on University Avenue
- Extend Route A (West Berkeley Connector) to connect to University Avenue rather than Cedar Street
- Use connectors to link Berkeley to the Ashby and MacArthur BART stations, West Oakland and Jack London Square

Support for Various Transit Modes

Streetcars:

- Impractical and inflexible form of public transit due to required route certainty
- Very expensive to develop and operate streetcars
- Streetcars are not affected by potholes which creates a smoother ride for passengers
- Loss of travel lane to streetcar is problematic due to multi-modal demands on streets
- Requires substantial capital investments and subsidized funding to develop and maintains streetcars
- Facilitates development and supports the growth of transit villages
- High cost of streetcars and low demand would lead to public opposition
- Saves costs by maintaining a long life span and using alternative energy fuel sources
- Streetcars are vulnerable to road obstructions
- Provides flexible service route options with doors opening on both sides of the streetcar

Shuttles:

- Provides cost effective and convenient service
- Needs to become accessible to non-able bodied persons
- Needs an appropriate price point for fares
- Shuttles enjoy broad public support due to low-cost and flexible service
- The lack of public awareness about the benefits of Emery-Go-Round shuttles leads to a lack of public support

Branded/Enhanced Buses:

- Provides important amenities for riders including level boarding, dual side doors and faster speeds
- Offers a cost effective option for transit riders
- Supported by elected officials and transportation agency staff
- Requires a targeted public education campaign to raise awareness of the service benefits

Other:

- Enhance bus routes by painting the route numbers on local streets
- Develop a ferry connection in Berkeley
- Create safer bike parking and bike lockers to prevent theft and support transit connectivity
- Improve ADA accessibility of all transit modes

Important Transit Features

- Accessible bus interiors and seating arrangements that accommodate wheelchairs, walkers and strollers
- Coordinated time transfers between buses and BART trains is essential
- Appropriate safety measures at all transit stops (e.g., lighting, security cameras)
- Clean, well-lit bus shelters with several seating options
- Additional bike-racks on the buses to support the growing cycling community
- Accurate Real Time Arrival information via 511, Next Bus, mobile tracking and print information at bus stops
- Accurate and appropriate frequency between bus arrivals
- Early morning bus and BART service during the weekday mornings
- Later weekend bus and BART service during the evening
- Safer driving practices by bus operators
- Use of alternative fuels to address air quality and health impacts
- Wi-Fi access is less important on buses

Ideas for Funding New Service

- Utilize and incorporate a variety of funding sources, including:
    - Property taxes
    - Sales taxes
    - Gas taxes
    - VMT taxes
    - Incremental car taxes
    - Cap and trade funds
    - Measure B funds
    - TIGER grants
    - Bay Area Air Quality Management District funds
- Encourage businesses to pay into Property Based Improvement Districts (PBID), which can support improved transit services
- Reward non-car owners with discounted transit fares
- Prohibit on-site and on-street parking to discourage car ownership
- Incorporate funds from companies beyond the EBOTS study area, such as Kaiser Permanente and Alta Bates
- Prevent fare increases
- Eliminate fares for public transit

IV. Interactive Display Board Results

During the Open House gallery walk, participants were encouraged to provide input by participating in the interactive display board exercises. Each workshop presented six* interactive display boards including:

- **Potential AC Transit Route Changes**
- **Potential Connector Service Routes**
- **Connector Concept Transit Routes (*only presented at the West Oakland and West Berkeley workshops)**
- **Transit Features**
- **Transit Modes**
- **Funding**

The summarized responses for each interactive display board exercise are presented below.

Potential AC Transit Route Changes

Participants were presented with potential AC Transit routes that increased service through the introduction of new routes, improved frequency of most routes to every 15 minutes and provided new connections to Emeryville, West Oakland, and West

Berkeley. Workshop participants were asked to answer two questions related to the potential route changes. The responses are summarized below.

Which of these route changes (if any) would make you more likely to take transit?

- Overall network is improved by potential route changes
- Extension of Line 57 to Emeryville Amtrak station is a positive change
- Changes to Lines 26, 72 and 13 are positive improvements
- Connect Emeryville to West Oakland BART for faster service to San Francisco
- Reduce traffic congestion on 40th Street which slows shuttle service from MacArthur BART station
- Extend Line 57 to Emeryville Peninsula
- Change the F Transbay route to provide "express service" (i.e., limited stops) from Downtown Berkeley to Emeryville Peninsula and Public Market to San Francisco

Would you recommend any changes to these routes?

Transbay Changes

- Line F should just come straight down Stanford and onto the freeway
- Line 12 duplicates Line F service from Emeryville
- Line F needs to be streamlined

Emery-Go-Round Related Changes

- Proposed routes lack connectivity to Emery-Go-Round
- Emery-Go-Round buses stack up at BART stations and Powell Street
- MacArthur BART should be redesigned to make it easier for Emery-Go-Round to get in and out of the station area

Line 26 Changes

- Line 26 should go to the Ferry and Jack London Square
- Line 26 will have low ridership similar to Line 19
- Extend Line 26 into Emeryville

Additional Changes

- Add transit options to 4th Street shopping area
- Need routes that connect North Berkeley BART to Solano Avenue
- Add transit options to the Port of Oakland and Oakland Army Base
- Install a pedestrian draw bridge to restore water taxi from Jack London Square to Alameda
- Need routes to connect Emeryville Peninsula

- Need direct routes from Public Market to Downtown Berkeley and San Francisco
- Extend Line 57 to Powell Street and the Emeryville Public Market
- BART should consider West Oakland a retail hub
- Too much traffic on Ashby for Line 49 to function well

Potential Connector Service Routes

Four Connector Routes were presented including Route A: West Berkeley Connector, Route B: Shellmound Connector, Route C: Hollis Connector, and Route D: West Oakland Connector. The connector service focuses on linking high-demand activity centers in the study area with BART stations and other transit centers, in order to better serve the busiest commute and visitor travel patterns throughout the day.

To determine the utility of the four proposed connector service routes, participants were asked to rate each route on a scale of 1 – 5 (1 being the least useful route and 5 being the most useful route). The responses are summarized below with an accompanying chart.

Table 1: Usefulness of Potential Connector Service Routes

	1 - Least Useful	2	3- Moderately Useful	4	5- Most Useful
Connector A: West Berkeley	4	1	7	1	4
Connector B: Shellmound	1	1	5	1	10
Connector C: Hollis	0	1	6	6	9
Connector D: West Oakland	5	2	4	2	7

Table 1 displays the combined utility ratings of Connectors A, B, C and D, from all participants of the West Berkeley, West Oakland and Emeryville workshops. Additional summary results are highlighted below:

- Connectors B and C were most frequently selected by workshop participants as "most useful" routes.
- The majority of workshop participants selected Connectors D and A as the "least useful" routes.
- Connector A was the most frequently selected route indicated as "moderately useful."

Participants were also asked to share any recommended changes for the proposed connector service routes.

Comments on Route A: West Berkeley Connector

- Loop service to both Downtown Berkeley and North Berkeley, connecting to 4th Street retail

- Loop service via Shattuck and Adeline
- Fully incorporate shuttle routes (e.g., Emery-Go-Round) if these services are to be replaced
- Include weekends into the connector service

Comments on Route B: Shellmound Connector

- Find ways of discouraging automobile use and parking in West Berkeley
- Connect Line 57 to Amtrak
- Connect to Berkeley Bowl
- Connect to Emeryville Towers, which represent a large employment and many Emery-Go-Round system payers

Comments on Route C: Hollis Connector

- Route C is more preferable than Route B
- Complete the route to form a circle, continuing from Ashby to Stanford and Powell

Comments on Route D: West Oakland Connector

- Connect to Ikea shopping area to build connection for San Francisco residents commuting to the East Bay
- Connect West Berkeley to West Oakland
- Connect to Jack London Square

Connector Concept Transit Routes

The project team created a concept map based on input collected from the public during the Emeryville workshop. Participants in the West Berkeley and West Oakland workshops used post-it notes to indicate their preferences and suggested changes to the connector routes. The comments are summarized below.

Above West Oakland BART near Line 14:

- Needs better options to facilitate off-peak-commuters from San Francisco (e.g., workers on weekdays)

4th Street Retail:

- Include 4th Street retail area via 6th Street

North Berkeley BART:

- Prefer North Berkeley BART route to better serve North Berkeley and Kensington

Downtown Berkeley:

- Improve Downtown Berkeley BART Route

I-580 and Berkeley Aquatic Park:

- Eliminate Line 13

- Re-route Connector B from Ashby BART via Adeline/Stanford/Powell to Emeryville Amtrak then to West Oakland
- Consider extending Line 26

Intersection of Line 72R and Line 48:

- Don't run down 7th Street in Berkeley because of heavy traffic
- Route the Connector on 9th and/or 10th between Ashby and Dwight
- At Dwight, move route to 4th Street, 5thStreet and 6th Street going north to Virginia

San Pablo Park:

- Intersection at Ashby and 7th is a mess that needs to be fixed
- The light at Murray Street one block north of Ashby needs to be removed
- Create a pedestrian only area to the east of 7th Street

Ashby BART:

- Ashby traffic isn't great but connectivity to Ashby BART needs to happen
- Select a side street with timed lights and preferred bus lanes

Between Marina Park and Point Emery:

- This area has great potential for improved transit
- Use Powell and Stanford instead of Ashby
- Utilize improved connections over rail road tracks and keep route east of tracks in Emeryville

Bay Street and Connector A:

- Connector A will overlap productive segments of AC Transit lines 57 and 51A
- Will greatly reduce productivity of those routes and likely result in less frequent service

Transit Modes

Participants were presented with a description of various transit modes including shuttles, conventional buses, branded/enhanced buses, streetcars and "other" modes. The "other" modes category included Light Rail, Bus Rapid Transit, Demand Response Transit, Heavy Rail and Personal Rapid Transit.

The "Transit Mode" display board included three activities that asked participants to rank their preferred transit mode, identify which routes could accommodate different transit modes and indicate their preference for stop spacing. Table 2 below highlights the results of each activity.

Preferred Transit Mode

Table 2: Preferred Transit Mode		
Rank	**Transit Mode**	**Frequency of Selection**
1	Shuttle	16
2	Streetcar	13
3	Other	6
4	Branded/Enhanced Bus	5
5	Conventional Bus	4

Additional Comments on Preferred Transit Modes:

- Demand response transit should be developed to improve public safety and improve last mile service
- Any transit mode that is fastest and most efficient
- San Pablo desperately needs BRT
- Buses should have priority on local streets
- Enhanced buses on San Pablo Avenue corridor could stimulate economic development opportunities
- Low-income residents need free or low-cost shuttle service to pharmacies, grocery stores and retail shopping areas

Connector Routes to Accommodate Different Transit Modes

Participants were asked to indicate which of the Connector Routes (A, B, C, D) should accommodate a different transit mode. The four possible Connector Routes included Route A: West Berkeley Connector, Route B: Shellmound Connector, Route C: Hollis Connector, and Route D: West Oakland Connector. The summarized responses are listed below.

Route A: West Berkeley Connector

- Streetcar service from Amtrak to North Berkeley that extends to Downtown Berkeley

Route B: Shellmound Connector

- BRT
- Demand personal rapid transit
- Utilize Mandela Parkway and West Oakland, rather than MacArthur
- Streetcar on Shellmound

Between Route B and Route C

- Modified trunk lines with transfer options in Emeryville
- Conventional bus
- Maintain Emery-Go-Round shuttle service

Route C: Hollis Connector

- Maintain shuttle service
- High potential for streetcar, except along Ashby due to traffic congestion
- Consider extending north and connect with North Berkeley BART or use Powell/Stanford

Route D: West Oakland Connector

- Streetcar

Transit Stop Spacing

Participants were asked to indicate their preference between fewer, more widely spaced stops for faster travel time, or more closely spaced stops for easier access. Table 3 highlights the summarized results of participants' preferences for transit stop spacing.

Table 3: Transit Stop Spacing

Rank	Transit Stop Spacing	Frequency of Selection
1	Widely Spaced Stops	11
2	Closely Spaced Stops	6

The majority of participants indicated that widely spaced stops are more preferable than closely spaced stops. However, participants noted that widely spaced stops are more efficient for conventional and branded/ enhanced buses. Other participants indicated that closely spaced stops are more efficient for shuttles.

Transit Features

Participants were asked to choose the transit features that would most likely help or encourage their use of transit. Bus frequency, improved bus speed and real time arrival information were the most frequently selected features among workshop participants.

Table 4 below displays the ranking of transit features based on how frequently the feature was selected by workshop participants.

Table 4: Transit Features

Rank	Transit Feature	Frequency of Selection
1	Bus Frequency	21
2	Improved Bus Speed	19
3	Real Time Arrival Information	15
4	Timed Transfers from BART and/or Amtrak	13
5	Cleanliness of Buses, Shelter, and Stop Areas	11
6	Enhanced Safety and Security at Stops	9

7	Stop Improvements	8
8	WIFI on Buses	3

Funding

Workshop participants were invited to share their ideas for funding new transit service by placing post-it notes on the interactive "Funding" display board. Participants offered a wide range of creative suggestions to fund transit improvements and new service.

Ideas for Funding New Service

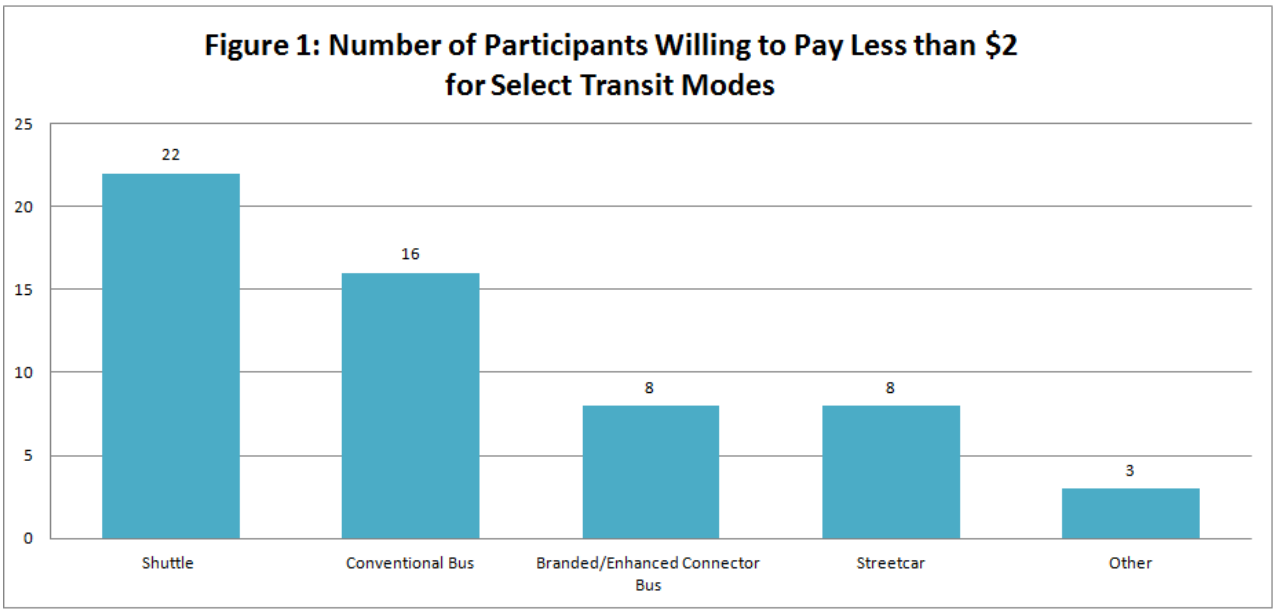
- Parking fees
- Gasoline taxes
- Property taxes
- Increased business taxes
- PBID assessments
- VMT tax state funds
- Measure B funds
- Parking fees
- Parcel taxes
- Cap and trade funds
- State and federal grant funding

Many participants indicated that public transit should be free and subsidized through a combination of taxes (e.g., property tax, gasoline tax and sales tax). Both taxes and fees for parking were noted as viable options to fund transit improvements.

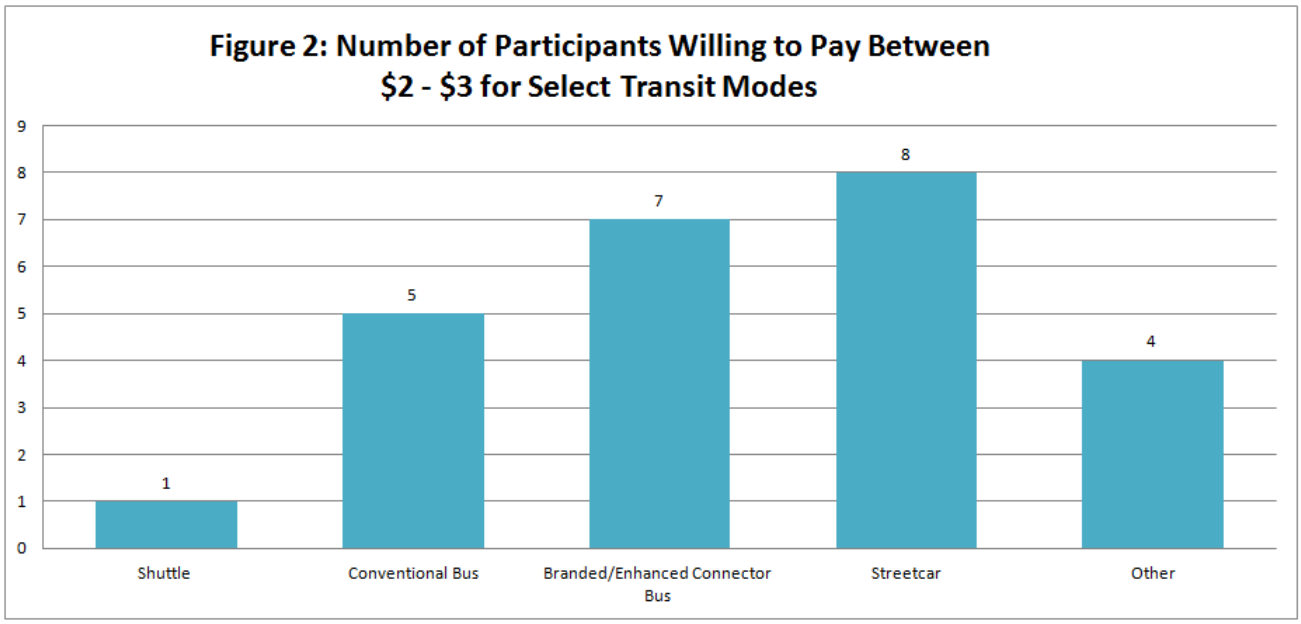
Would you be willing to pay a fare for this transit service?

