Appendix B

Technical Memorandum #2

Existing Conditions and Market Analysis

Existing Conditions and Market Analysis

Countywide Transit Plan

FINAL Technical Memo #2

ALAMEDA County Transportation Commission

Prepared for:
Alameda County Transportation Commission

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With

Arup North America Ltd.
Cambridge Systematics
Community Design + Architecture

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Acronyms

Acronym/Abbreviation	Definition
ABAG	Association of Bay Area Governments
ACE	Altamont Corridor Express
AC Transit	Alameda-Contra Costa Transit District
Alameda CTC	Alameda County Transportation Commission
BART	Bay Area Rapid Transit
BAAQMD	Bay Area Air Quality Management District
CCCTA	Central Contra Costa Transit Authority (County Connection)
CCJPA	Capitol Corridor Joint Powers Authority
CSUEB	California State University, East Bay
CTP	Alameda Countywide Transportation Plan
Focus	Focusing Our Vision program (MTC)
LAVTA	Livermore Amador Valley Transit Authority
LOS	Level of Service
MTC	Metropolitan Transportation Commission
NTD	National Transit Database
PDA	Priority Development Area
SJRRC	San Joaquin Regional Rail Commission
SRTP	Short-Range Transit Plan
STA	State Transit Assistance
VTA	Santa Clara Valley Transportation Authority
WETA	Water Emergency Transportation Authority

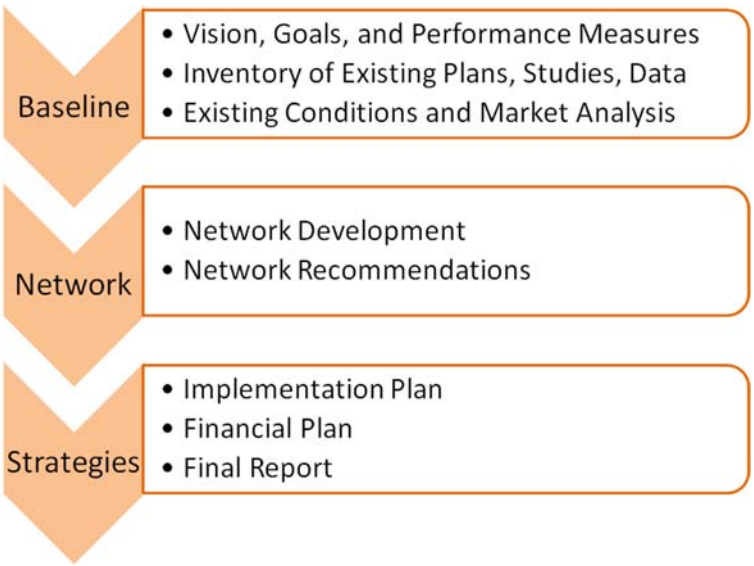
1.0. Introduction

The Alameda County Transportation Commission (Alameda CTC) Countywide Transit Plan seeks to create a unified vision for future transit service in Alameda County that will support Alameda County's future needs and to develop a framework that will enable Alameda County's jurisdictions and transit providers to better align transit, land use, and economic development goals and objectives. The plan will also identify near- and long-term transit capital and operating priorities in the county, including ADA paratransit needs and services as they relate to future transit investments. By developing consensus on a vision for future transit service in Alameda County as well as funding priorities, the Countywide Transit Plan will enable the Alameda CTC, its member jurisdictions and transit operators to leverage existing and advocate for additional resources to improve local, regional and inter-regional transit serving Alameda County.

This document lays the groundwork for that vision by analyzing current and future travel patterns, the characteristics of current transit riders, and transit service performance in Alameda County. Transit markets in Alameda County are also assessed, and transit service deficiencies are identified to frame the discussion of the future transit network and priorities.

The process that Alameda CTC is using to develop the Countywide Transit Plan is depicted in Figure 1. It also illustrates how the findings and analyses in this technical memorandum's report will inform subsequent steps in this process, including the development of the transit network.

Figure 1: Development of Alameda CTC's Countywide Transit Plan



2.0. Report Methodology

The data presented in this existing conditions report was gathered from multiple sources, including:

- Alameda-Contra Costa Transit District (AC Transit)
- Alameda County Transportation Commission (CTC)
- Bay Area Rapid Transit District (BART)
- Capitol Corridor Joint Powers Authority (CCJPA or Capitol Corridor)
- Central Contra Costa Transportation Authority (CCTA)
- Livermore Amador Valley Transit Authority (LAVTA)
- Metropolitan Transportation Commission (MTC)
- City of Union City
- San Joaquin Regional Rail Commission (SJRRC)
- Santa Clara Valley Transportation Authority (VTA)
- Water Emergency Transportation Authority (WETA)

Data requests were sent to the operators listed above for information that was not readily available. Sourced reports for publicly available information include operator short range transit plans (SRTPs), Alameda CTC's Countywide Transportation Plan (CTP), and travel behavior data/transit passenger survey results from the MTC website.[1]

For analytical purposes, data from regional service providers, such as BART, ACE and Capitol Corridor were isolated to capture Alameda County only trips. Extracting the Alameda County ridership allowed for an "apples to apples" comparison among all the operators with services in the county, regardless of the type of transit service (regional vs. local). For example, only ridership figures from the 20 BART stations within Alameda County were counted toward the transit ridership totals shown in this report.

[1] Data collected for the materials in this tech memo are from the following sources:
AC Transit: AC Transit, 2013 Annual Performance Report
ACE Transit: Alameda CTC, 2013 Performance Report; NTD, 2012
BART: BART, Station Origin/Destination Data, August 2014; BART, FY 2013 Quarterly Performance Report; NTD, 2012
Capitol Corridor: Capitol Corridor, 2014 Station Ridership Activity; CCJPA, Business Plan Update, April 2014; CCJPA, 2013 Memorandum with Supplemental Materials for June 12, 2013 CCJPA Board Meeting
County Connection: Laramie Brown, Central Contra Costa Transit Authority, 2014
LAVTA Wheels: LAVTA, FY 2014 Operating Statistics
Union City Transit: Stephen Adams, City of Union City, 2014
VTA: NTD, 2012; VTA 2014 Operating Statistics Summary; VTA FY 2014-2023 SRTP
WETA data: Kevin Connolly, WETA, 2014

3.0. Network Conditions

This section summarizes the existing and proposed transit services in Alameda County and describes the conditions affecting the transit network across the county. The land use characteristics in each of the four county planning areas are described, as are the existing travel patterns within the county and the level of congestion experienced. Future projects and existing Transportation Demand Management programs related to transit and intended to address existing congestion are also described.

3.1. Transit Providers Serving Alameda County

There are currently nine transit operators providing service in Alameda County. Bus services are provided by:

- Alameda-Contra Costa Transit District (AC Transit), which also provides inter-county connections to Contra Costa County and transbay connections to San Francisco, San Mateo, and Santa Clara counties;
- Livermore Amador Valley Transit Authority (LAVTA providing Wheels service); and
- Union City Transit.

