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.

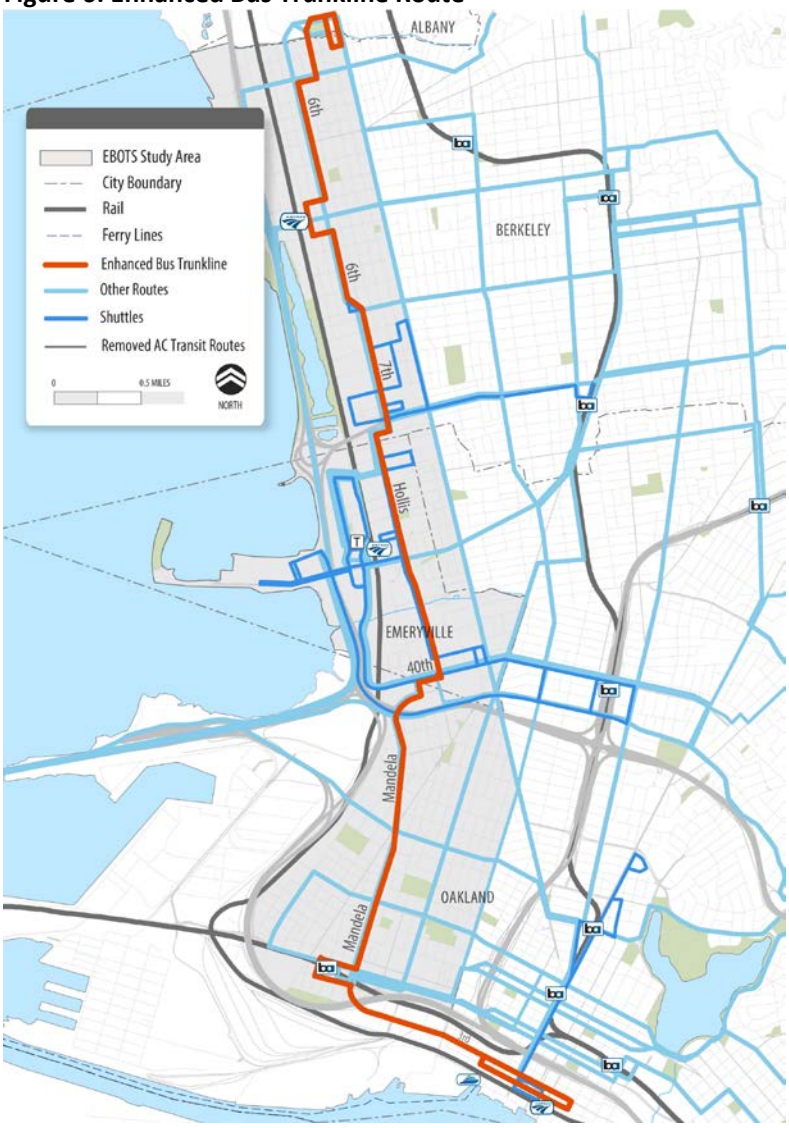
Study Demand-Responsive Transit

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