Participants were also asked to indicate how much they would be willing to pay for shuttle, conventional bus, branded/enhanced connector bus and streetcar service. Participants could also suggest "other" modes of transit and indicate their preferred pricing. Based on participant feedback, the charts below displaying the results are organized into three categories:

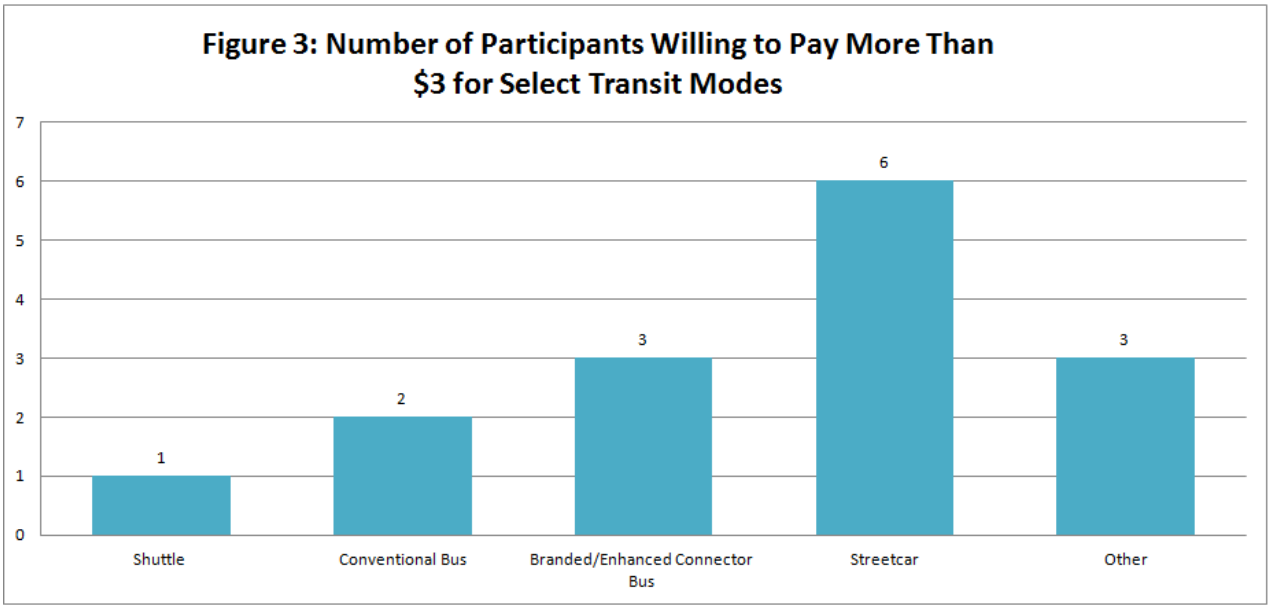
- Participants willing to pay less than $2 for select modes
- Participants willing to pay between $2 - $3 for select modes
- Participants willing to pay more than $3 for select modes



- The majority of participants are willing to pay less than $2 for shuttles followed by conventional buses and branded/ enhanced buses.



- The majority of participants are willing to pay between $2 - $3 for streetcars, followed by branded/ enhanced buses and conventional buses.



- The majority of participants are willing to pay more than $3 for streetcars, followed by branded/ enhanced buses and “other” transit modes.

V. Community Questionnaire Results

A community questionnaire for Phase II, developed by the City of Emeryville, was used to learn the public’s preferences and priorities for expanding transit service in the study area. The questionnaire identified options to improve existing service and options that included new service.

Approximately 502 questionnaires were collected from members of the public including current transit riders, residents, employers and employees in the study area.

VI. Next Steps

The EBOTS Project Team will incorporate the public input collected during Phase II into the refined transit options for the study area. For EBOTS updates and additional information, please visit www.emeryville.org/ebots.

Appendix D
Round 3 Community Engagement - Additional Information

EBOTS
Emeryville-Berkeley-Oakland Transit Study

Round 3 Community Engagement – Additional Information

Review of Preliminary Draft Recommendations and Draft Report

Overview

Between July 2014 and November 2014, the EBOTS project team presented preliminary draft recommendations the draft report to several groups for review. The groups included the Oakland Community Economic Development Committee, West Oakland Business Alert, West Oakland Neighbors, the Emeryville Economic Development Committee, the Berkeley Transportation Commission, and the Emeryville Transportation Committee. These groups' comments informed the draft report.

Outreach for meetings on the Draft Report included the City of Emeryville website, e-blasts, and bilingual postcards and flyers. The team discussed the Draft Report with the Emeryville Planning Commission, the Oakland Planning Commission, the Emeryville Transportation Management Association Board, the Emeryville City Council, the Berkeley City Council, a West Oakland Community Meeting attended by several members of the Alliance of Californians for Community Empowerment (ACCE) and others, the AC Transit Board, the Oakland City Council, the West Oakland Business Alert, and the BART Board.

Key Findings

The meetings garnered the following comments:

- Shuttles: The fourth Emery Go-Round route is not yet funded. Emphasize a new West Oakland shuttle and an expanded West Berkeley shuttle. Add shuttles and Measure BB to the funding table. Shuttles could compete with AC Transit for operating funding from Measure BB and the FTA. Service between Emeryville and West Oakland BART is top priority, and should go to stores on Shellmound. The route should not impede freight transportation. Encourage partnership with AC Transit.
- AC Transit: Add a transbay bus from downtown Berkeley through the planned Emeryville bus hub. Restore routes cut in 2010 before investing in enhanced buses or streetcars. A transbay bus should stop at Treasure Island. It is easier to take BART from West Oakland to San Francisco than to take AC Transit's Line 26 to Emeryville. A route to Maritime Street is needed. More Clipper Cart outlets and better hours are needed, especially for setting up new cards with discounts.
- Demand Response Transit: We need flex service at West Oakland BART at night. Only support it if it does not require smart phones.
- Enhanced Bus: The Enhanced Bus should jog to the Emeryville Amtrak station. AC Transit could set up a route there in two years. The stores are on Shellmound, but the route is on Hollis.

- Streetcars: Streetcars would be good for West Oakland and Emeryville. Phase the streetcars, starting with West Oakland BART to Emeryville. Streetcar tracks on bridges could be expensive. Generally streetcars are justified if there is an existing bus route with very high ridership. Streetcars are inflexible and can lead to gentrification. The cost of a streetcar could pay for many buses. Streetcars are dangerous to cyclists and problematic for truck freight movement. Do not recommend metal-rail streetcars.

Bilingual outreach materials for all three rounds of community engagement are shown in Appendix E.

Appendix E
Bilingual Outreach Materials

Emeryville-Berkeley-Oakland

Transit Study Community Workshop

Your Voice Counts!

Help us improve transit within West Berkeley, Emeryville and West Oakland. Join us for a community workshop to explore future visions for transit in these three communities and to provide input on our transit study. Your ideas and input will help shape the future of transit in this area!

For more information about EBOTS and to take our brief questionnaire, please visit: www.emeryville.org/ebots

Emeryville-Berkeley-Oakland

Taller Comunitario del Estudio de Tránsito

¡Su Opinión Importa!

Ayúdanos a mejorar el tránsito en West Berkeley, Emeryville y West Oakland. Únase a nosotros para un taller comunitario para mejorar el tránsito en estas tres comunidades. Sus ideas y sugerencias le ayudarán a formar al futuro del tránsito en este área!

Para obtener más información sobre EBOTS y tomar nuestro breve cuestionario, por favor visite: www.emeryville.org/ebots

Thursday, November 7, 2013 | 6:30 - 8:30 pm
Jueves, 7 de Noviembre, 2013 | 6:30 - 8:30 pm
West Oakland Senior Center, 1724 Adeline St., Oakland

Saturday, November 9, 2013 | 11:00 am - 1:00 pm
Sabado, 9 de Noviembre, 2013 | 11:00 am - 1:00 pm
James Kenney Community Center, 1720 8th St., Berkeley

Tuesday, November 12, 2013 | 6:30 - 8:30 pm
Martes, 12 de Noviembre, 2013 | 6:30 - 8:30 pm
Emery Unified School District Office, Multi-Purpose Room
1275 61st St., Emeryville

www.emeryville.org/ebots

EBOTS
Emeryville-Berkeley-Oakland Transit Study

In coordination with: En coordinación con:
AC Transit, Amtrak/Capitol Corridor, BART, Berkeley Gateway Shuttle, City of Berkeley, City of Emeryville, City of Oakland, Emery-Go-Round, Federal Transit Administration Transit Planning Grant through CalTrans.

EBOTS
Emeryville-Berkeley-Oakland Transit Study

Emeryville–Berkeley–Oakland

Transit Study Community Workshop

You're Invited!

Join us for a community workshop to improve transit within West Berkeley, Emeryville and West Oakland. Your ideas and input will help shape the future of transit in this area!

Emeryville–Berkeley–Oakland

Taller Comunitario del Estudio de Tránsito

¡Están Invitados!

Únase a nosotros para un taller comunitario para mejorar el tránsito en West Berkeley, Emeryville y West Oakland. Sus ideas y sugerencias le ayudarán a formar al futuro del tránsito en este área!

You're Invited!

¡Están Invitados!

Thursday, November 7, 2013 | 6:30 - 8:30 pm
Jueves, 7 de Noviembre, 2013 | 6:30 - 8:30 pm
West Oakland Senior Center, 1724 Adeline St., Oakland

Saturday, November 9, 2013 | 11:00 am - 1:00 pm
Sabado, 9 de Noviembre, 2013 | 11:00 am - 1:00 pm
James Kenney Community Center, 1720 8th St., Berkeley

Tuesday, November 12, 2013 | 6:30 - 8:30 pm
Martes, 12 de Noviembre, 2013 | 6:30 - 8:30 pm
Emery Unified School District, Multi-Purpose Room, 1275 61st St., Emeryville

Join the Discussion

For more information about the Emeryville-Berkeley-Oakland Transit Study (EBOTS), the community workshops and our community questionnaire, please visit: **www.emeryville.org/ebots**

Únete a la discusión

Para obtener más información sobre el Estudio de Tránsito de Emeryville-Berkeley- Oakland (EBOTS), los talleres comunitarios y el cuestionario comunitario, por favor visite: **www.emeryville.org/ebots**

Sponsored by: Patrocinado por:
AC Transit, Amtrak/Capitol Corridor, BART, Berkeley Gateway Shuttle, City of Berkeley, City of Emeryville, City of Oakland, Emery-Go-Round, Federal Transit Administration Transit Planning Grant through CalTrans

EBOTS
Emeryville-Berkeley-Oakland Transit Study

City of Emeryville
1333 Park Avenue
Emeryville, CA 94608

Emeryville-Berkeley-Oakland

Transit Study Community Workshop

Your Voice Counts!

Join us to evaluate ideas for improving transit in West Berkeley, Emeryville and West Oakland. Based on public input, we've developed potential options for better transit in these communities. Help us evaluate these transit options during the 2nd round of public workshops. Your ideas and input will help shape the future of transit in this area!

Emeryville-Berkeley-Oakland

Taller Comunitario del Estudio de Tránsito

¡Su Opinión Importa!

Únase a nosotros para evaluar ideas para mejorar el tránsito en West Berkeley, Emeryville y West Oakland. Ayúdanos a evaluar estas opciones durante la segunda ronda de talleres públicos. Sus ideas y sugerencias le ayudarán a dar forma al futuro de tránsito en esta zona!

For more information about EBOTS and to take our brief questionnaire, please visit: www.emeryville.org/ebots

Para obtener más información sobre EBOTS y tomar nuestro breve cuestionario, por favor visite: www.emeryville.org/ebots

2nd Round of Community Workshops

Thursday, May 8, 2014 | 6:30 - 8:30 pm
Jueves, 8 de Mayo, 2014 | 6:30 - 8:30 pm
Emery Unified District Office, Multi-Purpose Room
1275 61st St., Emeryville

Saturday, May 10, 2014 | 11:00 am - 1:00 pm
Sabado, 10 de Mayo, 2014 | 11:00 am - 1:00 pm
DeFremery Recreation Center, Fireplace Room,
1651 Adeline St., Oakland

Tuesday, May 13, 2014 | 6:30 - 8:30 pm
Martes, 13 de Mayo, 2014 | 6:30 - 8:30 pm
James Kenney Community Center, 1720 8th St., Berkeley

Light refreshments will be provided.

www.emeryville.org/ebots

EBOTS
Emeryville-Berkeley-Oakland Transit Study

In coordination with: En coordinación con: AC Transit, Alameda County Transportation Commission, Amtrak/Capitol Corridor, BART, Berkeley Gateway Shuttle, City of Berkeley, City of Emeryville, City of Oakland, Emery-Go-Round, Federal Transit Administration Transit Planning Grant through CalTrans.

EBOTS
Emeryville-Berkeley-Oakland Transit Study

Emeryville–Berkeley–Oakland

Transit Study Community Workshop

You're Invited!

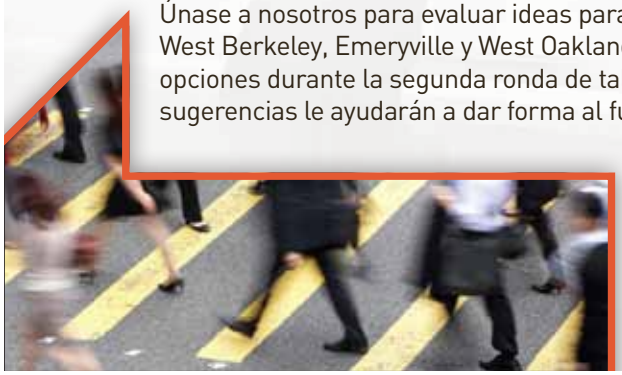
Join us to evaluate ideas for improving transit in West Berkeley, Emeryville and West Oakland. Help us evaluate these potential transit options during the 2nd round of public workshops. Your ideas and input will help shape the future of transit in this area!

Emeryville–Berkeley–Oakland

Taller Comunitario del Estudio de Tránsito

¡Están Invitados!

Únase a nosotros para evaluar ideas para mejorar el tránsito en West Berkeley, Emeryville y West Oakland. Ayúdanos a evaluar estas opciones durante la segunda ronda de talleres públicos. Sus ideas y sugerencias le ayudarán a dar forma al futuro de tránsito en esta zona!



You're Invited!
¡Están Invitados!

Thursday, May 8, 2014 | 6:30 - 8:30 pm
Jueves, 8 de Mayo, 2014 | 6:30 - 8:30 pm
Emery Unified District Office, Multi-Purpose Room, 1275 61st St., Emeryville

Saturday, May 10, 2014 | 11:00 am - 1:00 pm
Sabado, 10 de Mayo, 2014 | 11:00 am - 1:00 pm
DeFremery Recreation Center, Fireplace Room, 1651 Adeline St., Oakland

Tuesday, May 13, 2014 | 6:30 - 8:30 pm
Martes, 13 de Mayo, 2014 | 6:30 - 8:30 pm
James Kenney Community Center, 1720 8th St., Berkeley

Join the Discussion

For more information about the Emeryville-Berkeley-Oakland Transit Study (EBOTS), the community workshops and our community questionnaire, please visit: **www.emeryville.org/ebots**

Únete a la discusión

Para obtener más información sobre el Estudio de Tránsito de Emeryville-Berkeley- Oakland (EBOTS), los talleres comunitarios y el cuestionario, por favor visite: **www.emeryville.org/ebots**

In coordination with: En coordinación con: AC Transit, Alameda County Transportation Commission, Amtrak/Capitol Corridor, BART, Berkeley Gateway Shuttle, City of Berkeley, City of Emeryville, City of Oakland, Emery-Go-Round, Federal Transit Administration Transit Planning Grant through CalTrans

EBOTS
Emeryville-Berkeley-Oakland Transit Study

City of Emeryville
1333 Park Avenue
Emeryville, CA 94608

Emeryville-Berkeley-Oakland Transit Study Draft Report

Tell us what you think!

Comment on the Draft Report on how to improve transit in West Berkeley, Emeryville and West Oakland, at a public meeting or by e-mail, phone or mail.

To see the draft report and give us comments, visit www.emeryville.org/ebots or call 510-596-4335 or mail to EBOTS, 1333 Park Ave., Emeryville, CA 94608

Emeryville-Berkeley-Oakland Estudio de Tránsito

¡Díganos lo que usted piensa!

Comente sobre el reporte preliminar acerca de como mejorar el tránsito en el oeste de Berkeley, Emeryville y el oeste de Oakland ya sea en una reunión pública por correo electrónico, teléfono o correo.

Para ver el reporte preliminar y danos comentarios, visite www.emeryville.org/ebots o llame 510-596-4335 o por correo a 1333 Park Ave., Emeryville, CA 94608

It's on the agenda! ¡Es en la programa!

Emeryville City Council
Tuesday, October 21, 2014 - 6:30 pm study session
Martes, 21de Octubre, 2014 - 6:30 pm
Emeryville Old Town Hall, 1333 Park Ave at Hollis St., Emeryville

Berkeley City Council
Tuesday, October 28, 2014 - 7:00 pm meeting
Martes, 28 de Octubre, 2014 - 7:00 pm
Berkeley Council Chambers, 2134 Martin Luther King, Jr. Way, Berkeley

West Oakland Community Meeting
Saturday, November 8, 2014 - 10:00 am- Noon meeting
Sabado, 4 de Noviembre, 2014 - 10:00 am-Noon
West Oakland Senior Center, 1724 Adeline St. , Oakland

www.emeryville.org/ebots

EBOTS
Emeryville-Berkeley-Oakland Transit Study

In coordination with: En coordinación con: AC Transit, Alameda County Transportation Commission, Amtrak/Capitol Corridor, BART, Berkeley Gateway Shuttle, City of Berkeley, City of Emeryville, City of Oakland, Emery-Go-Round, Federal Transit Administration Transit Planning Grant through CalTrans

Emeryville-Berkeley-Oakland

Transit Study Draft Report

Tell us what you think!

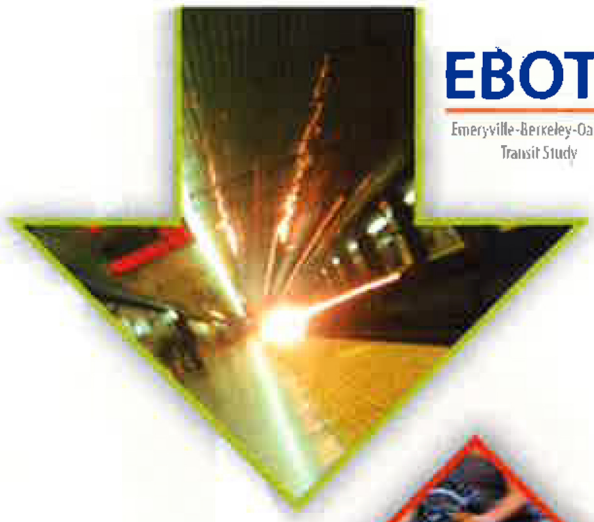
Comment on the Draft Report on how to improve transit in West Berkeley, Emeryville and West Oakland, at a public meeting or by e-mail, phone or mail.

Emeryville-Berkeley-Oakland

Estudio de Tránsito

¡Díganos lo que usted piensa!

Comente sobre el reporte preliminar acerca de como mejorar el tránsito en el oeste de Berkeley, Emeryville y el oeste de Oakland ya sea en una reunión pública por correo electrónico, teléfono o correo.



In coordination with: En coordinación con:
AC Transit, Alameda County Transportation Commission, Amtrak/Capitol Corridor, BART, Berkeley Gateway Shuttle, City of Berkeley, City of Emeryville, City of Oakland, Emery-Go-Round, Federal Transit Administration Transit Planning Grant through CalTrans

It's on the agenda! ¡Es en la programa!