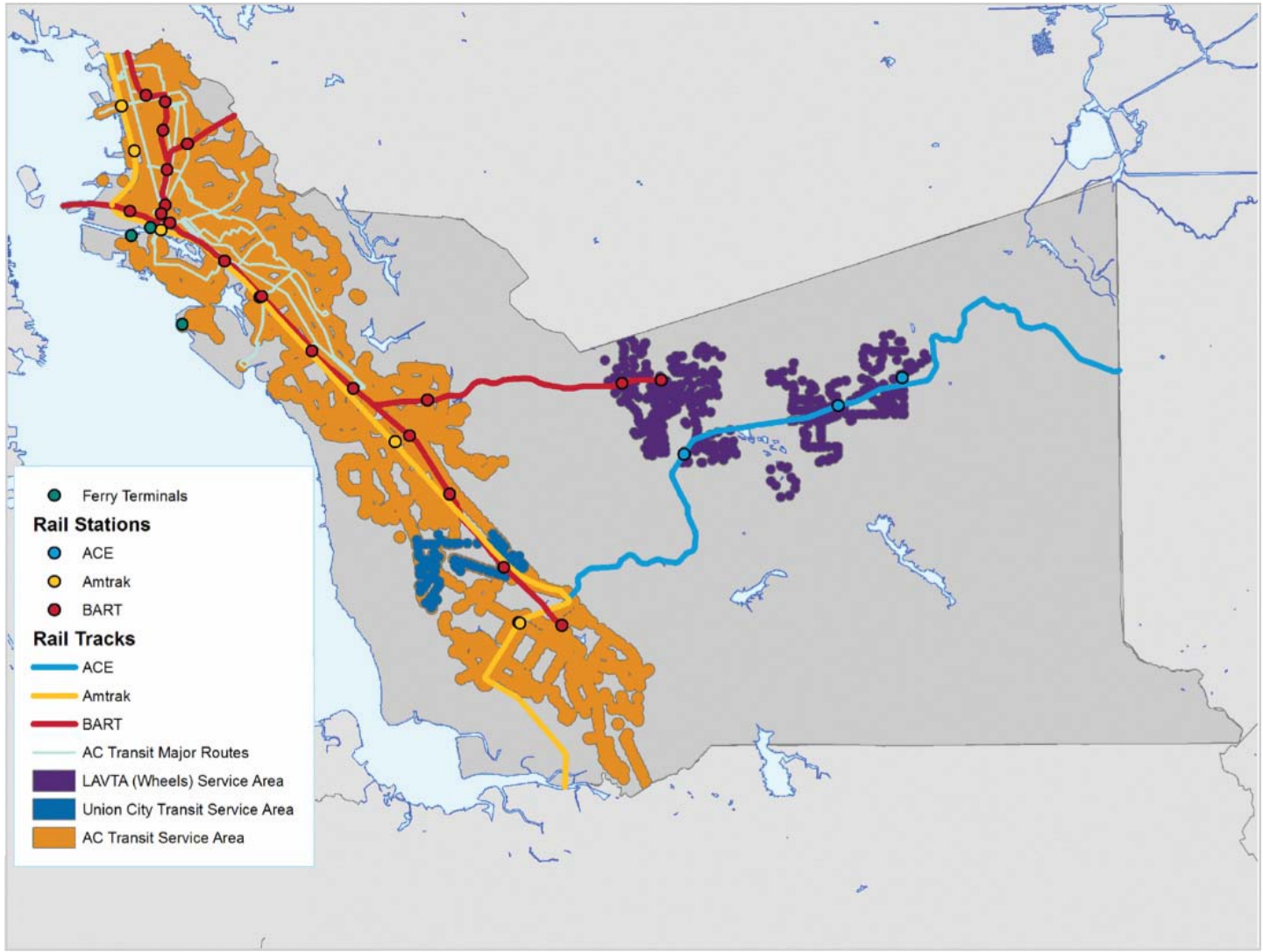
Additional bus service is provided by Santa Clara Valley Transportation Authority (VTA) extending north from Santa Clara County, and by County Connection bus service (provided by Central Contra Costa Transit Authority) extending south into Alameda County from Contra Costa County.

Rail service is provided by three different operators. The Bay Area Rapid Transit (BART) system is the backbone of regional rail for Alameda County, providing connections within Alameda County and to other counties in the region. Altamont Corridor Express (ACE) and Capitol Corridor provide regional and inter-regional rail service through the county with limited stops.

Lastly, the Water Emergency Transportation Authority (WETA) provides ferry services to San Francisco and South San Francisco.[2] These transit operators' service areas within Alameda County are shown in Figure 2 (with the exception of VTA and County Connection).

[2] Ferry service to South San Francisco was initiated in 2012.

Figure 2: Transit Operators in Alameda County



Source: Alameda CTC, Transportation Performance Report, 2013

3.2. Transit in Alameda County Planning Areas

Transit service and travel patterns differ significantly within the county due to variations in land use, density, and competitiveness of different modes of transportation. For planning purposes, Alameda CTC has divided the county into four planning areas, each with distinct travel and land-use patterns: North County, Central County, South County, and East County. These planning areas and the transit service within them are shown in Figure 3 and described below.

A. North County

North County (Alameda, Albany, Berkeley, Emeryville, Oakland, and Piedmont) encompasses the inner East Bay's urban core, with the most intense development centered around the major downtowns and in Emeryville and becoming more dispersed in the hills and moving away from the downtowns. North County includes the three most heavily-used BART stations outside of San Francisco (Downtown Berkeley and 12th Street and 19th Street in Downtown Oakland). Other BART stations in the North County include North Berkeley, Ashby, West Oakland, Rockridge, MacArthur, Lake Merritt, Fruitvale, and Coliseum/Oakland Airport. The Capitol Corridor provides service through North County, stopping at Berkeley, Emeryville, Jack London Square, and Oakland Coliseum, where connections to BART can be made.