Emeryville City Council
Tuesday, October 21, 2014 - 6:30 pm study session
Martes, 21de Octubre, 2014 - 6:30 pm
Emeryville Old Town Hall, 1333 Park Ave at Hollis St., Emeryville

Berkeley City Council
Tuesday, October 28, 2014 - 7:00 pm meeting
Martes, 28 de Octubre, 2014 - 7:00 pm
Berkeley Council Chambers, 2134 Martin Luther King, Jr. Way, Berkeley

West Oakland Community Meeting
Saturday, November 8, 2014 - 10:00 am-Noon
Sábado, 8 de Noviembre, 2014 - 10:00 am-Mediodía
West Oakland Senior Center, 1724 Adeline St., Oakland

EBOTS
Emeryville-Berkeley-Oakland Transit Study

City of Emeryville
1333 Park Avenue
Emeryville, CA 94608

Learn More, Contact Us

To see the Emeryville-Berkeley-Oakland Transit Study (EBOTS) Draft Report and to e-mail, phone in or mail comments, please visit www.emeryville.org/ebots, call 510-596-4335, or mail to EBOTS, 1333 Park Avenue, Emeryville, CA 94608

Aprenda más, póngase en contacto con nosotros

Para ver el reporte preliminar del Estudio de Tránsito de Emeryville-Berkeley-Oakland (EBOTS) y enviar sus comentarios por correo electrónico, por teléfono o por correo, favor visite: www.emeryville.org/ebots, llame 510-596-4335, o envia un correo a EBOTS, 1333 Park Avenue, Emeryville, CA 94608

Appendix F
Economic Development Inventory and Opportunity Analysis

Memorandum

To: Bill Hurrell and Brian Soland; CDM Smith

From: Ron Golem and Jessica Hitchcock; BAE Urban Economics

Date: December 20, 2013

Re: Economic Development Inventory and Opportunities Analysis

Summary of Key Findings

Between 2010 and 2040, the EBOTS Area is projected to add 24,000 new jobs and 13,000 housing units, according to forecasts from Plan Bay Area, creating a significant need for transit improvements. The land use plans currently in place or in progress will allow for this overall level of growth. This growth will generate circulation impacts, and highlights the importance of commensurate transit improvements and expansion to sustainably accommodate these future changes.

Total development within the EBOTS Area will be determined by land use plans, and their interaction with real estate markets and government initiatives, even though Plan Bay Area forecasts differ in some respects compared to those plans. While the land use plans currently in place or in progress for the entire EBOTS Area will allow an overall level of growth similar to the forecasts in Plan Bay Area, the forecasts do not necessarily align with individual cities' land use plans. Some Plan Bay Area estimates show higher employment and population growth than what is zoned for in existing plans, while other estimates for growth are lower. Local land use plans as well as investment decisions by developers, tenants, and companies will determine how much development occurs in each city.

The EBOTS Area has significant diversity in its existing economic base, which is likely to create differences in the timing and location of future growth. Industrial real estate space users in advanced manufacturing and R&D are currently drawn to West Berkeley and Emeryville because of access to the existing skilled workforce and proximity to similar firms. West Oakland does not currently have the same level of interest from these firms, although it has a strong industrial warehousing base. Current market conditions in Emeryville and West Berkeley, with low vacancy rates and higher rents, have created a near-term market opportunity for West Oakland, however Emeryville and West Berkeley still have the ability to support a substantial amount of new development in the medium-term and beyond for these users. West Oakland, with its lower rents and inventory of available buildings, has the opportunity to compete for these firms, as well as attract those priced out of Emeryville and West Berkeley. This means that the timing and types of development in West Oakland may differ from what occurs in Emeryville and West Berkeley.

The EBOTS cities have distinct and specific goals for their portion of the EBOTS Area. The West Berkeley Specific Plan aims to preserve the city's industrial base and retain a diverse mix of manufacturing, retail, and service jobs. Emeryville's General Plan proposes to accommodate future growth sustainably, pairing transportation investments with increased housing and jobs. The West Oakland Specific Plan is an economic development initiative geared towards targeting employment growth into specific opportunity areas, with plans to utilize investments to attract new businesses to move into the area.

The EBOTS Area is capturing more population growth than the combination of Emeryville, Berkeley, or Oakland, although demographic patterns between the EBOTS area and the combined three cities vary considerably. Population increased faster in the EBOTS Area compared to the overall area of the three cities, although most of the growth occurred in Emeryville and West Oakland, while West Berkeley's population growth rate was much slower. Educational attainment and household income levels also varied considerably among the subareas. Emeryville and West Berkeley exhibit relatively high levels of educational attainment, translating into higher median household incomes, compared to lower levels in West Oakland.

Sectors expected to experience sustained growth include Professional, Scientific, and Technical Services and Other Services, and Clean Technology and Advanced Manufacturing. Currently, the Professional, Scientific, and Technical Services sector is currently the largest sector in the EBOTS Area (18 percent), with Manufacturing second (13 percent), and Leisure & Hospitality (12 percent) and Retail Trade (11 percent) just below it.

Economic development and workforce training are important priorities in West Oakland, while jobs rich areas like West Berkeley and Emeryville are concerned with the impact of job growth on congestion. In West Oakland, there is a mismatch between the jobs available and the types of industries in which resident workers are employed, which suggests opportunities for workforce training and further diversification of jobs. West Berkeley and Emeryville, which have high levels of in-commuting, face the need to accommodate the mobility needs of its existing job base and to cope with increases in congestion from new development.

The differences within the EBOTS Area in economic base, demographic characteristics, and planning objectives is likely to lead to differences in the types, timing, and amount of development, and a potential need for different types of transit improvements. This suggests a flexible and phased approach to planning for transit improvements to better match community planning goals and market activity and growth.

The following sections of this memorandum contains the detailed analysis, with tables and text, that support and expand on these key findings.

Purpose and Approach to the Analysis

This economic development inventory and opportunities analysis seeks to assess demographic and economic trends in the EBOTS Area (Emeryville, West Berkeley, and West Oakland), and their implication for future land use and development activity. The reason for conducting this type of analysis is to identify and assess key factors that shape how transit can generate economic development impacts, as well as how economic trends create the need for transit improvements to increase mobility.

The factors that determine the extent to which new transit improvements can generate economic development and new investment include: (a) public agency planning and implementation programs; (b) market conditions for development; (c) current demographic and employment patterns; (d) the quality of the transit service; and (e) the existing transit and pedestrian orientation of a place. This memorandum assesses the first three of these factors in detail; the other factors will be addressed by others or at a later point in the study.

The approach to the analysis included a review of relevant plans and reports; interviews with City staff from each of the EBOTS cities; review of publicly available real estate market data as well as proprietary data made available for the study; and a quantitative analysis of demographic and economic data from multiple sources. The specific methodologies and data sources used are outlined in the next section.

Methodology

This memorandum analyzes current conditions and opportunities within the EBOTS Area. Specific Plans and relevant economic studies are summarized to provide an overview of current planning and economic development efforts to inform consideration of transit alternatives. A particular focus of this memorandum is on the residents who live in the EBOTS Area and the types of jobs available. Market conditions for industrial, office, housing, and retail uses are presented to illustrate the strength of the market for different real estate types. Finally, the memo concludes with a summary of total projected growth potential and the opportunity areas for growth.

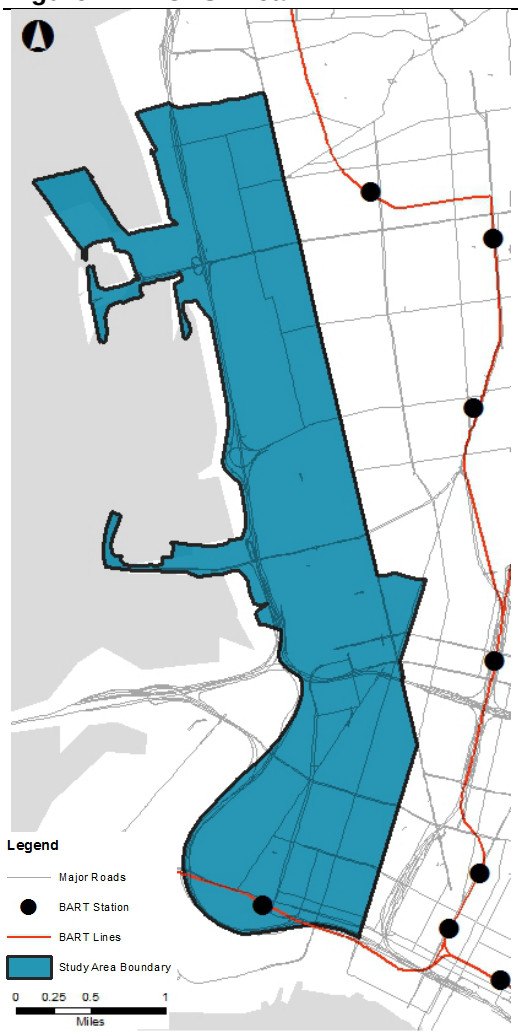
Demographic data for this analysis are drawn from the US Census and the Census Bureau's 2007-2011 American Community Survey (ACS). While the decennial Census describes a specific point in time, the American Community Survey estimates demographic conditions based on statistical sampling conducted continuously between 2007 and 2011. Employment data are derived from the Longitudinal Employer-Household Dynamics (LEHD) program, which is provided by the US Census Bureau. In order to protect the confidentiality of workers and employers, LEHD introduces a small amount of statistical "noise" for smaller geographic units. As a result, LEHD may not match data from other sources.

The real estate analysis provides an overview of market conditions for different product types to illustrate the strength of various markets. Data is presented on existing inventory, lease rates, and

occupancy levels for geographies that most closely resemble the EBOTS Area. Information was obtained from Cassidy Turley, a brokerage firm active in the area, private data vendors, and property listings.

Total build-out scenarios for each city were taken from the current Specific and General Plans. These build-out scenarios were compared to the Plan Bay Area Final Forecast of Jobs, Population, and Housing for the Transportation Analysis Zones (TAZs) that encompass the EBOTS Area to illustrate how the land use plans relate to forecasted growth between 2010 and 2035. Maps of opportunity areas showing the location of future areas of change are presented as a best available predictor of where change is likely to occur within the EBOTS Area.

Figure 1: EBOTS Area



Source: CDM Smith; BAE, 2013.

Current Plans and Programs

This section summarizes each city's plans and policies that will guide the area's development potential for the next 25 years. The analysis draws from the General and Specific Plans in place for West Berkeley and Emeryville, and the forthcoming West Oakland Specific Plan (WOSP). The maximum build-out scenarios are presented in a subsequent section to illustrate the development allowed under these existing land use plans, and these figures are compared to forecasts of future population and employment from Plan Bay Area. The purpose is to illustrate the extent of growth allowed within the EBOTS Area and set the stage for consideration of strategies and investments within each city.

West Berkeley

West Berkeley is the City's historic industrial district and is bounded by Albany to the north, Highway I-80 to the west, San Pablo Avenue to the east, and Emeryville to the south. Historically, West Berkeley was developed around a freight railroad, with factories that located around the transportation network. Since then, many of the heavy industrial uses have been converted to light industrial businesses, including biotechnology, R&D laboratories, and offices.

In 1993, Berkeley passed the West Berkeley Plan to preserve industrial jobs and channel new development into appropriate areas. One fundamental goal of the Plan is to maintain a mixed economy with a healthy mix of manufacturing, retail, and service sectors in order to provide a diverse economic base and provide jobs for all residents of different educational levels. The Plan established new zoning districts for West Berkeley and was projected to add a significant level of new jobs and light industrial development, with most occurring along Seventh Street between Ashby and Dwight. However, the pace of employment growth was significantly less than anticipated, so in 2007, the City began a process to amend the West Berkeley Plan to allow more flexibility in the zoning code. Zoning amendments were passed to add R&D as an allowable use and remove obstacles to the reuse of existing buildings. A concurrent effort (Measure T) to allow larger scale development on specific sites failed at the ballot.

According to the West Berkeley Project EIR, with the zoning amendments West Berkeley is expected to add 1,000,000 square feet of manufacturing and industrial space, 16,000 square feet of commercial space, and 1,651 new residential units by 2030.

In 2007, the City of Berkeley commissioned a study by Wilbur Smith and Associates (WSA) to model existing and future traffic conditions and to develop a comprehensive, long-range plan to guide the transportation improvements in West Berkeley. The West Berkeley Circulation Master Plan Report projected that congestion would continue to worsen in West Berkeley and recommended a series of improvements based on project readiness and funding potential. One of the options relevant to this project was to extend transit or shuttle service to connect North Berkeley BART to Ashby BART along Ashby, 7th, and Cedar Streets with weekday peak hour service on 20-minute headways. The estimated capital cost was $600,000, and although the project was deemed not ready, the Plan suggested the City work with AC Transit to explore service expansion in these areas.

Emeryville

Emeryville is bounded by West Berkeley to the north, Oakland to east and south, and the San Francisco Bay to the west. Like West Berkeley, Emeryville started as an industrial city around a railroad hub. In the last 20 years, the City has embraced the redevelopment of former industrial sites to accommodate office, R&D, retail, and residential development, and has transformed into an employment center with a mix of uses and high-density housing. With twice as many jobs (20,000) as residents (10,000), Emeryville, as of 2011, had among the highest ratio of jobs per employed resident compared to other Bay Area cities.

In 2009, Emeryville adopted a new General Plan to guide the City's future growth. According to the General, Plan, the City is almost built out, with only 40 acres considered vacant land. Almost all new development is expected to occur on infill or other underutilized sites, with non-residential intensities increasing and approved residential projects averaging over 60 units per acre.

According to the City's General Plan, by 2030 the city expects to experience a net gain of 2,000,000 square feet in office, 300,000 square feet of hotel, 640,000 square feet of retail and 3,767 residential units, while shedding a net 800,000 square feet of industrial square feet.

As the city plans for 10,000 new jobs and over 4,000 new residents, Emeryville has identified mobility as an important priority. The Fiscal Year 2012-2013 and 2013-14 Economic Development Strategy Implementation Plan cites improving mobility for employees and residents as a key strategic goal because a financially stable transit operation is necessary to accommodate a sustainable future. The business-funded free Emery-Go-Round shuttle service is reaching capacity, and the system is facing rising ridership demands and seeking additional financial support. With development of large parcels occurring outside of the existing Emery-Go-Round routes, the City is looking to pair strategic transit investments with future projects.

West Oakland

West Oakland is bounded by freeways on all sides, with I-880 to the north and west, I-580 to the east, and I-980 to the south. West Oakland borders the fifth largest U.S. port by volume and provides commercial linkages to national rail lines and international waterways. According to the WOSP, almost 60 percent of West Oakland is devoted to residential uses, and roughly one quarter to industrial, commercial or transportation uses. Prior to the dissolution of redevelopment, most of West Oakland fell within the West Oakland Redevelopment Project Area.

The WOSP mirrors the former redevelopment area, and is an economic development initiative to provide a comprehensive set of strategies to facilitate the development of select vacant and underutilized properties. With the exception of the West Oakland BART Station, the Plan focuses primarily on commercial and industrial sites, and calls for a preservation strategy for most existing residential neighborhoods. For the commercial areas, the Plan recommends transportation and infrastructure improvements, and implementation strategies to develop key opportunity sites. The

Plan is aimed at attracting developers, and encourages targeted economic development to boost commercial and industrial jobs to benefit the residents of West Oakland.

By 2035, the Specific Plan predicts a net increase of four million square feet of non-residential uses, approximately 15,000 new jobs, 5,000 new housing units, and over 11,000 new residents as a result of these land use changes. Virtually three-quarters of the area's new employment (10,000 jobs) is expected to come from five million square feet of campus or headquarters buildings for advanced manufacturing companies and other "new economy" ventures within the Mandela Parkway and West Grand Avenue areas. Specific prospective growth sectors include life sciences/biotechnology, clean/green technology, urban manufacturing, construction and information/digital media.[1]

The WOSP also calls for transportation infrastructure investments to support the future projected employment growth. Because the plan anticipates a significant increase in jobs, a phased transportation approach envisions starting with a shuttle service or enhanced AC transit bus service between the West Oakland BART station and new employment centers, with direct connections to retail opportunities at the Oakland/Emeryville border, downtown Oakland BART stations, and Jack London Square. City staff also wants to consider how West Oakland can leverage its assets within the regional Emeryville-Berkeley-Oakland economy to attract light industrial, R&D, and manufacturing businesses to locate in West Oakland.

[1] Based on a report by Hausrath Economics Group, *Market Assessment of Potentials for Business Mix/Light Industrial Uses, West Oakland Specific Plan,* December 2011.

Demographic Analysis

This section analyzes recent demographic data to profile the residents living in the EBOTS Area. The EBOTS Area is compared to a larger market area defined as the combined cities of Berkeley, Emeryville, and Oakland (Three Cities). To illustrate local trends, data is presented for three smaller subregions, which include West Berkeley, Emeryville, and West Oakland.

Population and Household Growth

In 2010, the EBOTS Area contained 35,191 residents living in 15,325 households. Between 2000 and 2010, population in the EBOTS Area grew more rapidly than the Three Cities, increasing by 18.1 percent or 5,405 residents, outpacing the combined cities' growth rate of 0.8 percent.

Among the subareas, Emeryville experienced the fastest rate of population growth, fueled by rapid housing construction in the last decade. Emeryville's population rose by 46.5 percent to 10,080 residents, and West Oakland's population increased by 11.7 percent to 17,876. West Berkeley's population, which was similar to Emeryville's in 2000, increased at a slower rate of 4.8 percent to 7,235 residents. Still, population growth in each subarea exceeded the Three Cities' growth rate.

Table 1: Population and Household Trends, 2000-2010

Population	2000	2010	% Change 2000-2010
West Berkeley	6,902	7,235	4.8%
Emeryville	6,882	10,080	46.5%
West Oakland	16,002	17,876	11.7%
EBOTS Area	29,786	35,191	18.1%
Three Cities (a)	509,109	513,384	0.8%
Households			
West Berkeley	2,797	2,858	2.2%
Emeryville	3,975	5,694	43.2%
West Oakland	5,551	6,773	22.0%
EBOTS Area	12,323	15,325	24.4%
Three Cities (a)	199,720	205,514	2.9%
Average Household Size			
West Berkeley	2.43	2.40	-1.2%
Emeryville	1.71	1.76	2.5%
West Oakland	2.79	2.54	-8.8%
EBOTS Area	2.36	2.22	-5.8%
Three Cities (a)	2.48	2.40	-3.5%

Note:
(a) The Three Cities include Berkeley, Emeryville, and Oakland.
Sources: US Census, 2000, 2010; BAE, 2013.

Between 2000 and 2010, the number of households in the EBOTS Area expanded by 24.4 percent, faster than the rate of the Three Cities (2.9 percent). Of the total households added, Emeryville accommodated most of the household growth (57 percent), followed by West Oakland (41 percent), and West Berkeley (2 percent).

The faster rate of household formation compared to population was driven by rising population coupled with declining household sizes, which fell from 2.36 to 2.22 between 2000 and 2010. All geographies experienced a decline in the average household size except for Emeryville, where the average household size increased slightly to 1.76 persons per household. This was still smaller than the average household size in West Berkeley (2.40) and West Oakland (2.54).

Household Composition and Tenure

The EBOTS Area has a high proportion of non-family households compared to the Three Cities. Non-family households accounted for 55 percent of all households in 2010, compared to 49 percent in the Three Cities.

Within the component geographies, family households make up the majority of households in West Berkeley and West Oakland, while in Emeryville, non-family households were the norm. Family households accounted for 61 percent in West Berkeley, and 63 percent of West Oakland households. The reverse was true in Emeryville, where the share of non-family households was 68 percent. In particular, single-person households dominated the majority of households in Emeryville with over 50 percent.

Table 2: Household Composition, 2010

Household Type	West Berkeley	Emeryville	West Oakland	EBOTS Area	Three Cities (a)
Non-Family Households	**48.9%**	**67.8%**	**47.0%**	**55.1%**	**49.2%**
Single Person	32.8%	50.4%	33.6%	39.7%	35.0%
2+ Persons	16.1%	17.4%	13.4%	15.4%	14.3%
Family Households	**51.1%**	**32.2%**	**53.0%**	**44.9%**	**50.8%**
Married Couple	29.6%	21.8%	20.8%	22.8%	31.9%
Other Family	21.5%	10.4%	32.2%	22.1%	18.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Households with Children Under 18	**29.1%**	**12.2%**	**32.8%**	**24.5%**	**26.2%**

Note:
(a) The Three Cities include Berkeley, Emeryville, and Oakland.
Sources: US Census, 2010; BAE, 2013.

Not only do West Berkeley and West Oakland have a higher share of family households, there are also more households with children. Over 29 percent of West Berkeley households and 33 percent of West Oakland households have children, compared to only 12 percent in Emeryville.

Educational Attainment

While the overall educational attainment of the EBOTS Area is comparable to the Three Cities, Emeryville and West Berkeley's educational attainment levels are significantly higher than West Oakland's. In Emeryville, nearly 75 percent of residents over the age of 25 held an AA degree or higher, and this figure was nearly 55 percent in West Berkeley. Higher levels of educational

attainment are an important factor in retaining existing businesses and attracting employers to an area. West Oakland diverges from trends in Emeryville and West Berkeley. Over 22 percent of West Oakland residents did not graduate from high school, and a relatively lower proportion of 29 percent earned an AA degree or higher. This translates into higher rates of population living in poverty and more residents with occupations associated with lower wages.

Table 3: Educational Attainment

Educational Attainment (a)	West Berkeley	Emeryville	West Oakland	EBOTS Area	Three Cities (b)
Less than 9th Grade	8.3%	0.2%	9.7%	6.2%	9.6%
9th to 12th Grade, No Diploma	6.5%	3.6%	13.1%	8.6%	7.5%
High School Graduate (incl. Equivalency)	14.2%	8.4%	20.5%	15.2%	15.9%
Some College, No Degree	16.5%	13.1%	28.0%	20.7%	17.4%
Associate Degree	5.4%	2.7%	9.2%	6.2%	5.2%
Bachelor's Degree	26.8%	35.3%	16.1%	24.7%	23.5%
Graduate/Professional Degree	22.3%	36.7%	3.4%	18.4%	20.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Population 25+ with Bachelor's Degree or Higher	**49.1%**	**72.0%**	**19.5%**	**43.1%**	**44.4%**

Note:
(a) The American Community Survey (ACS) publishes demographic estimates based on statistical sampling conducted continuously between 2007 and 2011.
(b) The Three Cities include Berkeley, Emeryville, and Oakland.
Sources: ACS, 2007-2011; BAE, 2013.

Household Income

Household incomes are correlated with educational attainment levels. Emeryville's median household income was the highest at $68,173, while the median income in West Berkeley ($46,061) and West Oakland ($30,354) were lower compared to the Three Cities ($53,531). Looking at income distributions, a high proportion (43 percent) of West Oakland households and earned below $25,000 per year. A similar pattern was observed in West Berkeley, where nearly 32 percent of households earned below $25,000 per year.

Table 4: Household Income

Income Category (a)	West Berkeley	Emeryville	West Oakland	EBOTS Area	Three Cities (b)
Less than $15,000	13.6%	6.1%	16.5%	12.2%	8.3%
$15,000-$24,999	18.1%	16.9%	26.5%	21.5%	18.4%
$25,000-$34,999	6.2%	5.0%	12.4%	8.6%	9.2%
$35,000-$49,999	15.0%	9.5%	12.8%	12.0%	11.6%
$50,000-$74,999	11.4%	17.4%	13.1%	14.4%	15.5%
$75,000-$99,999	14.3%	13.4%	8.2%	11.2%	10.8%
$100,000-$149,999	12.8%	16.0%	7.9%	11.7%	12.5%
$150,000-$199,999	6.7%	5.3%	1.9%	4.0%	5.9%
$200,000 or more	2.0%	10.4%	0.6%	4.5%	7.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Median HH Income (c)	**$46,061**	**$68,173**	**$30,354**	**$44,407**	**$53,581**

Notes:
(a) The American Community Survey (ACS) publishes demographic estimates based on statistical sampling conducted continously between 2007 and 2011.
(b) The Three Cities include Berkeley, Emeryville, and Oakland.
(c) All incomes adjusted to 2011 dollars.
Sources: ACS, 2007-2011; BAE, 2013.

Resident Employment by Occupation and Industry

The occupational profiles of residents in West Berkeley and Emeryville are similar, while West Oakland residents exhibited greater diversity in occupations. Management, professional and related jobs accounted for the majority of residents' occupations in West Berkeley (51 percent) and Emeryville (70 percent), followed by sales and office jobs. In total, these two occupational types comprised 70 to 90 percent of all occupations for residents living in West Berkeley and Emeryville, respectively. In contrast, West Oakland residents held a greater diversity of jobs, exhibiting an equal split among management (28 percent), service (28 percent), and sales jobs (27 percent).

Table 5: Occupation and Industry, Civilian Employed Population Age 16+

Occupation (a)	**West Berkeley**	**Emeryville**	**West Oakland**	**EBOTS Area**	**Three Cities** (b)
Management, Professional & Related	51.1%	69.7%	27.8%	48.2%	47.5%
Service	13.4%	6.1%	28.0%	16.9%	17.1%
Sales & Office	22.0%	19.0%	26.5%	22.8%	20.4%
Construction, Natural Resources & Maintenance	9.0%	3.0%	7.1%	5.9%	7.0%
Production, Transport. & Material Moving	4.6%	2.2%	10.6%	6.3%	8.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Industry (b)					
Agriculture, Forestry, Fishing/Hunting & Mining	0.6%	0.0%	0.6%	0.4%	0.3%
Construction	6.9%	2.2%	5.4%	4.5%	5.9%
Manufacturing	5.6%	7.4%	4.9%	6.0%	6.1%
Wholesale Trade	3.8%	2.7%	2.4%	2.8%	2.2%
Retail Trade	7.1%	11.3%	9.1%	9.5%	8.9%
Transportation, Warehousing & Utilities	3.9%	2.9%	9.3%	5.8%	4.5%
Information	3.5%	3.7%	3.5%	3.6%	3.6%
Finance, Insurance, Real Estate & Rental/Leasing	4.5%	8.3%	4.8%	6.1%	5.7%
Professional, Scientific, Management & Administrative	18.6%	19.5%	11.3%	15.8%	16.1%
Educational, Health & Social Services	29.1%	26.6%	20.8%	24.7%	27.4%
Leisure and Hospitality	9.2%	9.6%	12.1%	10.6%	9.7%
Other Services (Except Public Administration)	6.1%	3.1%	10.9%	7.0%	5.6%
Public Administration	1.3%	2.7%	4.8%	3.3%	4.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Note:
(a) The American Communities Survey (ACS) publishes demographic estimates based on statistical sampling conducted continuously between 2007 and 2011.
(b) The Three Cities include Berkeley, Emeryville, and Oakland.
Sources: ACS, 2007-2011; BAE, 2013.

Looking at employment by industry sector, residents in the three geographies worked in similar industries, primarily Education and Health, Professional, Scientific, Management & Administration, Leisure and Hospitality, and Retail Trade. Unfortunately, ACS data does not distinguish between jobs in Professional & Scientific fields from Management & Administration, which tend to have different wage and educational attainment characteristics. In West Berkeley, residents were mostly employed in Education and Health, Professional, Scientific, Management and Administration, and Leisure and Hospitality. Emeryville residents mostly worked in Education and Health, Professional, Scientific, Management and Administration, and Retail Trade. West Oakland residents were mainly employed in Education and Health, Leisure and Hospitality, and Professional, Scientific, Management, and Administration.

Employment Analysis

This section presents information on jobs within the EBOTS Area, and shows the types of jobs available, their physical location, and industries that are expanding or shrinking. The section starts with a summary of regional economic opportunities and trends taken from a regional assessment conducted by the Bay Area Council. After presenting data on jobs available within the EBOTS Area, the analysis focuses on the subareas and shows the major sectors and types of jobs available by wages and educational attainment. This section concludes with data on employment flows to highlight the relationship between jobs and transportation.

Regional Employment Trends

In October 2012, the Bay Area Council issued a report "The Bay Area, a Regional Economic Assessment" that presented trends and opportunities in the regional economy. Some of the major findings from the report include:

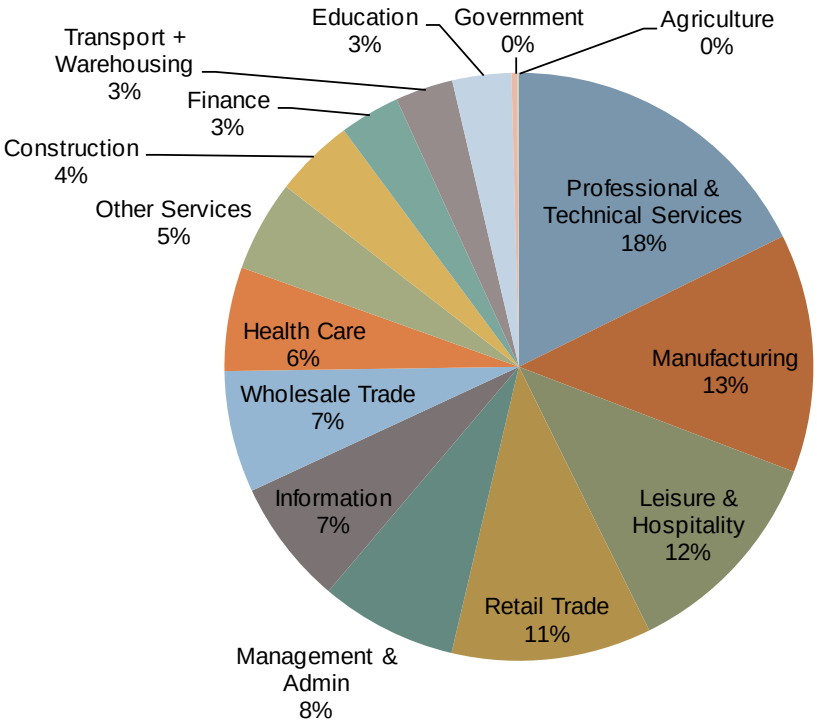
- The Bay Area economy is one of the most prosperous and productive regions in the country, with higher median household incomes compared to the state and country.
- Industry is heavily concentrated in sectors that require a highly-skilled labor force. The region's most concentrated sectors are Professional, Scientific, and Technical Services (PSTS) and Information, followed by Other Services.[2] PSTS and Information are strong sectors because the Bay Area benefits from access to a highly-educated workforce. Other Services, which includes in-home workers, is also robust, reflecting the region's prosperity.
- Within the East Bay, Other Services and PSTS have the highest employment concentrations.
- Transportation, warehousing and wholesale trade do not exhibit high concentrations within the Bay Area, even within subregions with goods movement hubs like the East Bay. These industries have been in decline in the last decade, possibly due to relocation to lower cost areas outside of the region.
- The green economy is an emerging sector with potential to add jobs to the regional economy. According to a July 2011 study by the Brookings Institution, "Sizing the Clean Economy: A National and Regional Green Jobs Assessment," the Bay Area is home to two metropolitan areas in the top ten for clean tech employment, with the San Francisco-Oakland-Fremont metro ranking number one with 13,917 clean jobs in 2010[3]. The Bay Area has also been attracting a rising share of venture capital investment in this sector.
- The region is home to pockets of concentrated low- and moderate-income (LMI) workers. The four industry sectors that provide the most jobs to LMI workers include retail trade, health care, accommodation and food services, and manufacturing.

[2] Job concentration is measured by location quotient, which compares the share of employment in Bay Area industries to the share of employment by industry in the United States as a whole.
[3] Clean or green jobs for this discussion are jobs in clean industries, such as Energy and Resource Efficiency; Greenhouse Gas Reduction and Environmental Management; Renewable Energy; Natural and Resource Conservation, etc.

Employment in the EBOTS Area

In 2011, the four largest industry sectors in the EBOTS Area were Professional and Technical Services (17.7 percent), Manufacturing (13.1 percent), Leisure & Hospitality (11.9 percent), and Retail Trade (11.0 percent). Together, these industries accounted for 53.7 percent of jobs in the EBOTS Area.

Figure 2: Employment by Industry Sector, EBOTS Area, 2011



Source: LEHD OnTheMap, 2011; BAE, 2013.

Between 2007 and 2011, the total number of jobs declined in the EBOTS Area from approximately 46,000 in 2007 to 41,000 jobs in 2011. The sectors that experienced the largest percentage declines were Financial Activities (-38 percent), Construction (-22 percent), Manufacturing (-20 percent), and Professional and Technical Services (-18 percent). Education and Health Care and Leisure and Hospitality were some of the few sectors that experienced moderate employment growth. Most of these losses were attributable to overall job decline due to the Great Recession. Looking forward, it is anticipated that these sectors will experience employment gains in the near future.

Table 6: Annual Employment by Industry, EBOTS Area, 2007-2011

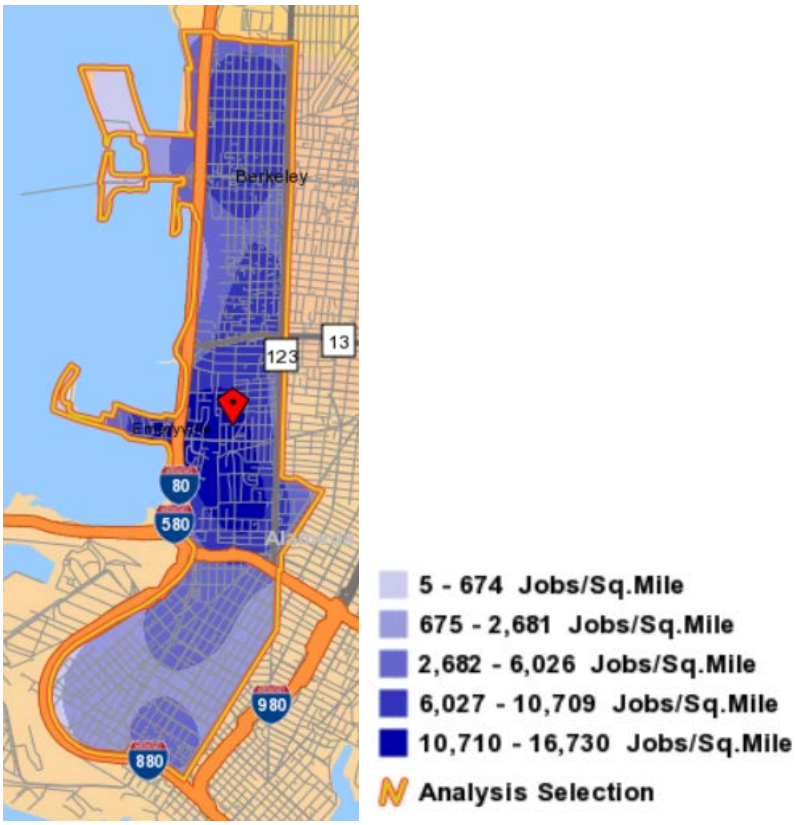
	EBOTS AREA					
	2007		2011		Change	
Industry (a)	#	%	#	%	#	%
Agriculture and Mining	16	0.0%	36	0.1%	20	125.0%
Construction	2,281	5.0%	1,789	4.4%	-492	-21.6%
Manufacturing	6,730	14.6%	5,372	13.1%	-1,358	-20.2%
Wholesale Trade	2,658	5.8%	2,737	6.7%	79	3.0%
Retail Trade	5,331	11.6%	4,492	11.0%	-839	-15.7%
Transport, Warehouse & Utilities	1,380	3.0%	1,300	3.2%	-80	-5.8%
Information	3,061	6.7%	2,818	6.9%	-243	-7.9%
Financial Activities	2,181	4.7%	1,357	3.3%	-824	-37.8%
Professional & Technical Services	8,788	19.1%	7,234	17.7%	-1,554	-17.7%
Management & Administration	3,642	7.9%	3,072	7.5%	-570	-15.7%
Education	1,192	2.6%	1,323	3.2%	131	11.0%
Health Care	2,077	4.5%	2,337	5.7%	260	12.5%
Leisure & Hospitality	4,579	10.0%	4,864	11.9%	285	6.2%
Other Services	1,965	4.3%	2,052	5.0%	87	4.4%
Government	60	0.1%	130	0.3%	70	116.7%
Total	**45,941**	**100.0%**	**40,913**	**100.0%**	**-5,028**	**-10.9%**

Sources: LEHD OnTheMap, 2007, 2011; BAE, 2013.

Employment in Subareas within the EBOTS Area

The figure below shows the distribution of jobs within the EBOTS Area and demonstrates high job density in parts of Emeryville, relatively high job density in West Berkeley, and lower intensities in the northern parts of West Oakland. In 2011, Emeryville contained the most jobs at 18,200, followed by West Berkeley at 16,500 and West Oakland with 6,200 jobs.

Figure 3: Location of Jobs, EBOTS Area, 2011



Sources: LEHD, OnTheMap, 2011; BAE, 2013.

The composition of jobs by industry sector varies considerably in each subarea. In West Berkeley, the largest industries were Manufacturing (19 percent of total jobs), Leisure & Hospitality (16 percent), and Professional, Scientific, and Technical Services (14 percent). Emeryville's supported the most jobs in Professional, Scientific, and Technical Services (26 percent), Information (12 percent), and Retail (10 percent). In West Oakland, the largest sectors were Wholesale Trade (16 percent), Transportation Warehousing (16 percent), and Other Services (13 percent).

The employment data suggests that the EBOTS Area consists of distinct submarkets. For example, West Oakland supports a high percentage of jobs in Wholesale Trade and Transportation and Warehousing, reflecting its proximity to the Port of Oakland. In addition, Professional, Scientific, and Technical Services jobs have a major presence in West Berkeley and Emeryville, which highlights the agglomerations that have formed in these areas, including due to the presence of UC Berkeley and

emergence of high tech and biotech firms. Manufacturing plays a major role in West Berkeley (19 percent) and West Oakland (12 percent). Looking at the EBOTS Area as an economic region, there may be opportunities for West Oakland to capture a larger share of the region's manufacturing sector, especially among companies that have outgrown their space and are looking to expand.

Table 7: Annual Employment by Industry, EBOTS Area, 2011

Industry (a)	West Berkeley #	West Berkeley %	Emeryville #	Emeryville %	West Oakland #	West Oakland %
Agriculture and Mining	3	0.0%	20	0.1%	13	0.2%
Construction	782	4.7%	426	2.3%	576	9.3%
Manufacturing	3,168	**19.2%**	1,468	8.1%	734	11.9%
Wholesale Trade	1,043	6.3%	643	3.5%	995	**16.1%**
Retail Trade	1,827	11.1%	1,786	9.8%	742	12.0%
Transport, Warehouse & Utilities	103	0.6%	244	1.3%	978	**15.8%**
Information	570	3.5%	2,176	**12.0%**	8	0.1%
Financial Activities	387	2.3%	895	4.9%	82	1.3%
Professional & Technical Services	2,358	**14.3%**	4,765	**26.2%**	207	3.4%
Management & Administration	973	5.9%	1,783	9.8%	322	5.2%
Education	499	3.0%	676	3.7%	144	2.3%
Health Care	1,448	8.8%	492	2.7%	419	6.8%
Leisure & Hospitality	2,659	**16.1%**	2,224	**12.2%**	184	3.0%
Other Services	665	4.0%	463	2.5%	772	**12.5%**
Government	28	0.2%	104	0.6%	3	0.0%
Total	**16,513**	**100.0%**	**18,165**	**100.0%**	**6,179**	**100.0%**

Sources: LEHD OnTheMap, 2007, 2011; BAE, 2013.

Jobs per Employed Resident

The table below shows the number of jobs available compared to the number of working residents. This ratio is an indicator of whether there are sufficient local jobs within an area to accommodate all the residents who live in an area and want to work. If the ratio is 1.0 or greater, this means the area is "jobs rich", and there is theoretically a job for each working resident, creating a sufficient job base to employ residents locally. Although the ratio does not account for an exact match between the skill set of the resident workforce and the jobs in a particular place, it helps to illustrate whether an area has a sufficient level of jobs.