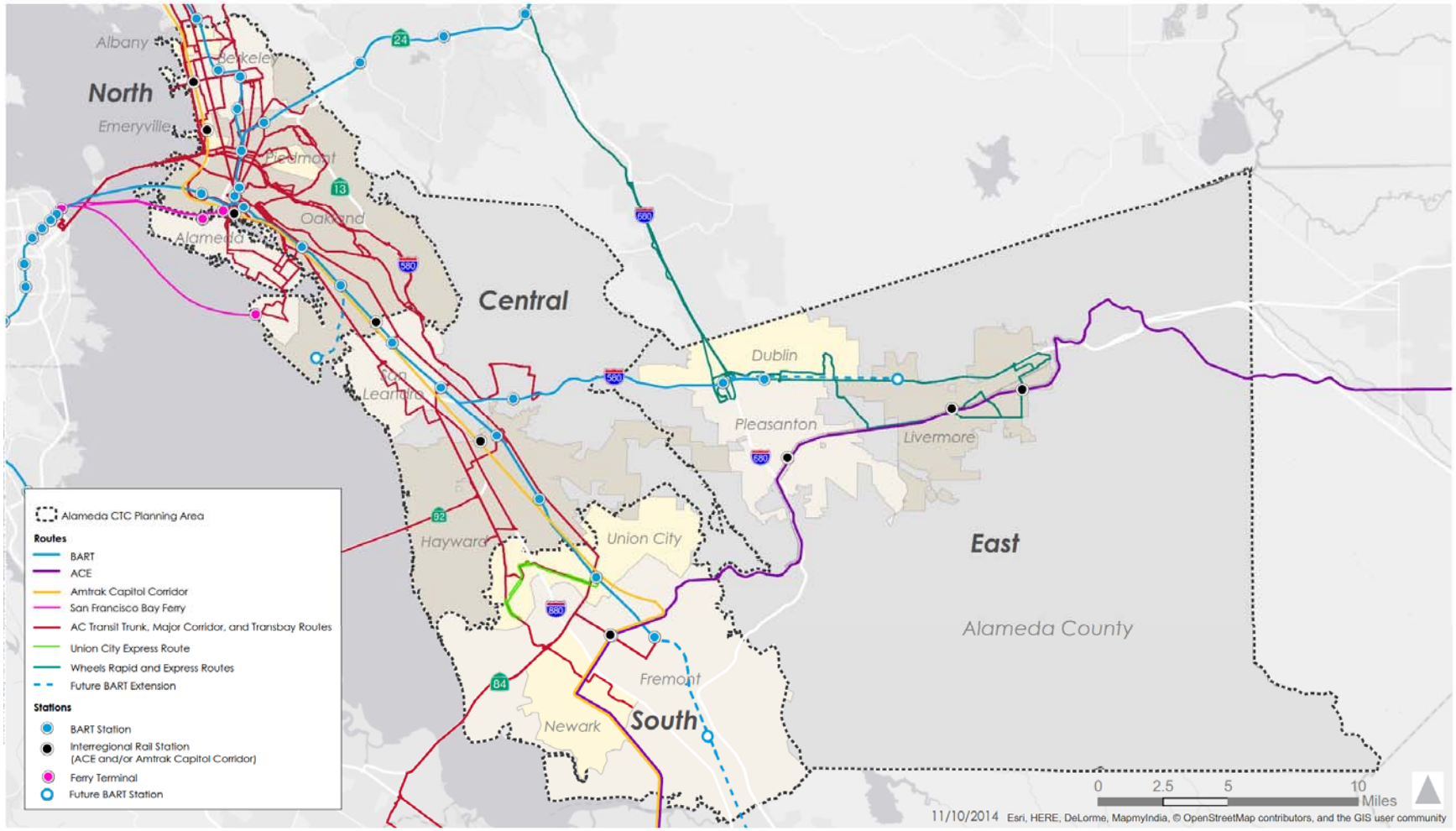
AC Transit provides bus transit service throughout North County, with major hubs at the BART stations and at the University of California Berkeley campus, 19th Street Uptown Transit Center in downtown Oakland, and the Eastmont Transit Center. Major corridors in North County with bus service include San Pablo Avenue, Telegraph Avenue, College Avenue, MacArthur Boulevard, Fruitvale Avenue, International Boulevard, and the Webster/Posey Tubes into the City of Alameda. AC Transit also provides a considerable amount of transbay bus service along the I-80/I-880 corridor into San Francisco and more limited service on Highway 24 (Line E), Highway 13 (Line V), and I-580 (Line NX).

Bus service in North County is also provided by public and private shuttle operators. The most significant is the Emery-Go-Round, which provides critical first- and last-mile service in Emeryville. Shuttle services are discussed in more detail in Section 8.0 of this report.

WETA provides ferry service to San Francisco from Jack London Square in Oakland and two locations in the City of Alameda, the Main Street Terminal at Alameda Point and the Harbor Bay ferry terminal.

The regional transbay transit routes to/from North County are listed in Table 1.

Figure 3: Alameda CTC's Planning Areas and Major Transit Lines



Source: Parsons Brinckerhoff, 2014

Table 1: Regional Transit Routes to/from North County

Route	Route Destination	Operator
B	Oakland – Transbay Terminal	AC Transit
C	Piedmont – Transbay Terminal	AC Transit
CB	Oakland – Transbay Terminal	AC Transit
E	Oakland – Transbay Terminal	AC Transit
F	UC Berkeley – Transbay Terminal	AC Transit
FS	Berkeley – Transbay Terminal	AC Transit
G	(El Cerrito, Albany,) Berkeley – Transbay Terminal	AC Transit
H	(Richmond,) Berkeley – Transbay Terminal	AC Transit
J	Berkeley – Transbay Terminal	AC Transit
NL	Oakland – Transbay Terminal	AC Transit
NX/NX1/NX2/NX3	Oakland – Transbay Terminal	AC Transit
O	Oakland – Transbay Terminal	AC Transit
OX	Alameda – Transbay Terminal	AC Transit
P	Piedmont – Transbay Terminal	AC Transit
V	Oakland – Transbay Terminal	AC Transit
W	Alameda – Transbay Terminal	AC Transit
Z	Albany – Transbay Terminal	AC Transit
Pittsburg Bay Point	Daly City – Pittsburg Bay Point	BART
Richmond	Daly City (Millbrae) – Richmond	BART
Fremont	Fremont – Richmond	BART
Alameda/Oakland	Alameda Main Street/Oakland Jack London Square – SF Ferry Building	WETA
Alameda Harbor Bay	Alameda – SF Ferry Building	WETA

B. Central County

Central County (the cities of Hayward and San Leandro, and the unincorporated communities of Ashland, Castro Valley, Cherryland, Eden, Fairview and San Lorenzo) consists of a mix of older urban and newer suburban neighborhoods. Central County has five BART stations (San Leandro, Bay Fair, Castro Valley, Hayward and South Hayward), and one Capitol Corridor station located in Hayward.

AC Transit provides bus service to hubs at BART stations as well as at Foothill Square and in downtown Hayward. Major corridors with bus service in Central County include International Boulevard, East 14th Street/Mission Boulevard, Hesperian Boulevard, and Foothill Boulevard. Transbay bus service, the S Route into San Francisco, operates along the I-80/I-880 corridor. Route M provides regional express bus service from the Hayward BART station to the Hillsdale shopping center in San Mateo, crossing the San Mateo Bridge.

The regional transbay transit routes to/from Central County are listed in Table 2.

Table 2: Regional Transit Routes to/from Central County

Route	Route Destination	Operator
M	Hayward – San Mateo	AC Transit
S	Hayward – Transbay Terminal	AC Transit
SB	Newark – Transbay Terminal	AC Transit
Fremont	Fremont – Richmond	BART
Fremont	Fremont – Daly City	BART

C. South County

South County (Fremont, Newark, and Union City) has land-use characteristics similar to those of Central County, consisting of medium- and lower density neighborhoods and communities. Of the two BART stations located in South County (Union City and Fremont), the Fremont BART station is the fifth busiest station in the county following MacArthur in North County. The BART Warm Springs extension, currently under construction, is expected to open to the public in the fall of 2015. At that time, it is anticipated that AC Transit and VTA will provide bus service connecting to this new station. Both Capitol Corridor and ACE trains stop at the Fremont – Centerville station.