West Berkeley and Emeryville are "jobs rich", with a high level of jobs per working resident compared to West Oakland, which is relatively "jobs poor". In West Berkeley, there are approximately 4.9 jobs per working resident, and 2.9 jobs per working resident in Emeryville, which leads to a high level of in-commuting into these job centers. In West Oakland, there are 0.9 jobs per working resident, fewer jobs than employed residents.

Table 8: Jobs per Employed Resident

	West Berkeley	Emeryville	West Oakland	EBOTS Area	Three Cities (c)
Jobs (a)	16,513	18,165	6,179	40,913	267,218
Employed Residents (b)	3,353	6,272	7,063	16,688	241,771
Ratio of Jobs to Employed Residents	**4.92**	**2.90**	**0.87**	**2.5**	**1.1**

Notes:
(a) Total jobs was derived from LEHD OnTheMap for 2011.
(b) Total employed residents data is taken from the American Community Survey (ACS) 5-year estimates from 2007-2011 and includes the civilian employed population over the age of 16.
(c) The Three Cities include Berkeley, Emeryville, and Oakland.
Sources: LEHD OnTheMap, 2011; ACS 2007-2011; BAE, 2013.

Unemployment Rate

While the jobs per working resident ratio shows whether there is a sufficient balance of jobs compared to working residents, it excludes those in the labor force who want to work but are unemployed. According to the California Employment Development Department (EDD), the unemployment rate in July 2013 varied across the cities and was lowest in the City of Emeryville (5.6 percent), followed by Berkeley (7.4 percent), and Oakland (11.9 percent).

Because EDD doesn't provide unemployment data below the place level, ACS 5-year estimates were used to determine the unemployment rate within the EBOTS Area. The table below shows that the EBOTS Area had an unemployment rate of 11.3 percent. West Oakland's unemployment rate was highest at 17.4 percent, followed by West Berkeley at 10.2 percent, and Emeryville at 4.0 percent. In absolute terms, this translated into 1,486 residents in West Oakland who were unemployed, compared to 380 in West Berkeley, and 262 in Emeryville.

Table 9: Resident Employment

	Resident Workers (a)			Unemployment
Geography	In Labor Force	Employed	Unemployed	Rate
West Berkeley	3,733	3,353	380	10.2%
Emeryville	6,534	6,272	262	4.0%
West Oakland	8,549	7,063	1,486	17.4%
EBOTS Area	18,816	16,688	2,128	11.3%
City of Berkeley	57,319	53,222	4,097	7.1%
City of Emeryville	6,534	6,272	262	4.0%
City of Oakland	204,670	182,277	22,393	10.9%

Notes:
(a) The American Community Survey (ACS) publishes demographic estimates based on statistical sampling conducted continously between 2007 and 2011.
Sources: ACS, 2007-2011; BAE, 2013.

Factoring in unemployment figures, West Oakland has fewer employment opportunities than residents in the labor force, while West Berkeley and Emeryville are still jobs rich, even after accounting for unemployment. In West Oakland, there were only 0.72 jobs per residents in the labor force compared to 4.42 in West Berkeley and 2.78 in Emeryville. This implies that strategies to boost the overall employment are important for West Oakland.

Table 10: Jobs per Resident in the Labor Force

	West Berkeley	Emeryville	West Oakland	EBOTS Area	Three Cities (c)
Jobs (a)	16,513	18,165	6,179	40,913	267,218
Labor Force (b)	3,733	6,534	8,549	18,816	268,523
Ratio of Jobs to Employed Residents	**4.42**	**2.78**	**0.72**	**2.2**	**1.0**

Note:
(a) Total jobs was derived from LEHD OnTheMap for 2011.
(b) Consists of total employed and unemployed residents. Data is taken from the American Community Survey (ACS) 5-year estimates from 2007-2011 and includes the civilian employed population over the age of 16.
(c) The Three Cities include Berkeley, Emeryville, and Oakland.
Sources: LEHD OnTheMap, 2011; ACS 2007-2011; BAE, 2013.

West Oakland: Opportunities in Workforce Training and Diversifying Job Sectors

Comparing the industries in which residents are employed to jobs suggests a mismatch between the jobs available and the skills of workers, particularly in West Oakland. The table below shows that in West Oakland, the largest sectors are Wholesale Trade, Transportation and Warehousing, and Other Services. In contrast, working residents are mostly employed in Education and Health Care, Leisure and Hospitality, and Professional, Management, and Administration.

West Oakland residents aren't working in the sectors that are concentrated in the area, which may be attributable to a skills mismatch or a lack of job diversity or other factors. In combination with a high unemployment rate of 17.4 percent, there may be opportunities to expand the types of industries available, or to provide workforce training to align workers' skills better with the jobs in the area. One example of a successful workforce training partnership is the Biotech Partners program, run by Bayer, a biotechnology firm located in West Berkeley. Students from populations underrepresented in the sciences are introduced to a biotechnology curriculum, including job training and internships that lead to careers in biotechnology and opportunities to higher education. Each year, 110 to 125 students are taken from Berkeley High and Oakland Technical High School, and the program has funded 343 paid internships between 1992 and 2011. Of the 142 students who graduated from the program, 92 were hired into biotech jobs, including 48 by Bayer.

Table 11: Working Residents' Jobs by Industry Compared to Jobs Available, 2011

Industry (a)	West Berkeley		Emeryville		West Oakland	
	Jobs (a)	Residents (b)	Jobs (a)	Residents (b)	Jobs (a)	Residents (b)
Agriculture and Mining	0.0%	0.6%	0.1%	0.0%	0.2%	0.6%
Construction	4.7%	6.9%	2.3%	2.2%	9.3%	5.4%
Manufacturing	**19.2%**	5.6%	8.1%	7.4%	11.9%	4.9%
Wholesale Trade	6.3%	3.8%	3.5%	2.7%	**16.1%**	2.4%
Retail Trade	11.1%	7.1%	9.8%	**11.3%**	12.0%	9.1%
Transport, Warehouse & Utilities	0.6%	3.9%	1.3%	2.9%	**15.8%**	9.3%
Information	3.5%	3.5%	**12.0%**	3.7%	0.1%	3.5%
Financial Activities	2.3%	4.5%	4.9%	8.3%	1.3%	4.8%
Professional, Management, Admin	**20.2%**	**18.6%**	**36.0%**	**19.5%**	8.6%	**11.3%**
Education and Health Care	11.8%	**29.1%**	6.4%	**26.6%**	9.1%	**20.8%**
Leisure & Hospitality	**16.1%**	**9.2%**	**12.2%**	9.6%	3.0%	**12.1%**
Other Services	4.0%	6.1%	2.5%	3.1%	**12.5%**	10.9%
Government	0.2%	1.3%	0.6%	2.7%	0.0%	4.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Total Jobs	16,513		18,165		6,179	
Total Working Residents	3,353		6,272		7,063	
Ratio of Jobs to Working Residents	**4.92**		**2.90**		**0.87**	

Notes:
(a) Total jobs data from LEHD OnTheMap for 2011.
(b) Total employed residents data is taken from the American Community Survey (ACS) 5-year estimates from 2007-2011 and includes the civilian employed population over the age of 16.
Sources: LEHD OnTheMap, 2011; ACS, 2007-2011; BAE, 2013.

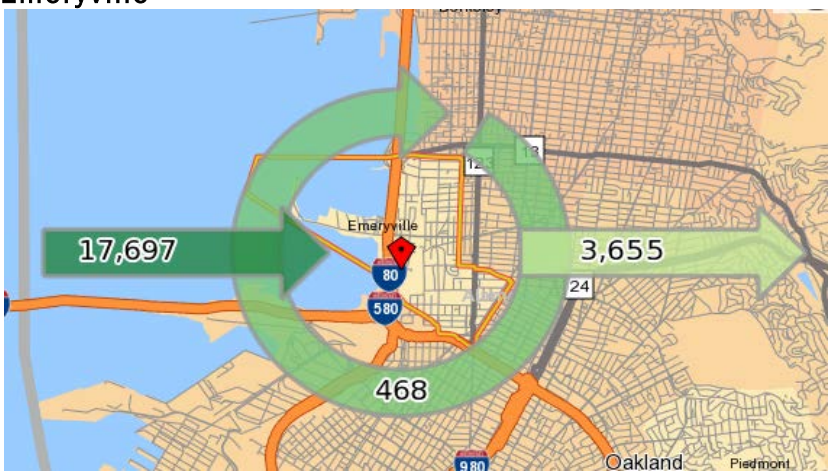
West Berkeley and Emeryville: Jobs and Mobility

West Berkeley and Emeryville both have high concentrations of jobs compared to the residential labor force, which leads to a significant level of in-commuting. The figure below shows commute flows for each of the subareas, and large commuter inflows into West Berkeley and Emeryville, and somewhat similar levels of inflows and outflows in West Oakland.

Figure 4: Commute Flows, 2011

West Berkeley

Emeryville



Note: Overlay arrows do not indicate directionality of worker flow between home and employment locations.

- Employed and Live in Selection Area
- Employed in Selection Area, Live Outside
- Live in Selection Area, Employed Outside

Sources: LEHD, OnTheMap, 2011; BAE, 2013.

The high level of in-commuting into West Berkeley and Emeryville reflects their jobs-rich character, and highlights the importance of mobility especially for workers. On average in 2011, 16,130 workers commuted into West Berkeley daily, while a much smaller number, about 2,200 residents, commuted out for work. Emeryville exhibited a similar pattern, with almost 17,700 workers commuting into the City and about 3,700 residents commuting out daily. In contrast, West Oakland had a more balanced level of inflows and outflows, with over 5,800 commuters coming into the area and 6,620 commuting out for work.

The Emeryville Transportation Management Association's Emery Go-Round is a shuttle system that links major employment centers, retail destinations, and residential areas to the MacArthur BART station. The Emery Go-Round is a free shuttle with 15 minute headways on weekdays and 20 minute headways on weekends. According to its 2012 Annual Report, annual ridership increased by 15 percent between 2011 and 2012 to over 1.5 million passenger trips. Since the shuttle began operations in 1995, the system has increased ridership by serving a wide range of users and being` known for its dependability. Based on a survey conducted in 2011, 57 percent of riders took the Emery Go-Round to work, while 12 percent used the shuttle for shopping, 4 percent for hotel/events, and the rest for other purposes. In addition, 51 percent of surveyed riders said they rode the shuttle daily, while another 38 percent claimed they took the shuttle at least one to four times per week. Reliability was also a key asset; 94 percent of riders rated the system as either reliable or very reliable.

Given the shuttle's success, one of the long-term challenges for the system is that as the economy grows, demand for the service is expected to climb, and the City must find ways to meet this rising demand with limited resources. The shuttle is funded by a property-based business improvement district (PBID), where all commercial, industrial, and residential property owners in the City are assessed a fee to pay for the service. The current PBID comes up for renewal in 2016, and securing a long-term funding source for the Emery Go-Round is vital in order to sustain long-term mobility for all users of the system. The Emery Go-Round is also seeking additional sources of funding beyond the PBID in order to sustain future service.

The West Berkeley Shuttle runs from Ashby BART to major employers in West Berkeley, but unlike the Emery Go-Round, has low ridership and competes with other public transit routes. The shuttle is intended to provide a last-mile connection to major employers and serves destinations including Bayer and Wareham Development. Headways are 30 minutes during peak commute hours on weekdays only. Unlike the Emery Go-Round's more extensive routes, the West Berkeley shuttle only goes as far north as Dwight and 7th Street, and does not connect to the Fourth Street shopping district or retail on Gilman Street. Funding is provided by assessments collected by the Berkeley Gateway Transportation Management Association (BGTMA), mostly from major biotech employers. According to the West Berkeley Circulation Master Plan Report published in 2009, among the transit services available in West Berkeley, which include AC Transit, the West Berkeley Shuttle, and the Capitol Corridor commuter rail, average daily ridership on the West Berkeley Shuttle was only 100 riders, compared to 140 riders for the Capitol Corridor, and over 3,700 riders for AC Transit.

One of the challenges facing the West Berkeley shuttle is to consider whether to expand the service beyond the current operations serving major employers, to a system that provides access to a more diverse base, including retail and residential uses in West Berkeley. This would require an expansion of its assessment district and the route, perhaps with connections to other BART stations, which may impact existing AC Transit bus operations. The daily commute inflows in West Berkeley suggest that there are a sufficient number of commuter inflows to justify a more robust system, assuming funding can be secured for operations.

Real Estate Market Analysis

The real estate analysis provides an overview of conditions for different product types to illustrate the strength of various markets. Data is presented on inventory, lease rates, and occupancy levels for geographies that most closely resemble the EBOTS Area. This analysis includes a summary of trends in manufacturing, research and development (R&D), warehousing, office, retail, and housing.

Manufacturing

The East Bay manufacturing real estate market, which stretches along I-80 and I-880 from Richmond to Fremont, contains over 88 million square feet of inventory. According to Cassidy Turley, Berkeley and Emeryville accounted for a small fraction of the East Bay's regional manufacturing space, while Oakland contained a larger inventory. In the Third Quarter of 2013 (Q3 2013), Berkeley's 4.6 million square feet of manufacturing space translated into a 5 percent market share, which was higher than Emeryville, which had 1.2 million square feet or 1 percent of the entire market. In contrast, Oakland's share of the manufacturing space market was 29 percent, or 25.2 million square feet.

The East Bay manufacturing sector has posted strong growth in 2013, buoyed by growth in advanced manufacturing. Vacancy rates have fallen to their lowest levels since 2007, and according to Cassidy Turley, 2013's year to date 2.1 million square feet of positive net absorption represents more positive absorption than in any year since 1997. According to the SF Business Times, the resurgence in manufacturing is driven by advanced manufacturing, one of the fastest growing sectors in the East Bay, that includes high technology, medical, pharmaceutical, and other specialized manufacturing.[4] Companies like Penumbra Inc., a medical device maker, cite benefits from local engineering talent and proximity to other large medical device manufacturers, including Abbott Diabetes Care and NanoVasc, Inc., who are located in Alameda. Advanced technology and medical manufacturers have realized the benefits of locating in the East Bay, with relatively low rents compared to the Peninsula, access to a skilled labor force, and proximity to advanced transportation networks at the Port of Oakland and Oakland Airport.

[4] San Francisco Business Times, *Manufacturers See Advantages in East Bay Sites*, March 30, 2012, Accessed November 4, 2013, http://www.bizjournals.com/sanfrancisco/print-edition/2012/03/30/manufacturers-see-advantages-in-east.html?page=all

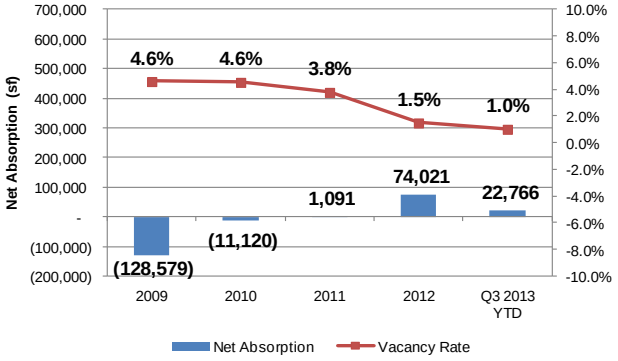
Vacancy rates in Berkeley, Emeryville, and Oakland were below the average compared to the East Bay market. The Q3 2013 vacancy rate was 1.0 percent in Berkeley, 0.9 percent in Emeryville, and 3.7 percent in Oakland, lower than the East Bay average of 5.3 percent.

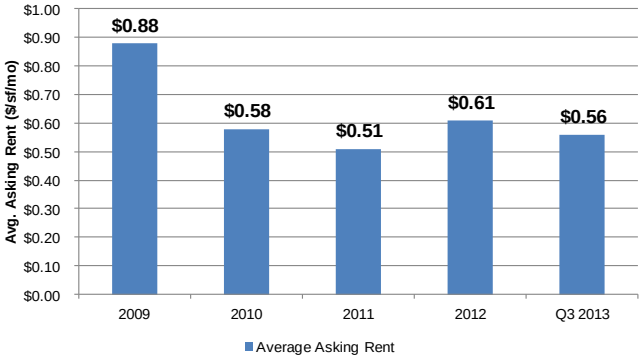
Meanwhile, Emeryville and Berkeley led the East Bay manufacturing sector with the highest average asking rents, while Oakland's rents were slightly lower than the average, giving Oakland a potential competitive advantage. The average asking rent for manufacturing space in Emeryville was $0.75 per square foot per month triple net, and $0.56 per square foot per month triple net in Berkeley, higher than the market average of $0.47 per square foot per month triple net (sf/month/NNN). The higher rents in Berkeley and Emeryville may reflect a premium for proximity to other advanced manufacturers and access to a skilled labor pool compared to other geographies. In comparison, Oakland's manufacturing asking rents of $0.37/sf/month NNN[5] were lower than the market average. These lower rents, combined with a tight inventory in Berkeley and Emeryville and no new manufacturing space in the pipeline, may provide an opening for Oakland to attract manufacturers looking to expand or seeking more affordable rents.

[5] NNN = "triple-net", a common method for leasing industrial space, where tenants are fully responsible for all expenses related to maintenance, insurance, and property taxes.

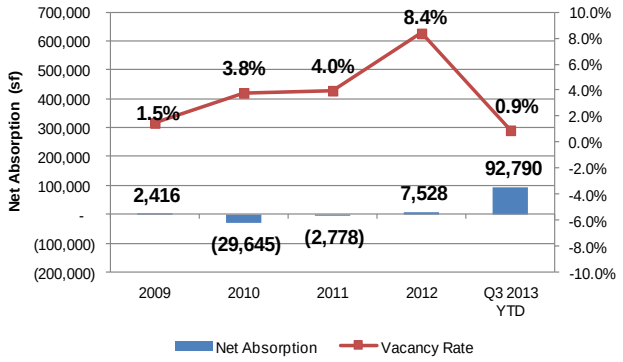
Figure 5: Manufacturing Real Estate Market Overview, 2009 – Q3 2013

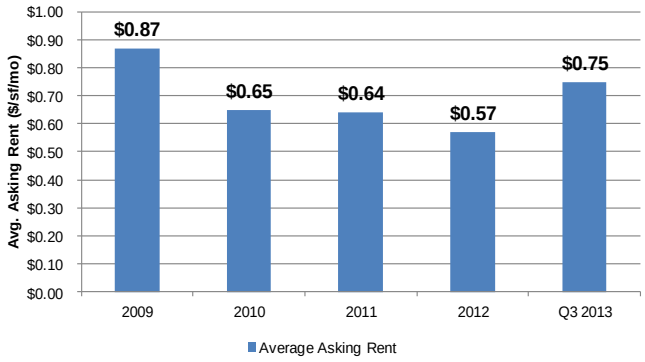
Berkeley



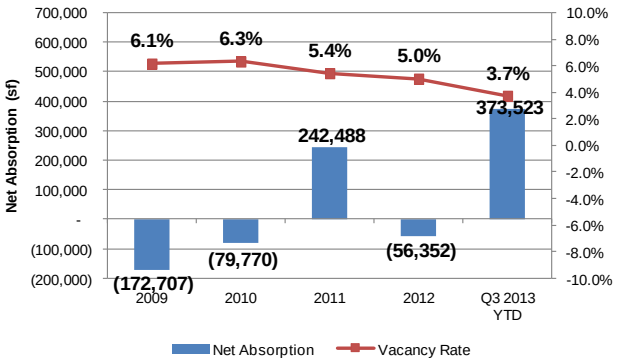


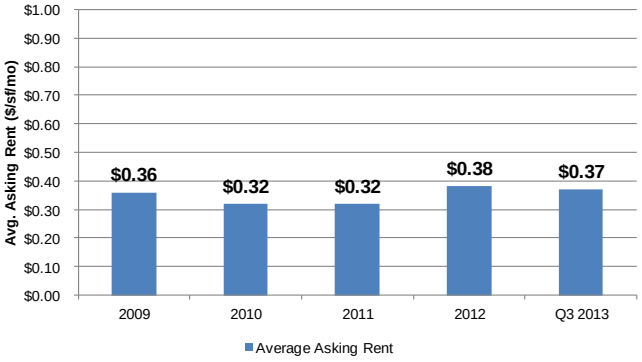
Emeryville





Oakland





Sources: Cassidy Turley; 2013; BAE, 2013.

Warehouse

Similar to the manufacturing market, the East Bay warehouse market follows I-80 and I-880 from Richmond to Fremont and contains over 74 million square feet of warehouse space. As of Q3 2013, Berkeley and Emeryville each maintained a small share of the regional market, with Berkeley at 2.1 million square feet, or 3 percent of the regional warehouse market, and Emeryville at 1.15 million square feet, or 2 percent of market supply. In contrast, Oakland contained a much larger share, 12.2 million square feet, or 17 percent of the warehouse market.

Berkeley and Emeryville led all trade areas with the highest average asking rents as of Q3 2013. The average asking rent was $0.64/sf/month NNN in Berkeley and $0.55/sf/month NNN in Emeryville, significantly higher than the East Bay market average of $0.40/sf/month NNN. Like rents for manufacturing space, Oakland's average asking rent of $0.37/sf/month was lower than the other geographies and on par with the average in the market.

Historic data shows that warehouse vacancy rates have declined to 2008 levels, and the occupancy rates in Berkeley, Emeryville, and Oakland were fairly robust compared to the overall market. In Q3 2013, the East Bay warehouse vacancy rate declined to 7.4 percent, marking the eighth consecutive quarter in which vacancy either declined or remained the same.

In Berkeley, the vacancy rate was only 2.5 percent in Q3 2013 and has remained below 5 percent since 2009. The historically low vacancy rates, coupled with limited annual net absorption, suggests little turnover. In fact, only two warehouse spaces were available for lease in Berkeley as of Q4 2012, with between 10,000 and 25,000 square feet, the smallest size facility available.

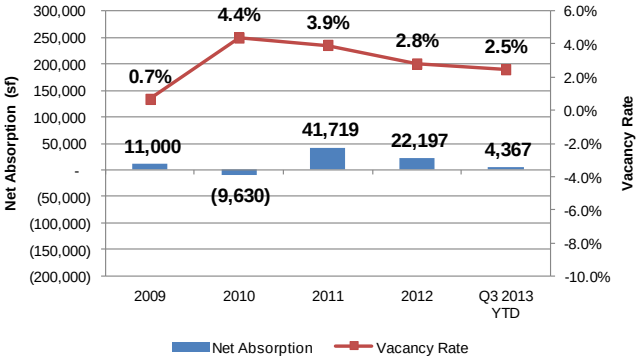
Emeryville has a higher vacancy rate of 10.5 percent compared to the regional market, which may be attributable to a small but significant number of economically obsolescent properties. Based on data from Q4 2012, there were three warehouses available in Emeryville, which remained on the market on average for three years, contributing to a high vacancy rate.

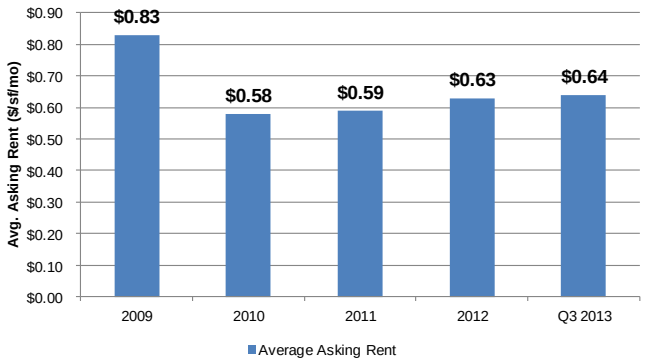
In Oakland, the availability of leasable warehouse space was tight, with vacancy rates reaching a low of 2.3 percent. Oakland's warehousing market is tied to activity at the Port of Oakland and the airport, and the Port is expected to continue a healthy level of trade in the near future, which will support the local warehousing sector. Historic trends point to declining vacancy rates between 2009 and 2013, a sign of a strong market. The Airport Logistics Center, a 375,000 square foot distribution facility, will be completed in the first half of 2014, and will be one of a few new speculative warehouse projects that are expected to add another one million square feet of inventory in the East Bay market[6], with most of the new facilities expected in Fremont, Newark, and Union City. These modern distribution facilities will be a competitive addition to the market, since much of the existing inventory is comprised of older facilities that are bordering on functional obsolescence or are not suitable for modern logistics users.

[6] Excluding new logistics facilities being developed at the Port of Oakland and the former Oakland Army Base, both of which are west of I-880 and outside the EBOTS Area.

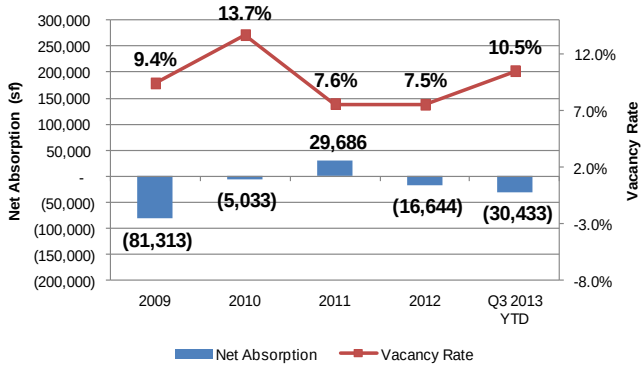
Figure 6: Warehouse Real Estate Market Overview, 2009 – Q3 2013

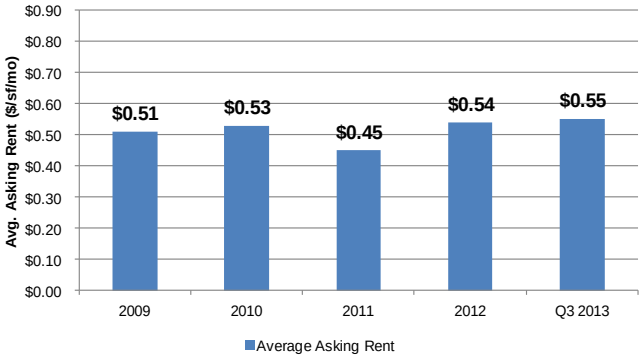
Berkeley



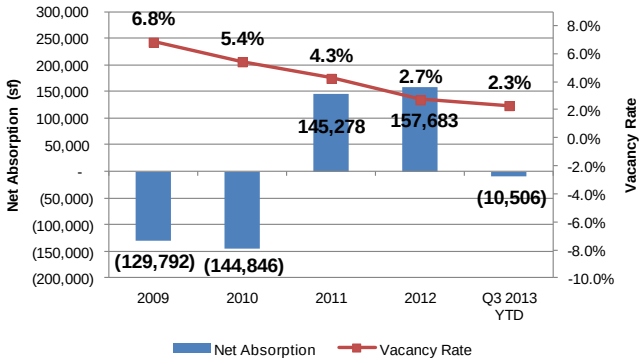


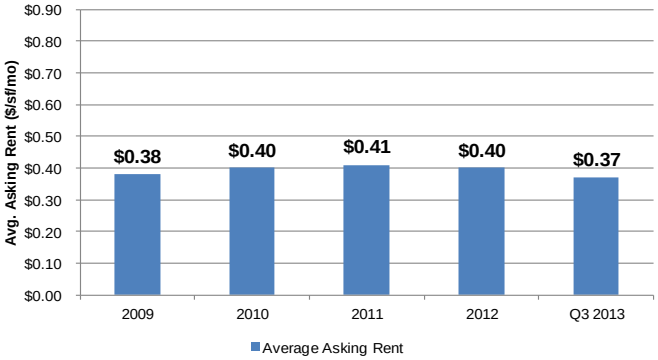
Emeryville





Oakland





Sources: Cassidy Turley; 2013; BAE, 2013.

Research and Development (R&D)

The East Bay R&D market consisted of 31.8 million square feet, with a majority of R&D based in Fremont. While the I-880 market is influenced by trends in Silicon Valley, Berkeley and Emeryville's R&D market is shaped by local forces and somewhat removed from high tech-related activity in the South Bay. Because Cassidy Turley only tracks R&D inventory in Berkeley and Emeryville and areas south of Oakland below I-880, Oakland is excluded from the following discussion.

The inventory of R&D space in Berkeley and Emeryville is tight. As of Q3 2013, Berkeley maintained approximately 850,000 square feet of R&D, 3 percent of the East Bay market, while Emeryville hosted 1.7 million square feet, or 5 percent of the market.

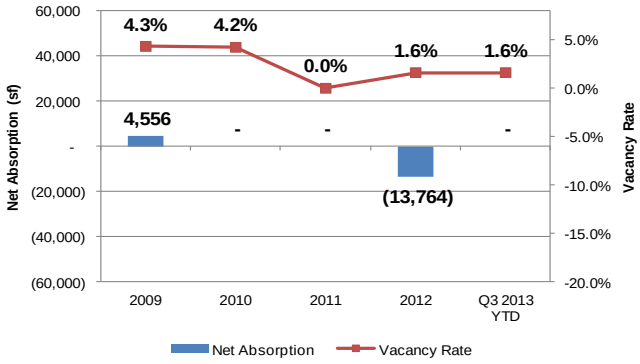
Vacancy rates for R&D space were extremely low in Berkeley and Emeryville, registering at 1.6 percent in Berkeley and 0.2 percent in Emeryville, compared to a high of 19.4 percent in the East Bay as of Q3 2013. This translated into a scarce availability of vacant R&D stock, with only 13.800 square feet in Berkeley and 3,280 square feet in Emeryville. Based on these figures, there is virtually no vacancy in the Berkeley and Emeryville marketplace.

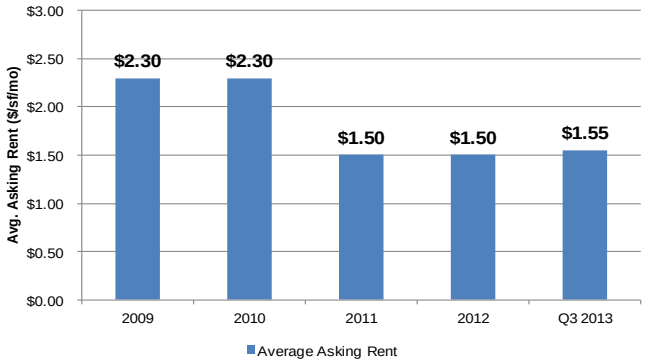
Historically low vacancy rates have led to high average asking rents. In Q3 2013, the average asking rent in Berkeley was $1.55/sf/month NNN and $1.45/sf/month NNN in Emeryville, higher than the East Bay average of $0.89/sf/month NNN.

No new R&D development is currently in the pipeline, and the market is expected to remain very tight. Given the historically low vacancy rates and the short average time that R&D properties remain on the market, the EBOTS Area is likely to support additional R&D development.

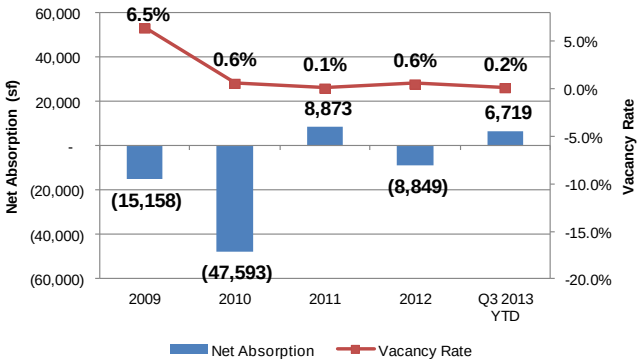
Figure 7: R&D Real Estate Market Overview, 2009 – Q3 2013

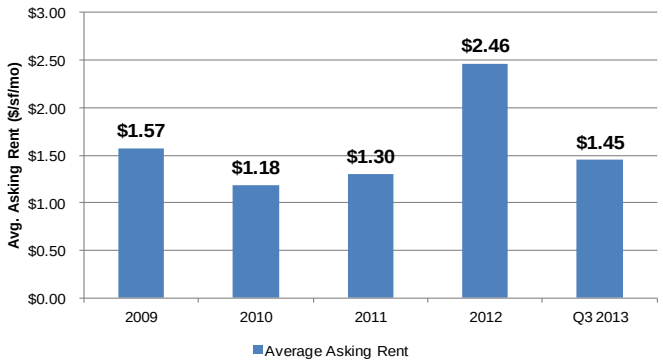
Berkeley





Emeryville





Sources: Cassidy Turley; 2013; BAE, 2013.

Office

The East Bay office market contains 29.6 million square feet of inventory and includes office markets from Richmond through Oakland and Alameda. West Berkeley maintains a small fraction of the regional office inventory, with 1.3 million square feet, or 4 percent of the regional market. Emeryville contains 4.1 million square feet, or a 14 percent market share. While Cassidy Turley does not track office inventory in West Oakland, the Oakland Central Business District (CBD) is the nearest and largest center for office activity in Oakland. In Q3 2013, the Oakland CBD consisted of 5.1 million square feet, or 17 percent of the total market. Vacancy rates were very low in West Berkeley, and higher in the Oakland CBD and Emeryville. The average rental rate for the East Bay office market was $2.26 per square foot per month, full service gross.

In Q3 2013, West Berkeley's vacancy rate registered 4.5 percent, which reflects the limited availability of office space. Only a handful of office properties were vacant in West Berkeley, with half less than 5,000 square feet, and the other half between 5,000 to 10,000 square feet. Rental rates matched that for the larger East Bay market. Finding available space continues to be a challenge for mid-size or large users.

Emeryville's office vacancy was 16.1 percent, but excluding lab space, pure office vacancy rates were approaching 10 percent, with the majority of recent growth occurring in startups seeking small spaces in non-institutional buildings at lowers rents, according to Cassidy Turley. The average rent in Emeryville, depending on the class of space, ranged from $2.60 to $2.65[7] per square foot per month, full service gross; however, this average masks the impact of much more expensive lab space that ranges, depending on class, from $2.99 to $3.13 per square foot per month, full service gross.

Vacancy rates in the Oakland CBD were also fairly low, at 12.9 percent, which reflects investment activity in downtown this past quarter. Oakland's CBD vacancy rate is now lower than the average in the regional market of 15.5 percent, with rental rates ranging from $2.50 to $2.72 per square foot per month full service gross, depending on the class of space. Vacancy rates are expected to continue to decline, as tenants in the San Francisco continue to face rising rents, which may force them seek office space elsewhere. Still, recent net absorption figures have shown only modest recovery, and there is still a substantial amount of inventory in the Oakland CBD and periphery markets to work through.

Retail

The East Bay retail market is somewhat flat, with vacancy rates unchanged at six percent since Q1 2013. Despite the limited changes in net absorption, the overall trend has been one of declining vacancy and rising rents, led by more activity in Class A retail products and gradual improvement in Class B and C space. According to Cassidy Turley, new Class A retail is moving quickly, with minimal lease up times, while Class B and C space, which accounts for a large share of the existing vacant

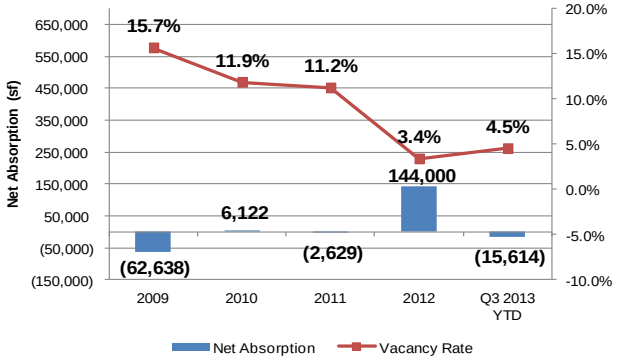
[7] In this section, the lower figure represents all classes of space, while the high figure represents Class A space (newer, more modern, higher quality space).

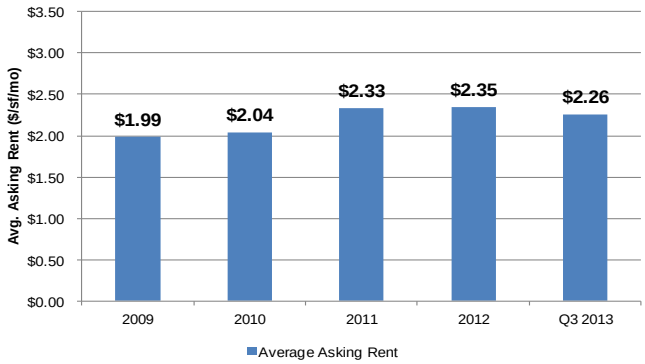
stock, is still waiting to be filled. The economic recovery underway is expected to boost absorption of Class B and C space, as start-up mom and pop retailers, which typically occupy these spaces, are expected to return to the market. These types of businesses are typically funded by SBA and home equity loans, which are expected to rebound with the upswing in the housing market.

Within the EBOTS Area, Cassidy Turley tracks the I-80 corridor, which extends from Hercules to Emeryville, so this submarket will be used to describe trends in Berkeley and Emeryville. In Q2 2013, there was a total of 5.4 million square feet of retail along the I-80 corridor, and another 2.7 million square feet in Oakland. Vacancy rates were fairly low, at 5.0 percent along I-80 and just 3.9 percent in Oakland, the lowest vacancy rate in the region. Triple-net annual asking rents averaged $19.59 per square foot per year ($1.63 per month) for the I-80 corridor and $22.40 per square foot per year ($1.87 per month) for Oakland, somewhat similar to the regional average of $20.34 per square foot per year ($1.70 per month).