AC Transit provides bus services to hubs at BART stations as well as Union Landing Transit Center, Ardenwood Park and Ride, Lido Faire Shopping Center, ACE/Amtrak Centerville Train Station, Newpark Mall, and Ohlone College's Newark Campus. Major corridors with bus service include Mission Boulevard, Fremont Boulevard, Decoto Road, Newark Boulevard, Cedar Boulevard, and Highway 84/Mowry Avenue.

Union City Transit operates local bus transit and paratransit service within the City of Union City. Service is hubbed out of the Union Landing Transit Center and the Union City BART station with routes along Alvarado – Niles Road and Dyer Street to reach other major destinations within the city and connect to AC Transit routes.

There are five express bus routes that operate between Alameda County and San Mateo and Santa Clara counties. Express bus service operates along the Highway 84/Dumbarton Bridge and I-880 corridors. These express routes and regional transit routes to/from South County are listed in Table 3.

Table 3: Regional Transit Routes to/from South County

Route	Route Destination	Operator
U	Fremont BART Station – Stanford Campus via Fremont – Centerville Train Station (Palo Alto)	AC Transit
Fremont	Fremont – Richmond	BART
Fremont	Fremont – Daly City	BART
DB/DB1	Union City BART Station – Stanford Research Park	Dumbarton Express (AC Transit, BART, SamTrans, VTA and Union City Transit)
140	Fremont BART Station – Mission College (San Jose)	VTA
180	Fremont BART Station – Great Mall Transit Center	VTA
181	Fremont BART Station – San Jose Diridon Station	VTA

D. East County

East County (Dublin, Livermore, Pleasanton, and the unincorporated communities of Sunol and others in the East Bay Hills) is organized around lower-density suburban communities similar to Central and South county planning areas. The area is a key through-route for commuters from San Joaquin County bound for jobs in Alameda County and Silicon Valley.

East County is home to two BART stations: the West Dublin/Pleasanton Station and the Dublin/Pleasanton Station, which is the eighth busiest BART station in Alameda County. ACE has three East County stations (Vasco, Livermore and Pleasanton). LAVTA and County Connection provide regional express bus service.

LAVTA provides local service for the cities of Dublin, Pleasanton and Livermore. Service is hubbed from the Stoneridge Shopping Center, Dublin/Pleasanton BART station, Hacienda Business Park, and downtown Livermore. Connections are also provided to the two ACE stations. Major service corridors include Dublin Boulevard, Santa Rita Road, Jack London Boulevard, Maple/East Avenue and First Street in Livermore. LAVTA operates one bus rapid transit route, "The Rapid," that runs between Livermore, Dublin and Pleasanton on a 15-minute headway. LAVTA also operates two routes, the 70X and the 70XV, into Contra Costa County to the Walnut Creek and Pleasant Hill BART stations.

County Connection provides local and express service to East County from Contra Costa County via the I-680 corridor. Route 35 provides weekday service from the San Ramon Transit Center to the Dublin/Pleasanton BART station with local coverage through east San Ramon. Route 36 provides weekday service from San Ramon Transit Center to the Dublin/Pleasanton BART station with local coverage through west San Ramon. County Connection also operates two express routes to East County, the 92X and 97X.

Regional transit services to/from East County along the I-680 corridor are listed in Table 4.

Table 4: Express Routes to/from East County

Route	Route Destination	Operator
Dublin/Pleasanton	Daly City – Dublin/Pleasanton	BART
70X	Pleasant Hill BART to Dublin/Pleasanton BART via Walnut Creek BART and continuing service to Hacienda Business Park	LAVTA
70XV	Pleasant Hill BART to Dublin/Pleasanton BART via Walnut Creek BART and continuing service to Hacienda Business Park	LAVTA
92X	Mitchell Park and Ride (Walnut Creek) – ACE Pleasanton Train Station	County Connection
97X	San Ramon Transit Center – Dublin/Pleasanton BART Station	County Connection

3.3. Alameda County Travel Patterns

A. Overall Transportation Patterns

Currently, nearly six million total trips (all modes) are made from Alameda County each day. These trips are forecasted to increase to 7.5 million by 2040, as shown in Figure 4 which depicts annual trips for all travel for Alameda County residents in 2010 and as forecasted for 2040. The majority of trips in both 2010 and 2040 are made within Alameda County, followed by trips between Alameda County and Contra Costa County, San Francisco County, Santa Clara County, and San Mateo County, respectively. There are significantly fewer trips to the North Bay counties of Marin, Napa, Sonoma and Solano than to other destinations. There are also a large number of trips travelling between Alameda County and San Joaquin County on the I-580 corridor.[3]

Generally, automobiles (including carpools) are the predominant mode of travel for commute trips originating in Alameda County, accounting for slightly less than three-quarters of all work trips (See Figure 5) made by Alameda County residents. Fourteen percent of work trips originating in Alameda County are made on transit, and bicycling and walking make up six percent of work trips. An additional six percent of Alameda County residents work from home.

B. Transit Travel Patterns

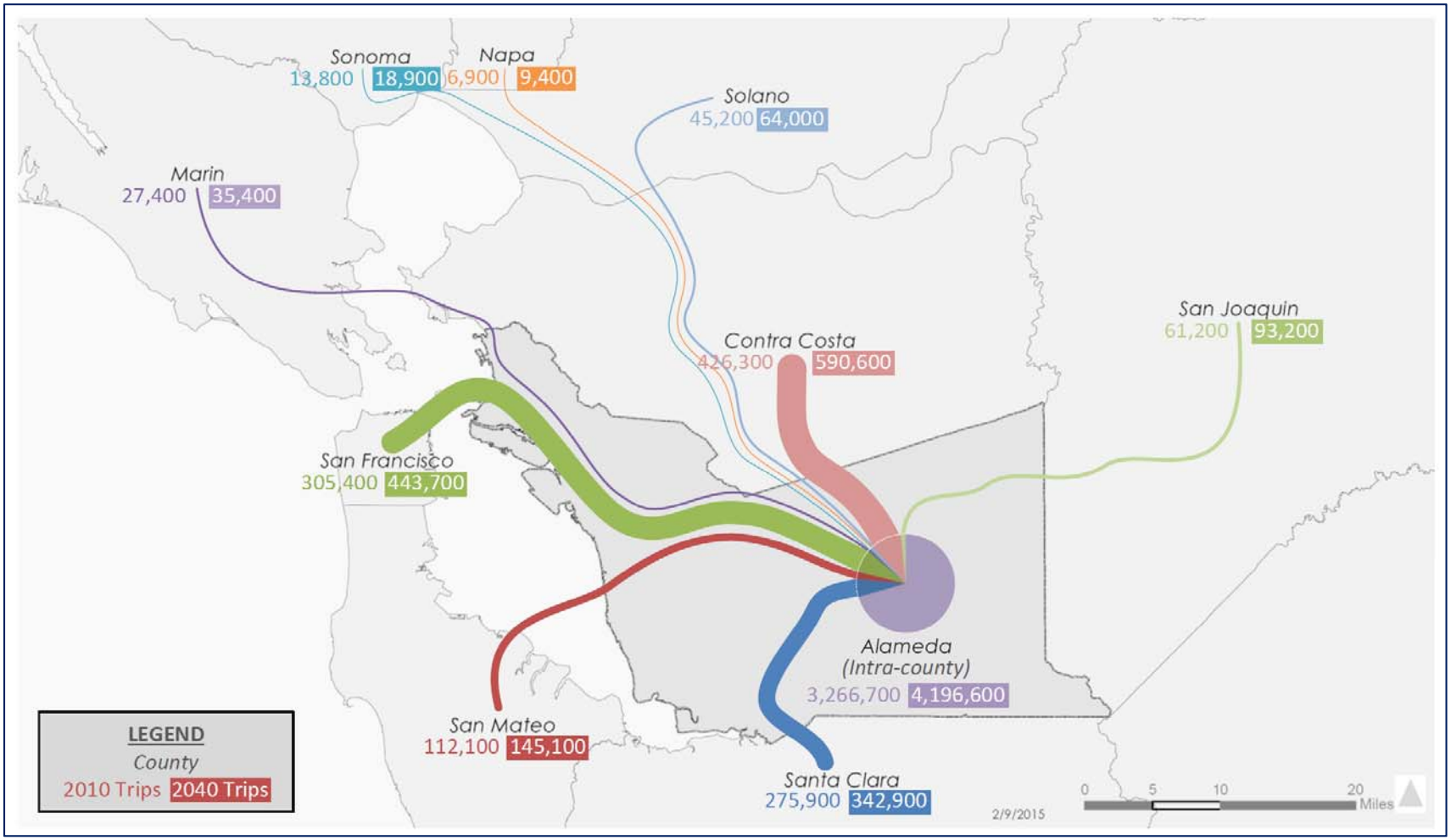
A majority of transit trips taken in Alameda County are regional trips (see