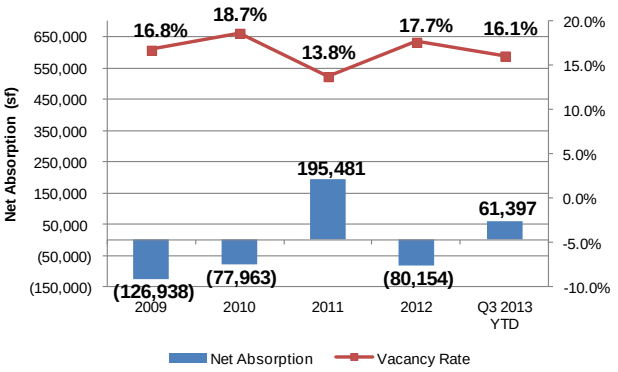
Figure 8: Office Real Estate Market Overview, 2009 – Q3 2013

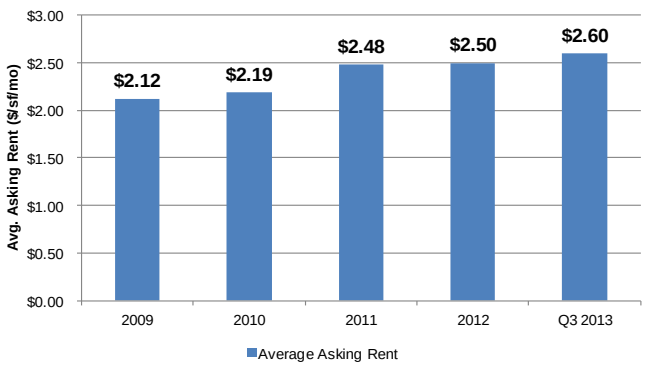
West Berkeley



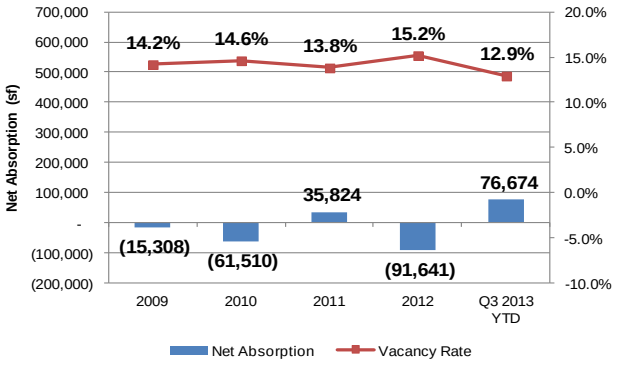


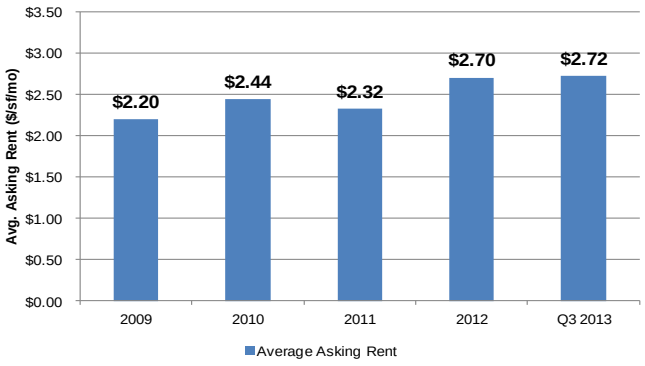
Emeryville





Oakland CBD

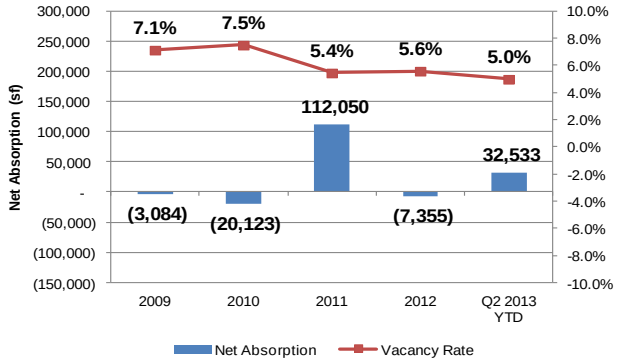


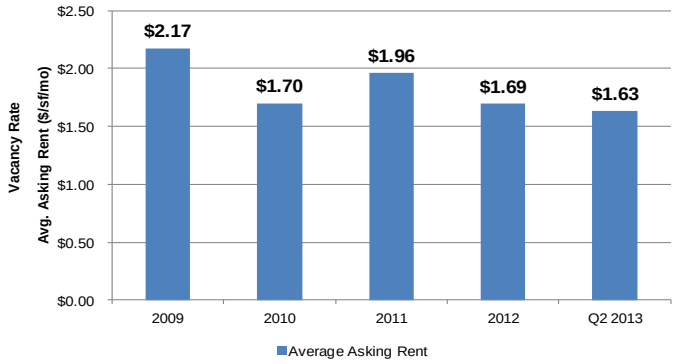


Sources: Cassidy Turley; 2013; BAE, 2013.

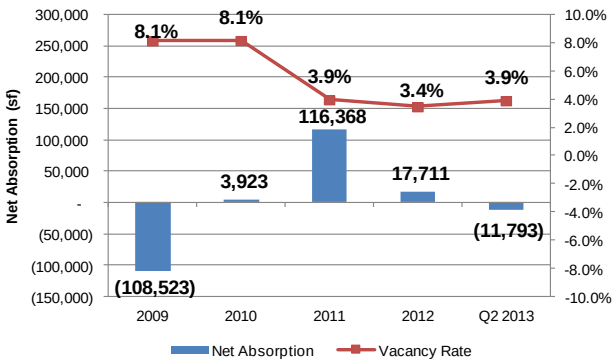
Figure 9: Retail Real Estate Market Overview, 2009 – Q3 2013

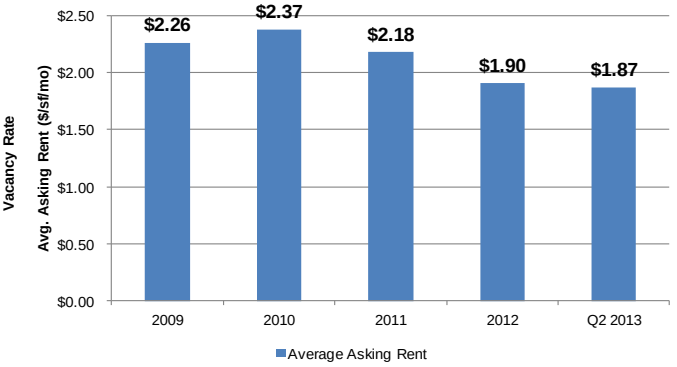
I-80 Corridor





Oakland





Sources: Cassidy Turley; 2013; BAE, 2013.

Rental Housing

Multi-family rental housing is tight in the East Bay, driven by high demand for rental housing and rapidly rising rents in San Francisco that has led renters priced out of that market to seek housing elsewhere. In Alameda County, the vacancy rate in Q3 2013 was 3.1 percent, well below the 5 percent vacancy threshold that typically indicates full occupancy.

In Alameda County, asking rents averaged $1,781 per month in Q3 2013, a nine percent increase from the same time last year. New developments are ramping up and deliveries will hit the market in the second half of 2014 and early 2015.

Comparing monthly rents in the EBOTS Area to Alameda County, average rents in Emeryville ($2,453) and Berkeley ($1,994) were higher than the County average ($1,781) while rents in West Oakland were slightly lower ($1,692) than the average.

Table 12: Monthly Average Rents, Currently Leasing Rental Residential Units in the EBOTS Area, October 2013

West Berkeley			Emeryville			West Oakland		
Unit Type	**#**	**Avg. Rent** (a)	**Unit Type**	**#**	**Avg. Rent** (a)	**Unit Type**	**#**	**Avg. Rent** (a)
1 BD / 1 BA	2	$1,709	Studio	4	$1,998	Studio	1	$975
2 BD / 2 BA	1	$2,564	1 BD / 1 BA	23	$2,101	1 BD / 1 BA	5	$1,324
Total	**3**	**$1,994**	2 BD / 1 BA	3	$2,388	2 BD / 1 BA	11	$1,717
			2 BD / 2 BA	8	$2,486	2 BD / 2 BA	1	$958
			3 BD / 1 BA	1	$3,200	3 BD / 1 BA	3	$1,682
			3 BD / 2 BA	4	$3,297	3 BD / 2 BA	5	$1,696
			3 BD / 3 BA	1	$4,309	3 BD / 3 BA	2	$2,075
			4 BD / 3 BA	1	$3,900	4 BD / 2 BA	3	$2,443
			Total	**45**	**$2,453**	**Total**	**31**	**$1,692**

Note:
(a) Average rents are based on posted apartments with complete information as of 10/30/2013
Padmapper aggregates online apartment listings from multiple sources, including Craigslist and brokers.
Source: Padmapper, 2013; BAE 2013

For Sale Housing

The for-sale housing market in Alameda County is robust, with home prices rising 34 percent between September 2012 and September 2013. According to DQNews, the average price of homes sold in Alameda County was $512,000 in September 2013, up from $382,000 in September 2012.

Within the EBOTS Area, prices in West Berkeley eclipsed the County average, while homes sold in Emeryville and West Oakland were slightly below the average. Based on data from April to October of 2013, with only 11 total sales, the average single family home in West Berkeley sold for $1,225,000, while the average condominium sold for $553,000, higher than the County average of $512,000. These figures are not representative due to the very few homes were sold in West Berkeley in this time period.

Table 13: Sales Price Distribution, West Berkeley, April – October 2013

	Number of Units Sold					
Sale Price Range	**1 BRs**	**2 BRs**	**3 BRs**	**4+ BRs**	**Total**	**% Total**
Single-Family Residences						
Less than $400,000	0	0	0	0	0	**0.0%**
$400,000-$499,999	1	2	0	0	3	**27.3%**
$500,000-$599,999	0	1	0	0	1	**9.1%**
$600,000-$699,999	0	1	0	0	1	**9.1%**
$700,000-$799,999	0	1	1	0	2	**18.2%**
$800,000-$899,999	0	1	0	0	1	**9.1%**
$900,000-$999,999	0	0	0	0	0	**0.0%**
$1,000,000 or more	0	0	3	0	3	**27.3%**
Total (a)	**1**	**6**	**4**	**0**	**11**	**100.0%**
% Total	**0.0%**	**54.5%**	**36.4%**	**0.0%**	**90.9%**	
Median Sale Price	**N/A**	**N/A**	**N/A**	**N/A**	**$725,000**	
Average Sale Price	**N/A**	**N/A**	**N/A**	**N/A**	**$1,228,000**	
Average Size (sf)	**N/A**	**N/A**	**N/A**	**N/A**	**966**	
Average Price/sf	**N/A**	**N/A**	**N/A**	**N/A**	**$573**	
Condominiums						
Less than $300,000	0	0	0	0	0	0.0%
$300,000-$399,999	0	1	0	0	1	16.7%
$400,000 or more	2	2	1	0	5	83.3%
Total (a)	**2**	**3**	**1**	**0**	**6**	**100.0%**
% Total	**33.3%**	**50.0%**	**16.7%**	**0.0%**	**100.0%**	
Median Sale Price	**N/A**	**N/A**	**N/A**	**N/A**	**$525,000**	
Average Sale Price	**N/A**	**N/A**	**N/A**	**N/A**	**$553,000**	
Average Size (sf)	**N/A**	**N/A**	**N/A**	**N/A**	**1,348**	
Average Price/sf	**N/A**	**N/A**	**N/A**	**N/A**	**$410**	

(a) Consists of all full and verified sales of single-family residences and condominiums in the 94710 zip code between 4/29/2013 and 10/29/2013.
Sources: DataQuick 2013; BAE 2013

Emeryville's prices were slightly lower than the County average, which may be due to a high proportion of studio and 1-bedroom condos sold in the last six months. The average sale price for single family homes was $435,000, while the average price for condos was $345,000. Condos accounted for a majority of total units exchanged in the Emeryville market (58 percent), and a

majority of those units were either studios or one-bedrooms (64 percent). Comparing the average price per square foot, both single family homes and condominiums averaged approximately $359 per square foot.

West Oakland had the lowest average sales price of the three subareas, with single family home sales averaging $295,000 and condominiums averaging $358,000. Similar to West Berkeley, there were few single family homes sold in the last six months, which means this data may not be representative of the overall market for single family homes. The overall data shows, compared to the other subareas, that average home prices in West Oakland were generally lower than both Emeryville and West Berkeley.

Table 14: Sales Price Distribution, Emeryville, April – October 2013

	Number of Units Sold						
Sale Price Range	**Studios**	**1 BRs**	**2 BRs**	**3 BRs**	**4+ BRs**	**Total**	**% Total**
Single-Family Residences							
Less than $300,000	**N/A**	3	7	5	2	17	**17.2%**
$300,000-$399,999	**N/A**	0	8	5	3	16	**16.2%**
$400,000-$499,999	**N/A**	1	24	5	3	33	**33.3%**
$500,000-$599,999	**N/A**	2	11	3	2	18	**18.2%**
$600,000-$699,999	**N/A**	0	7	2	3	12	**12.1%**
$700,000-$799,999	**N/A**	1	0	2	0	3	**3.0%**
$800,000 or more	**N/A**	0	0	0	0	0	**0.0%**
Total (a)	**N/A**	**7**	**57**	**22**	**13**	**99**	**100.0%**
% Total	**N/A**	**0.0%**	**57.6%**	**22.2%**	**13.1%**	**92.9%**	
Median Sale Price	**N/A**	**$405,000**	**$436,200**	**$402,550**	**$440,000**	**$435,000**	
Average Sale Price	**N/A**	**$375,714**	**$442,245**	**$434,934**	**$434,154**	**$434,854**	
Average Size (sf)	**N/A**	**831**	**1,047**	**1,391**	**1,861**	**1,215**	
Average Price/sf	**N/A**	**$452**	**$422**	**$313**	**$233**	**$358**	
Condominiums							
Less than $200,000	16	1	0	0	0	17	12.4%
$200,000-$299,999	5	35	2	2	0	44	32.1%
$300,000-$399,999	0	16	19	2	0	37	27.0%
$400,000 or more	0	14	21	4	0	39	28.5%
Total (a)	**21**	**66**	**42**	**8**	**0**	**137**	**100.0%**
% Total	**15.3%**	**48.2%**	**30.7%**	**5.8%**	**0.0%**	**100.0%**	
Median Sale Price	**$192,500**	**$290,000**	**$397,500**	**$418,000**	**N/A**	**$335,000**	
Average Sale Price	**$188,620**	**$324,404**	**$444,179**	**$405,188**	**N/A**	**$345,027**	
Average Size (sf)	**527**	**886**	**1,173**	**1,584**	**N/A**	**960**	
Average Price/sf	**$358**	**$366**	**$379**	**$256**	**N/A**	**$359**	

(a) Consists of all full and verified sales of single-family residences and condominiums in the 94608 zip code between 4/29/2013 and 10/29/2013.
Sources: DataQuick 2013; BAE 2013

Table 15: Sales Price Distribution, West Oakland, April – October 2013

Sale Price Range	Number of Units Sold: Studios	1 BRs	2 BRs	3 BRs	4+ BRs	Total	% Total
Single-Family Residences							
Less than $300,000	**N/A**	1	5	1	1	8	**42.1%**
$300,000-$399,999	**N/A**	0	2	3	1	6	**31.6%**
$400,000-$499,999	**N/A**	0	1	0	4	5	**26.3%**
$500,000 or more	**N/A**	0	0	0	0	0	**0.0%**
Total (a)	**N/A**	**1**	**8**	**4**	**6**	**19**	**100.0%**
% Total	**N/A**	**0.0%**	**42.1%**	**21.1%**	**31.6%**	**94.7%**	
Median Sale Price	**N/A**	**$242,000**	**$236,000**	**$360,000**	**$412,500**	**$305,000**	
Average Sale Price	**N/A**	**$242,000**	**$247,625**	**$303,750**	**$362,333**	**$295,368**	
Average Size (sf)	**N/A**	**670**	**985**	**1,423**	**1,344**	**1,174**	
Average Price/sf	**N/A**	**$361**	**$251**	**$213**	**$270**	**$252**	
Condominiums							
Less than $200,000	4	8	1	0	0	13	13.4%
$200,000-$299,999	0	13	10	0	0	23	23.7%
$300,000-$399,999	0	11	17	3	0	31	32.0%
$400,000 or more	0	11	14	5	0	30	30.9%
Total (a)	**4**	**43**	**42**	**8**	**0**	**97**	**100.0%**
% Total	**4.1%**	**44.3%**	**43.3%**	**8.2%**	**0.0%**	**100.0%**	
Median Sale Price	**$168,000**	**$310,000**	**$358,000**	**$451,250**	**N/A**	**$330,750**	
Average Sale Price	**$200,400**	**$329,186**	**$389,940**	**$444,688**	**N/A**	**$358,081**	
Average Size (sf)	**638**	**935**	**1,066**	**1,381**	**N/A**	**1,012**	
Average Price/sf	**$314**	**$352**	**$366**	**$322**	**N/A**	**$354**	

(a) Consists of all full and verified sales of single-family residences and condominiums in the 94607 zip code between 4/29/2013 and 10/29/2013.
Sources: DataQuick 2013; BAE 2013

Projections

Total Build-Out Scenarios per Plan Bay Area

In July 2013, ABAG and MTC adopted the Plan Bay Area Final Forecast of Jobs, Population and Housing, which show the expected growth between 2010 and 2040 based on the region's Sustainable Communities Strategy (SCS).

Table 16 shows the forecasts by Plan Bay Area for the areas of West Berkeley, Emeryville, and West Oakland that comprise the EBOTS Area (these are based on Transportation Analysis Zones, or TAZs, which were used to approximate boundaries, as the only practical method to develop forecasts for areas that differ from either city or PDA boundaries).

Table 16: Plan Bay Area Forecasts, 2010-2040

Plan Bay Area Forecasts, 2010-2040

Existing Conditions, 2010	**West Berkeley** (a)	**Emeryville** (a)	**West Oakland** (a)	**Total**
Population	7,221	10,080	17,902	35,203
Employment	16,349	16,040	8,786	41,175
Housing Units	2,858	5,694	6,795	15,347
Households	2,858	5,694	6,795	15,347
Net New Change, 2010-2040				
Population	2,556	10,960	17,107	30,623
Employment	9,097	7,578	7,720	24,395
Housing Units	1,024	5,922	6,139	13,085
Households	1,024	5,922	6,139	13,085
Total in 2040				
Population	9,777	21,040	35,009	65,826
Employment	25,446	23,618	16,506	65,570
Housing Units	3,882	11,616	12,934	28,432
Households	3,882	11,616	12,934	28,432

Note:
(a) Transportation Analysis Zones (TAZs) were used to approximate the geographies in the EBOT Study Area.
Sources: Plan Bay Area Final Forecast of Jobs, Population and Housing, adopted by ABAG and MTC, July 2013; BAE, 2013.

Because the planning horizons for the three cities in the EBOTS Area go to 2035, the Plan Bay Area forecasts were then calculated for the period 2010 to 2035, using the five-year intervals already calculated in the projections. According to these forecasts, as summarized in Table 17, between 2010 and 2035[8], the EBOTS Area is expected to add 20,500 net new jobs and 11,000 new housing units, which is similar to the maximum build-out scenarios from the land use plans, which projected 28,600 net new jobs and 10,500 new housing units.

[8] Plan Bay Area forecasts through 2035 were used to more easily allow comparison with the planning horizons used by the Three Cities.

Table 17: Plan Bay Area Forecasts, 2010-2035

Plan Bay Area Forecasts, 2010-2035				
Existing Conditions, 2010	**West Berkeley** (a)	**Emeryville** (a)	**West Oakland** (a)	**Total**
Population	7,221	10,080	17,902	35,203
Employment	16,349	16,040	8,786	41,175
Housing Units	2,858	5,694	6,795	15,347
Households	2,858	5,694	6,795	15,347
Net New Change, 2010-2035				
Population	2,079	8,959	13,870	24,908
Employment	7,426	6,496	6,530	20,452
Housing Units	849	4,909	5,066	10,824
Households	849	4,909	5,066	10,824
Total in 2035				
Population	9,300	19,039	31,772	60,111
Employment	23,775	22,536	15,316	61,627
Housing Units	3,707	10,603	11,861	26,171
Households	3,707	10,603	11,861	26,171

Note:
(a) Transportation Analysis Zones (TAZs) were used to approximate the geographies in the EBOT Study Area.
Sources: Plan Bay Area Final Forecast of Jobs, Population and Housing, adopted by ABAG and MTC, July 2013; BAE, 2013.

Total Build-Out Scenarios per EBOTS Area Existing Plans

Based on the adopted land use plans of Berkeley, Emeryville, and Oakland, the EBOTS Area is zoned to accommodate 10,500 new housing units between 2010 and 2035, an increase of 51 percent over the 2010 baseline. In West Oakland, zoning will allow up to 5,100 new housing units within the Opportunity Areas, while West Berkeley is zoned to accept 1,650 new units and Emeryville is zoned for another 3,800 new units.