Figure 6) that either originate in or are destined to locations within Alameda County. Interstate 580, Macarthur Boulevard, Interstate 880, and Interstate 80 constitute the most heavily traversed corridors by transit riders making regional trips to and from Alameda County. Local trips (those occurring entirely within Alameda County) are the second largest type of trip made on transit.

The Alameda countywide travel demand model indicates that the majority – 72 percent -- of all trips (including non-transit trips) associated with Alameda

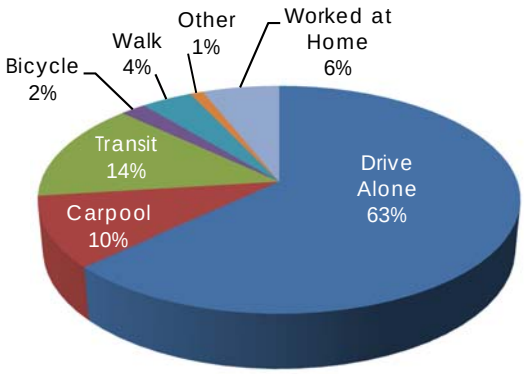
[3] San Joaquin County is outside the nine-county Bay Area.

Figure 4: All Daily Trips To and From Alameda County, All Modes



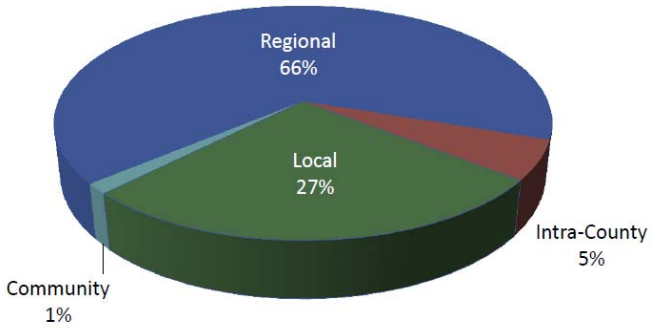
Source: Parsons Brinckerhoff, using Alameda CTC Countywide Travel Demand Model data (2014)

Figure 5: Alameda County Mode Share



Source: American Communities Survey, One-Year Survey Data, 2013

Figure 6: Transit Trips by Type (for All Trips)



Source: Arup, 2014, based on calculations of ridership data provided by operators

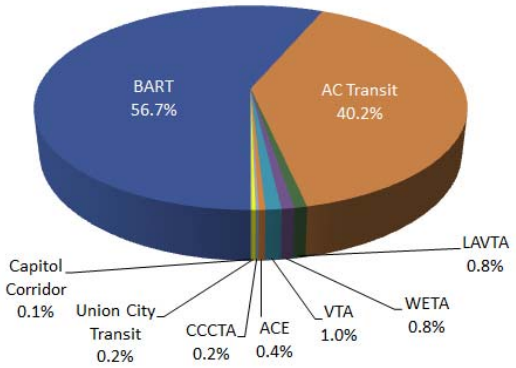
County take place entirely within the County, signifying the potential for more robust intra-county and local transit service.

Among all operators providing transit service in Alameda County, the BART system serves the largest number of Alameda County transit riders, carrying approximately 78.5 million annual riders traveling within, to, or from Alameda County.[4] Within the county, BART acts as both a regional and intra-county operator. For example, many riders who begin their trips in the county travel to employment destinations within the county, such as downtown Oakland or downtown Berkeley. As a regional service, many riders board BART within the county and travel to employment destinations in downtown San Francisco.

AC Transit serves the second largest number of annual riders at almost 56 million.[5] AC Transit serves regional riders using its Transbay bus service to San Francisco and across the Dumbarton Bridge, but a majority of its service is in providing intra-county and local trips within the county. Together, BART and AC Transit serve 97 percent of all transit trips associated with Alameda County (see Figure 7).

[4] BART, FY 2013 Quarterly Performance Report
[5] AC Transit, 2013 Annual Performance Report

Figure 7: Transit Ridership in Alameda County by Operator



Ridership data provided by operators. See Footnote 1 in Section 2.0 Report Methodology.

The other transit services in Alameda County constitute the remaining three percent of service and include:

- Wheels provided by LAVTA,
- Union City Transit provided by the City of Union City,
- San Francisco Bay Ferry Service provided by WETA,
- ACE provided by the San Joaquin Regional Rail Commission (SJRRC), and
- Capitol Corridor provided by the Capitol Corridor Joint Powers Authority (CCJPA).

In addition, the Santa Clara Valley Transportation Authority (VTA) and Central Contra Costa Transit Authority (CCCTA) provide regional connectivity from their respective counties to a limited number of destinations in Alameda County. (CCCTA's service is referred to as County Connection.)

While transit service coverage extends throughout the county, transit service operations and frequency (i.e., routes and schedules) are most concentrated in the inner East Bay's urban core, with the system becoming less dense and service less frequent in the southern and eastern parts of the county. This service pattern reflects the different population and employment densities, as well as development patterns in Alameda County.

The assessment of transit service characteristics and the market analysis show that Alameda County has a number of very competitive transit markets; however, the levels of transit ridership in certain transit-competitive markets are lower than what would be expected given the "competitive" transit conditions outlined in Section 9.0. For example, the bus service on the San Pablo Avenue corridor (72, 72M, and 72R) and Mission Boulevard in Hayward (99) is capturing

fewer riders than the potential identified in the transit market analysis.[6] Other services are oversubscribed. Of all transit trips taken in Alameda County, two-thirds are regional in nature (see Figure 6), which includes transbay trips to San Francisco and also trips to other counties. The transbay BART service experiences crush loads during peak commute hours and some of the more heavily utilized AC Transit buses are also exceeding seating capacity during the peak. In addition to serving inter-county trips, BART and AC Transit are also providing good connections to the concentrated transit markets in downtown Oakland and Berkeley.

3.4. Congestion

A vast majority of trips in Alameda County are made by automobiles, using the county's roadway network. Despite the expanse of the roadway network, several freeway segments currently experience high levels of delay. Alameda CTC uses Level of Service (LOS) as a measure to analyze and track the traffic flows and congestion on its roadway segments. Figure 8 shows LOS for Alameda County evening commute hours in 2014. LOS is poor (LOS E or F), along many major freeway segments in the North and South county planning areas and along the roadways leading to the three transbay corridors (San Francisco/Oakland Bay, San Mateo, and Dumbarton bridges).

A significant amount of bus service operates on these congested roadways and experiences delays. For example, AC Transit operates two dozen routes across the three bridges, all of which experience congestion at the toll booths. This happens despite carpool lanes on the freeways and transit-priority facilities, such as bypass lanes at the toll plazas. Even with these transit exclusive lanes, traffic often backs up and slows bus travel before reaching the bypass lanes. Similarly, many buses are delayed because of a lack of queue-jump lanes or signal priority at intersections on surface streets. As a result, congestion has a significant detrimental effect on the performance of transit service.

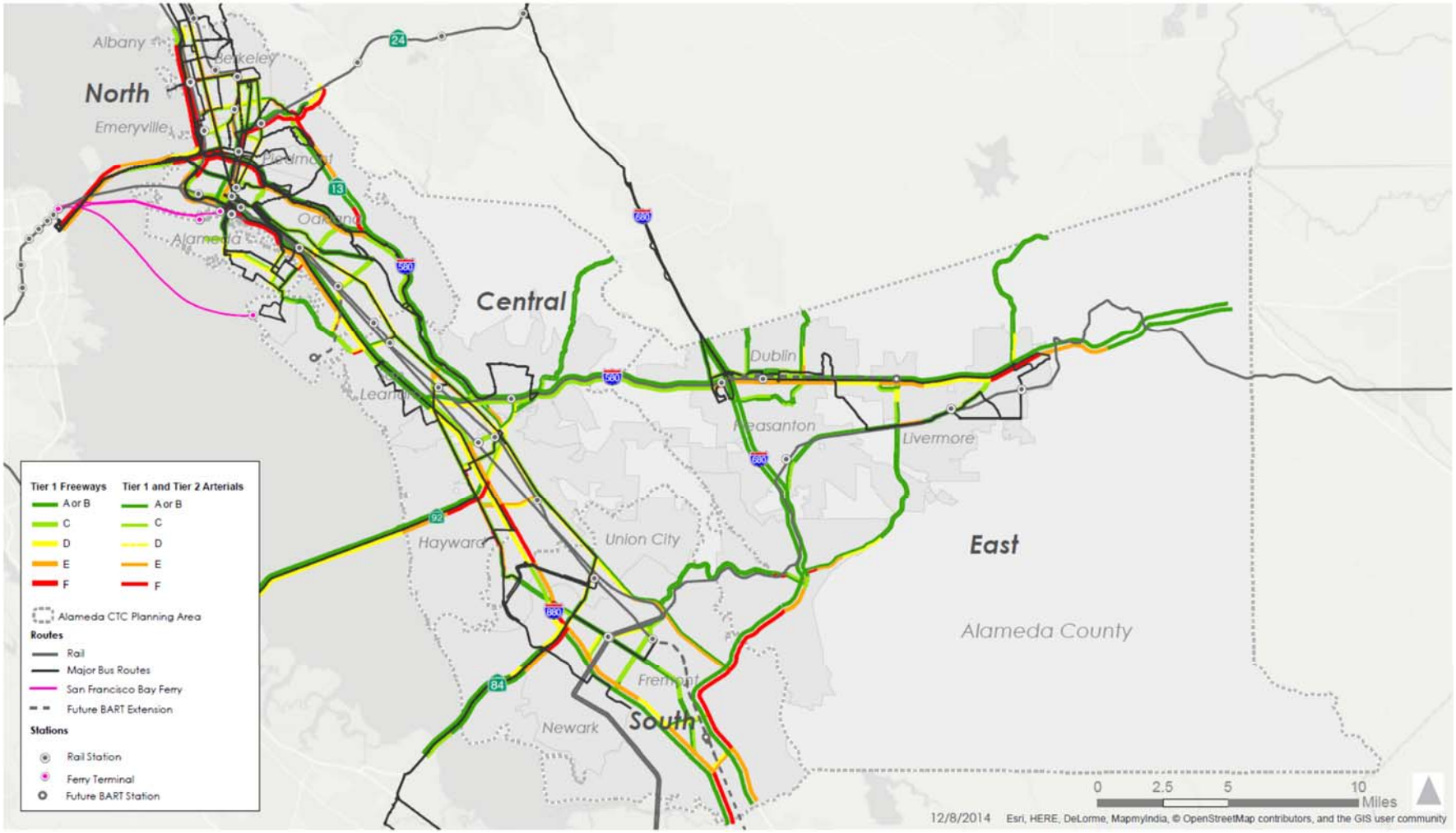
To address these regional issues on the freeway system, Alameda CTC and MTC are expanding the number of express lanes in the county through the conversion of existing HOV lanes and construction of new express lanes. By utilizing dynamic pricing to maximize the efficiency of HOV lanes, express lanes provide their users, including bus riders, more reliable travel times.

In Alameda County, there is an existing express lane facility on I-680 southbound from SR 84 to SR 237 in Santa Clara County. Alameda CTC and MTC are also constructing or planning several more express lane facilities in Alameda County (see Table 5) that will form part of a network of express lanes in the Bay Area.

[6] Appendix B provides an overview of the Alameda County transit market analysis. A more detailed analysis of corridors will be described in the next phase of the Countywide Plan – Network Development.

Several of the facilities planned for Alameda County are in locations that currently experience LOS E and F during the AM and/or PM peak periods.

Figure 8: PM Peak Period LOS on Major Existing and Planned Transit Routes



Source: Alameda CTC, 2014 LOS Monitoring Report

Table 5: Existing and Planned Express Lanes in Alameda County

Implementing Agency	Project	Schedule	Transit Agency Serving this Segment*
Alameda CTC	I-580 from Alameda/San Joaquin County line to Greenville Road	Open by 2025	—
MTC	I-880 NB in Alameda and Santa Clara counties between SR-237 and Lewelling Boulevard and I-880 SB between Hegenberger Road and SR-237	Open by 2017	AC Transit VTA
MTC	SR 84 WB approach from I-880 to Dumbarton Bridge Toll Plaza	Open by 2017	AC Transit
MTC	SR 92 WB approach from I-880 to San Mateo-Hayward Bridge Toll Plaza	Open by 2017	AC Transit
MTC	I-80 Carquinez Bridge to Bay Bridge in Contra Costa and Alameda counties	Open by 2020	AC Transit BART
MTC	I-80, I-580 and I-880 Bay Bridge WB approach	Open by 2020	AC Transit BART
MTC	I-880 NB from Lewelling to Hegenberger	Open by 2020	AC Transit
Sunol JPA	I-680 SB from SR 84 to SR 237	Open	VTA
Sunol JPA	I-680 NB from SR 84 to SR 237	Environmental approval expected summer 2015	VTA
Sunol JPA	I-680 NB and SB from SR 84 to Alcosta Boulevard	Open by 2030	—
Alameda CTC	I-580 EB from Hacienda Drive to Greenville Road I-580 WB from Greenville Road to San Ramon Road/Foothill Road Overcrossing	Under construction, open by 2015	LAVTA

Note:

* Transit agencies listed are those that serve Alameda County and are covered in this report. For example, WestCAT provides bus service to the Bay Bridge but is not included in the table above because it does not provide service in Alameda County.