Table 18 shows the maximum build-out scenario based on combined allowances in the West Berkeley Specific Plan, Emeryville General Plan, and the West Oakland Specific Plan, based on adjustments as outlined in the table footnotes. West Oakland has implemented a plan to accommodate the largest share of the new development. Between 2010 and 2035, the entire EBOTS Area will be able to accommodate 8 million square feet of new commercial and industrial development. This represents a significant increase of 26 percent in net new development over the current 2010 baseline. The majority of this potential will be zoned in West Oakland, where 4 million square feet of commercial and industrial will be allowed under the West Oakland Specific Plan. Emeryville and Berkeley are zoned to be able to accommodate 3 million square feet and 1 million square feet, respectively.

Table 18: Maximum Build-Out Based on Existing Specific and General Plans in the EBOTS Area, 2010-2035

Maximum Build Out Based on Existing Specific and General Plans, EBOT Study Area, 2010-2035				
Existing Conditions (a)	**West Berkeley** (b)	**Emeryville** (c)	**West Oakland** (d)	**Total**
Population	7,025	9,727	17,876	34,628
Employment (# jobs)	16,645	20,552	9,770	46,967
Housing Units	7,718	5,988	6,773	20,479
Households	7,718	5,570	6,773	20,061
Building Area (nonresidential sf)	9,881,849	11,890,953	7,975,000	29,747,802
Net New Change, 2010-2035 (e)				
Population	3,777	6,773	11,136	21,686
Employment (# jobs)	4,300	9,448	14,850	28,598
Housing Units	1,651	3,767	5,081	10,499
Households	1,651	3,740	4,949	10,340
Building Area (nonresidential sf)	1,016,000	2,940,000	4,030,000	7,986,000
Total in 2035				
Population	10,802	16,500	29,012	56,314
Employment (# jobs)	20,945	30,000	24,620	75,565
Housing Units	9,369	9,755	11,854	30,978
Households	9,369	9,310	11,722	30,401
Building Area (nonresidential sf)	10,897,849	14,830,953	12,005,000	37,733,802

Notes:
(a) The starting year for each plan varies slightly due to minor differences in the planning period. Existing conditions for the West Berkeley Project assumes a 2010 start year; the City of Emeryville General Plan assumes a 2008 start year, and the West Oakland Specific Plan assumes a 2012 start year. Because the West Oakland Specific Plan only provided data for the Opportunity Areas, BAE pulled data from the US Census in order to show existing conditions in 2010 for all of West Oakland.
(b) Exisitng conditions and maximum build-out projections are based on the West Berkeley Project Draft EIR No Project Alternative, which represents the scenario without Measure T, which was rejected at the ballot by Berkeley voters.
(c) The maximum build out was taken from the City of Emeryville General Plan Draft EIR dated 2008.
(d) Because the West Oakland Specific Plan EIR was not yet available for review, the build-out scenario was derived from the West Oakland Specific Plan Project Description dated 2012.
(e) Net new change describes the incremental change projected to occur within each plan area.
Sources: City of Emeryville, General Plan Draft EIR, 2008; City of Berkeley, West Berkeley Project Draft EIR, 2010; City of Oakland, West Oakland Specific Plan Project Description, 2012; BAE, 2013.

Between 2010 and 2035, the EBOTS Area is zoned to accommodate another 28,600 new jobs, an increase of 61 percent over the 2010 baseline. Of the three subareas, West Oakland will be zoned to accommodate approximately 15,000 new jobs within the Opportunity Areas defined by the plan, which represents about half of all new jobs slated for the EBOTS Area. In the same time period, Emeryville is zoned to add 9,500 jobs while West Berkeley plans for an additional 4,300 jobs.

It is important to note that these build-out scenarios do not represent projections of what will actually be built between 2010 and 2035, which is a function of the real estate market, and reflect the outside potential of what is allowable under the existing plans.

Comparison Between Plan Bay Area Forecasts and Existing EBOTS Area Land Use Plans

While Plan Bay Area's total forecasts for new housing units for the EBOTS Area align with the growth described in the Specific and General Plans, its total forecast for employment growth is nearly 29 percent lower, or more than 8,100 fewer jobs, compared to the Specific and General Plans. It is

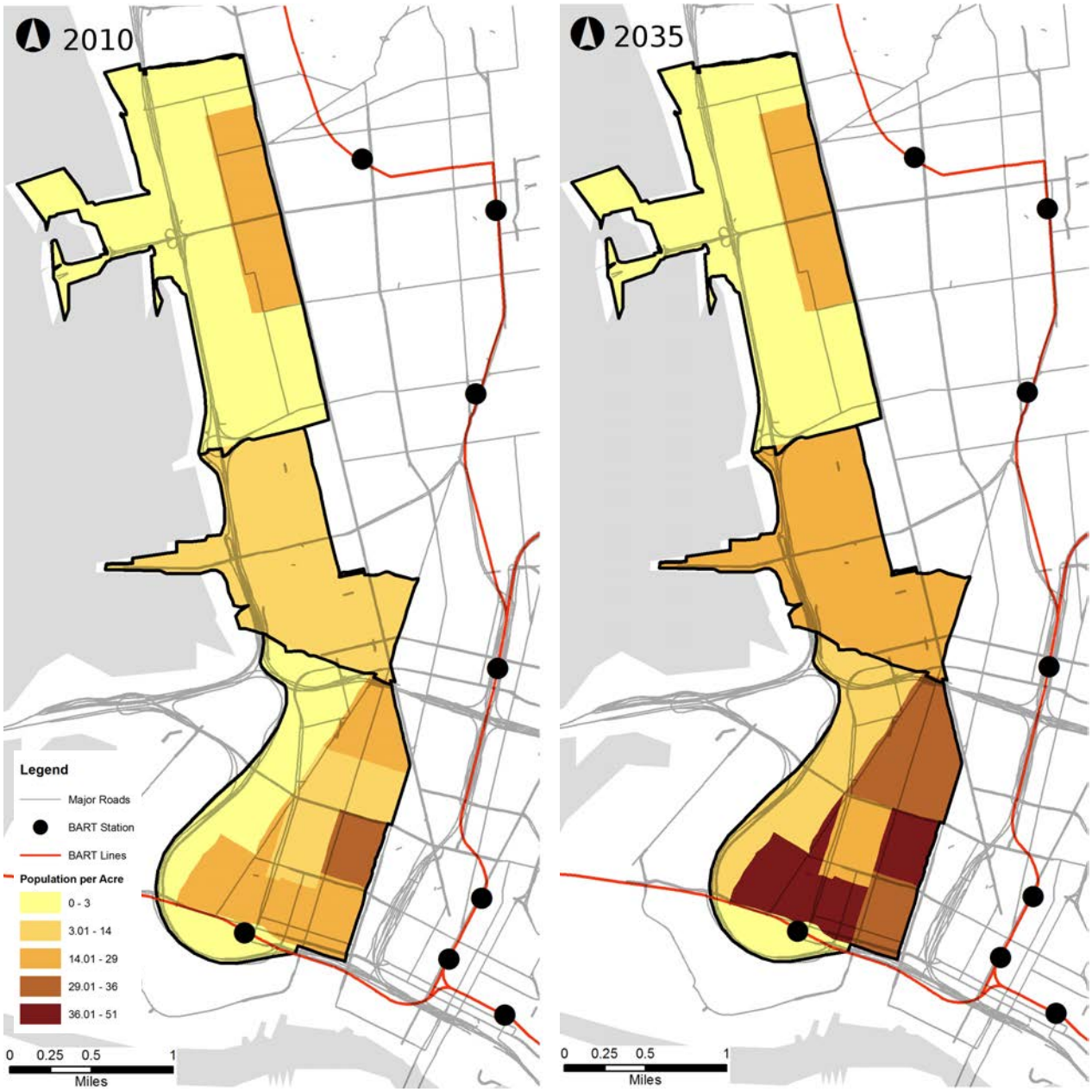
assumed that Plan Bay Area assumptions may account for a greater impact from the 2008 financial crisis and subsequent recession. It should be kept in mind that local economies with significant existing high-tech sectors, such as the EBOTS area, may have considerable variance in future job growth depending upon the pace of technological change and its impact on the economy. Successful planning initiatives also have the potential to "grow" the market, or increase demand above what would be expected based on current trends, such as what the WOSP seeks to do.

Plan Bay Area also allocates growth among the three subregions differently than the Specific and General Plans. While the land use plans showed a significant level of employment occurring in West Oakland, Plan Bay Area forecasts show employment gains mostly in West Berkeley (7,400 net new jobs vs. 4,300 jobs in the West Berkeley Plan), followed by West Oakland (6,500 net new jobs vs. 15,000 jobs in the WOSP) and Emeryville (6,500 net new jobs vs. 9,400 jobs in its General Plan). The largest number of new housing units is expected in West Oakland (5,100 new units, essentially the same as in the WOSP). This is followed by Emeryville (4,900 new units vs. 3,800 in the General Plan), and West Berkeley (800 new units vs. 1,700 in the West Berkeley Plan) – however the net difference between Emeryville and West Berkeley is essentially zero, and with the adjacency of the EBOTS Area housing markets it should be considered that demand that cannot be met in Emeryville may be met in either West Berkeley or West Oakland.

Despite the differences between the land use plans and Plan Bay Area forecasts, the development that occurs in the EBOTS Area will be governed by the local land use plans and policies that are in place, as well as the investment decisions made by developers, tenants, and companies. OneBayArea Grant Program and other MTC funding will be focused on communities that accommodate Regional Housing Needs Allocation figures, as well as in Priority Development Areas.

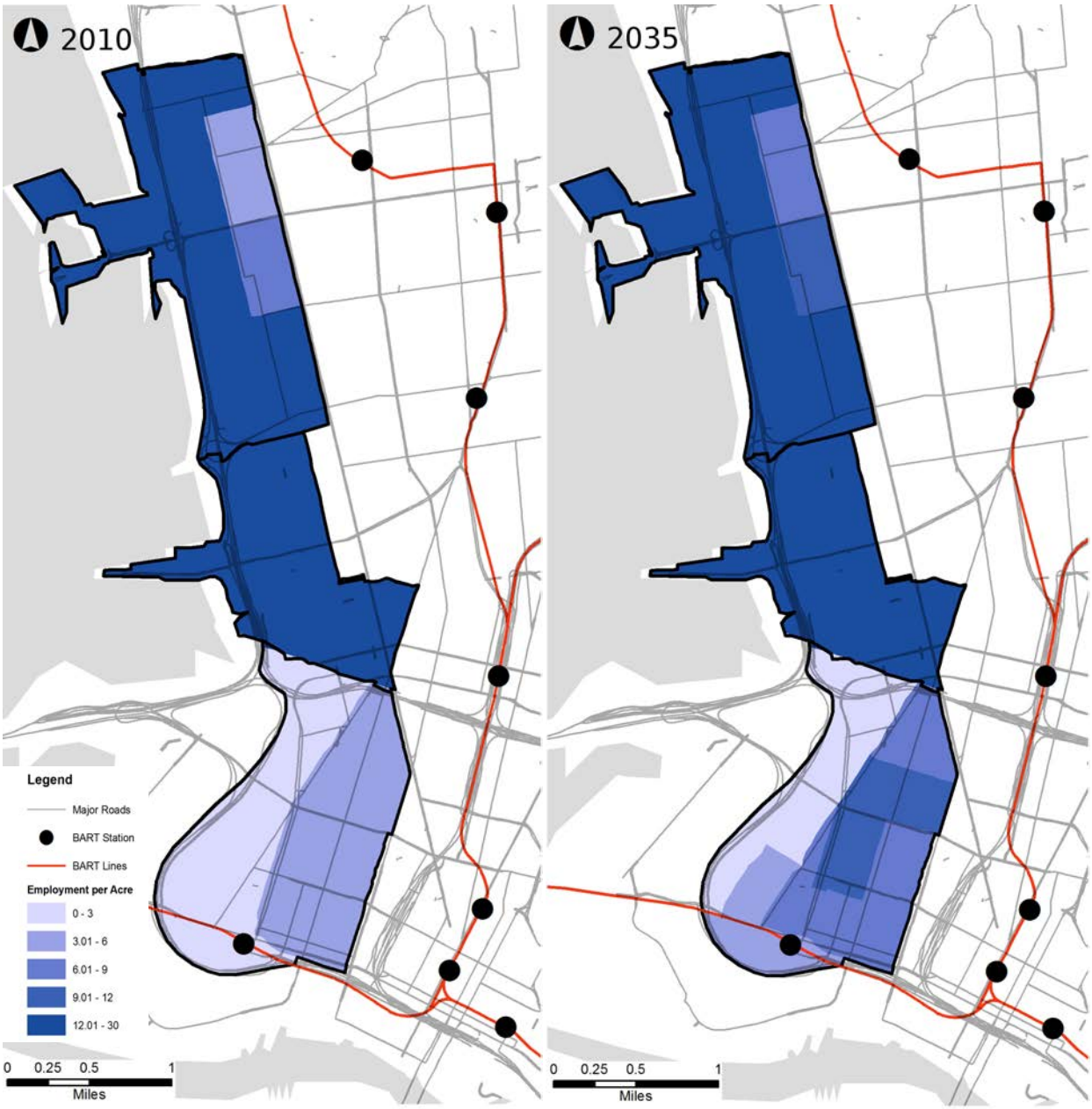
The figures on the following pages depict where growth is expected to occur within the EBOTS Area based on forecasts from Plan Bay Area. The images show population and employment densities per acre in 2010 and 2035 based on TAZ geographies, which vary in geographic size.

Figure 10: Population per Acre, EBOTS Area, 2010-2035



Sources: Plan Bay Area Final Forecast of Jobs, Population, and Housing, adopted by ABAG and MTC July 2013; BAE, 2013.

Figure 11: Employment per Acre, EBOTS Area, 2010-2035



Sources: Plan Bay Area Final Forecast of Jobs, Population, and Housing, adopted by ABAG and MTC July 2013; BAE, 2013.

Opportunity Sites

The precise location of where change will occur depends on multiple factors, including real estate markets; decisions of private developers and landowners; government regulations, plans, and implementation programs; and other supportive initiatives. The figures below illustrate potential opportunity areas within the EBOT corridor, using graphics prepared by each city based on its most recent plans.

Figure 12: Emeryville Opportunity Areas

Figure 13: West Berkeley Opportunity Areas

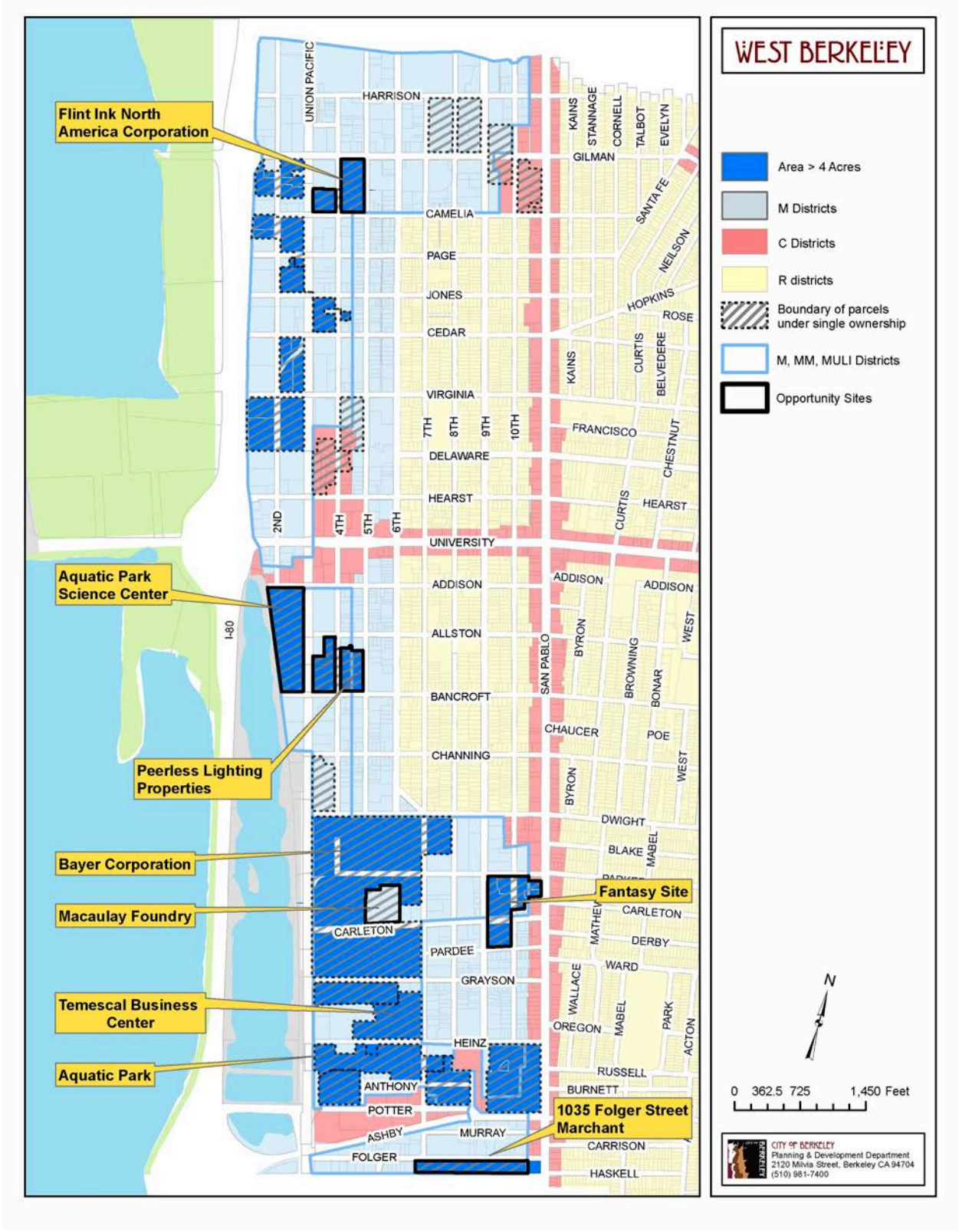


Figure 14: West Oakland Opportunity Areas

Opportunity Site Key

1. 1650 32nd St.
2. 2601 Peralta
3. Upper Wood St.
4. 2240 Wood St. (Grand/Campbell
5. Pacific Pipe/American Steel
6. 1699 West Grand
8. Roadway Express
9. Grand & Market
10. 2300 Peralta (Mandela/Peralta/W.Grand)
11. 2701 Poplar (CASS)
12. Half-block at Willow, Campbell & 17th Street
13. 1700 20th St., (Wood, Willow, W. Grand, 20th Street)
14. 2001 Peralta (portion of block – Campbell, 20th, Peralta)
15. Triangle – Mandela, Peralta, 20th
16. North portion of block – Peralta, Mandela, 20th
17. Poplar to Linden, W. Grand to 20th
18. Grand/32nd, Campbell to Wood
19. Triangle - Peralta, Poplar, 26th
20. Kirkham to Poplar, W. Grand to 24th
21. Triangle - Peralta/Kirkham/24th Street
22. W. Grand/Myrtle/Filbert/24th Street
23. West Oakland Transit Village
24. West Oakland Alliance Development
25. EPA Site
26. 10th to 11th, Pine to Frontage
27. 9th to 10th, Pine to Frontage
28. Phoenix Iron Works
29. 7th & Wood
30. 7th & Willow
31. 7th & Campbell
32. 7th & Peralta
33. South half-block between Union & Magnolia
34. Brush and Castro
35. 425 Market Street
36. North portion of block, Filbert, 32nd, San Pablo
37. San Pablo, W. Grand, 23rd, Brush

FIGURE 3 CITY OF OAKLAND JRDV Urban International OCTOBER, 2012