NB = northbound, SB = southbound, EB = eastbound, WB = westbound

Source: MTC, Bay Area Express Lanes, 2014

3.5. Future Transit Projects

A number of major transit projects and plans are currently under development or in construction in Alameda County. The Inventory of Existing Plans, Studies, and Data (Technical Memorandum #1) discusses these projects and plans in detail. These projects are intended to expand the rail, bus, and ferry network capacity in Alameda County along the most congested corridors and to improve travel times and reliability along the most heavily used bus routes. Table 6 highlights the major transit projects.

Table 6: Future Alameda County Transit Projects

Project	Project Description	Operator	Anticipated Completion/Opening
AC Transit East Bay BRT	New bus rapid transit route between 20th Street in Oakland and San Leandro BART, primarily along International Boulevard and East 14th Street.	AC Transit	2016
AC Transit Line 51 Improvements	Reduce corridor delay and improve transit service along a 15-mile corridor through Berkeley, Oakland, and Alameda.	AC Transit	December 2015
BART Metro Vision	Identify new infrastructure needed to facilitate different types of services needed to serve BART Metro markets.	BART	TBA
BART extension – Livermore	BART is undergoing environmental analysis to determine a potential extension in the vicinity of Livermore.	BART	TBA
BART to Warm Springs	5.4-mile extension from existing Fremont BART station.	BART	Fall 2015
BART to San Jose	A planned 16-mile extension to Milpitas, San Jose and Santa Clara.	BART	Berryessa, 2018 Other locations TBA
Ferry Expansion Program	Expansion of ferry service to Berkeley and other cities in the region.	WETA	TBA

3.6. TDM Measures Supporting Transit

In addition to investing in improvements to transit capacity and efficiency that increase the supply of transit, Alameda CTC is also focused on managing travel demand to shift travel to alternative modes, including transit, and out of the most heavily congested peak hours. Transportation Demand Management (TDM) programs and policies at the regional, county, and local level are designed to reduce and efficiently manage transportation demand in Alameda County through land use and transportation management approaches, both of which support increasing transit use.

TDM strategies involve cost-effective ways to provide encouragement and incentives for people to use the various existing transportation options available to them, especially transit. These programs seek to maximize the transportation system's available capacity, thereby complementing public investments in transit systems and other alternatives to solo driving.

In Alameda County, like many other jurisdictions, TDM strategies are employed at a regional, county, and city level as well as through private entities, such as private employers, developers, homeowner associations, and non-profit organizations. Examples specifically involving transit include:

- At the regional level, MTC and the Bay Area Air Quality Management District (BAAQMD) have implemented a commuter benefits pilot program that applies to all Bay Area employers with 50 or more employees. The ordinance requires employers to offer one of four commuter benefits

options, each of which is intended to reduce vehicle miles traveled and employee commute costs. The benefits options that involve transit include employees offering to pay for employees' transit, vanpooling or bicycling expenses with pre-tax dollars, as allowed by federal law and an option for a transit or vanpool subsidy of at least $75 per month.

- MTC's 511.org program includes a Transit Trip Planner, which provides point-to-point transit directions and real-time information for all of the Bay Area's transit agencies.
- AC Transit's Easy Pass program is a TDM tool that allows employers and residential communities to purchase heavily discounted bus passes for their employees or residents to use on this operator's bus service.
- At the county level, Alameda CTC funds the Guaranteed Ride Home Program. This countywide program offers eligible employees a way of getting home during emergencies when their regular transit, carpool, or other alternative mode choice is not available.
- An example of a city-level program includes the City of Alameda's optional in-lieu parking fees for developments which are used to pay for transit and bicycling improvements.

Other approaches to incentivize transit use and reduce parking demand and traffic impacts are being utilized by employers. These include:

- Employer supported "last-mile" connections to transit, including bike-sharing and employer provided shuttles.
- Employer provided transit service for long-distance trips.
- Limiting parking supply on-site, charging employees for parking, or allowing employees to "cash-out" and exchange parking for a transit subsidy.

4.0. Demographics

The following section describes demographics of Alameda County residents and transit riders, including age, annual household income, and vehicle ownership.

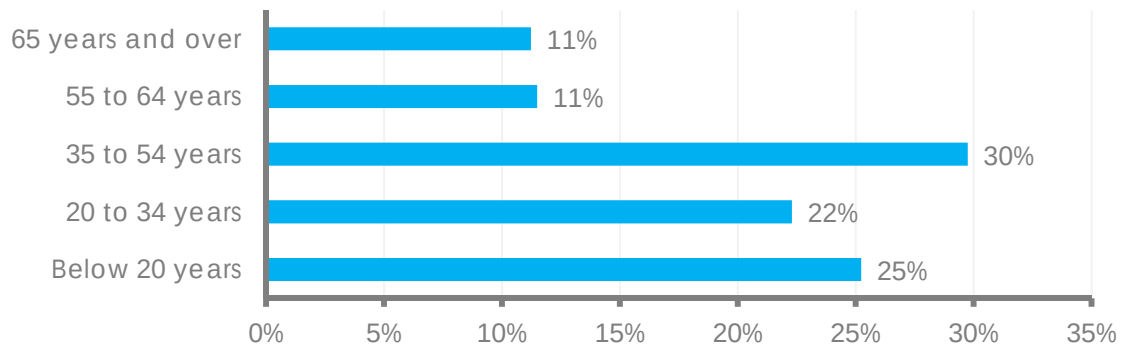
The information regarding the distribution of age, household income, and household vehicle ownership provides a means for understanding how the transit-riding population compares with the county as a whole. The comparison of transit rider characteristics to the characteristics of the general population in each of the transit service areas provides insight into the different populations and needs that transit currently serves in Alameda County.

4.1. Characteristics of Alameda County Residents

A. Age

Alameda County has a younger population, as a large majority of Alameda County residents (78 percent) are below the age of 55 (see Figure 9.) The county's median age is relatively aligned with the state's median age: In 2015, the median age of the Alameda County population was 38 years old, compared to a statewide average of 36 years.[7]

Figure 9: Age of Alameda County Residents



Note: Totals may not add up to 100 percent due to rounding.

Source: 2012 American Community Survey (5-year Data Profiles)

B. Household Income

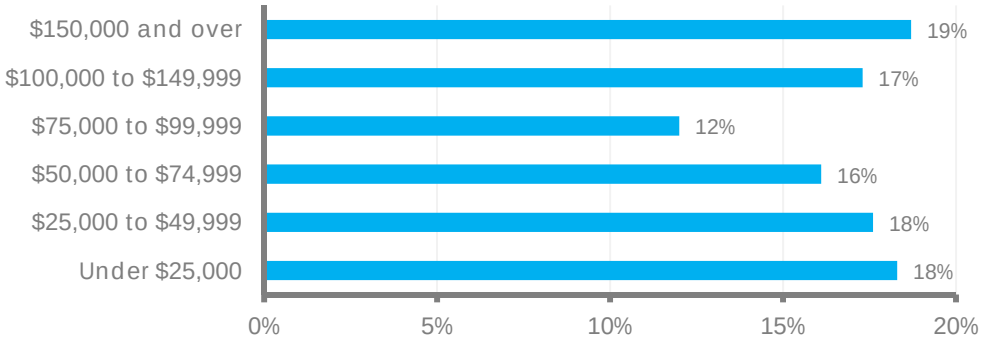
All income levels are represented roughly evenly in Alameda County. Approximately 48 percent of all Alameda County households have an annual

[7] Alameda County Public Health Department, http://www.healthyalamedacounty.org/index.php?module=DemographicData&func=ddview&varid=1585&varset=1&topic1=County&topic2=Alameda&ddloc=&regcomp=1&sregcomp=1&levels=-1&action=Refresh&ve=tab&pct=0, 2015 Data, last updated January 2015, June 19, 2015,.

income of $75,000 or more. Nearly 18 percent of Alameda County households earn $25,000 or less annually (see Figure 10).[8]

The median income in 2014 in Alameda County was $72,112 compared to $61,094 statewide.[9] California's Department of Housing and Development defines an Alameda County household with an annual income of $60,800 or below as "low income" and an annual household income of $25,250 as "extremely low income." As such, about 18 percent of Alameda County households can be considered to have "extremely low incomes".

Figure 10: Annual Household Incomes in Alameda County



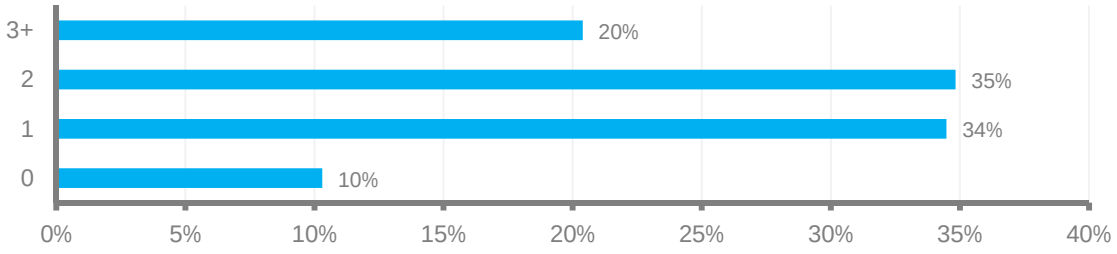
Note: Totals may not add up to 100 percent due to rounding.

Source: 2012 American Community Survey (5-year Data Profiles)

C. Vehicle Ownership

Although most Alameda County residents belong to households that own at least one vehicle, 10 percent of households do not own a car. Figure 11 shows the distribution of vehicle ownership across households in Alameda County.

Figure 11: Number of Vehicles in Alameda County Households



Note: Totals may not add up to 100 percent due to rounding.

Source: 2012 American Community Survey (5-year Data Profiles)

[8] According to the US Census Bureau, an average household in Alameda County consists of nearly three people.

[9] US Census Bureau, http://quickfacts.census.gov/qfd/states/06/06001.html, updated December 4, 2014.

4.2. Characteristics of Transit Riders

The following sections describe characteristics of transit riders for four transit providers in Alameda County: AC Transit, BART, WETA San Francisco Bay Ferry, Union City Transit, and LAVTA Wheels. Information on rider characteristics for the other transit properties operating in Alameda County (e.g., ACE, Capitol Corridor, County Connection (CCCTA), VTA) is not provided because route/station-specific ridership characteristics were not available for Alameda County.

To compare the transit survey data with the transit agencies' area of service, the American Communities Survey data (2012) by census tracts within a quarter-mile of transit agencies' bus stops were aggregated for each agency.

A. AC Transit

1. AC Transit Rider Summary

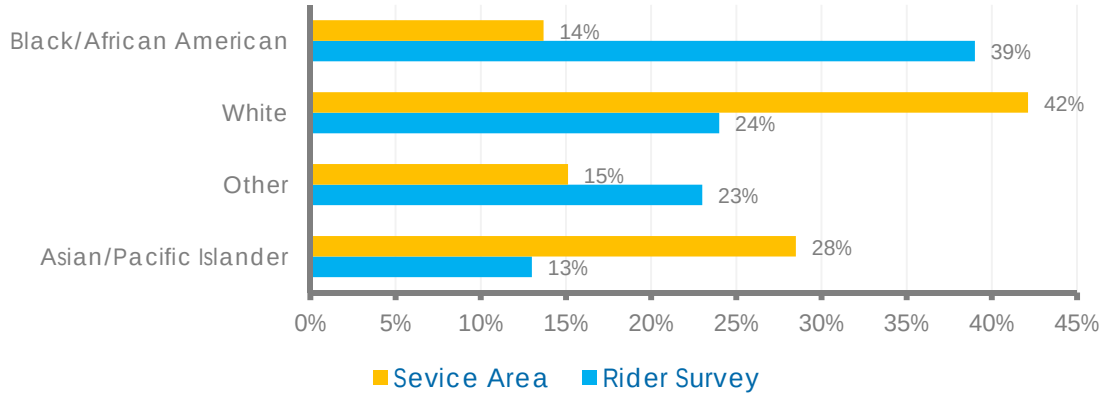
AC Transit's 2012 Passenger Study provides demographic characteristics of its riders. According to the Study, most AC Transit riders are non-White (76 percent), and significant proportions of riders are younger (43 percent are under 30 years of age), have an annual income of under $25,000 (49 percent), and do not have access to a car (40 percent). About three-quarters of AC Transit's passengers are non-White, which contrasts with the approximately 57 percent of residents in the service area who are non-White. About 28 percent of AC Transit passengers are in their 20's, which is higher than the percentage of residents in the service area who are in their 20's (15 percent). Nearly half of AC Transit's riders (49 percent) have a household income of $25,000 or less, which is more than double the percentage of residents in the service area in that income range (20 percent).

2. Race/Ethnicity

African Americans represent 39 percent of AC Transit users. Twenty-four percent of respondents identified themselves as White, 13 percent of respondents indicated they were of Asian origin, and 23 percent reported as "other" or "multi-racial." See Figure 12.

The racial mix of AC Transit's ridership is very different from that of the general population in its service area. The percentage of African American or Black riders is nearly three times higher than the percentage of the service area population.

Figure 12: Race/Ethnicity of AC Transit Riders



Note: Totals may not add up to 100 percent due to rounding.

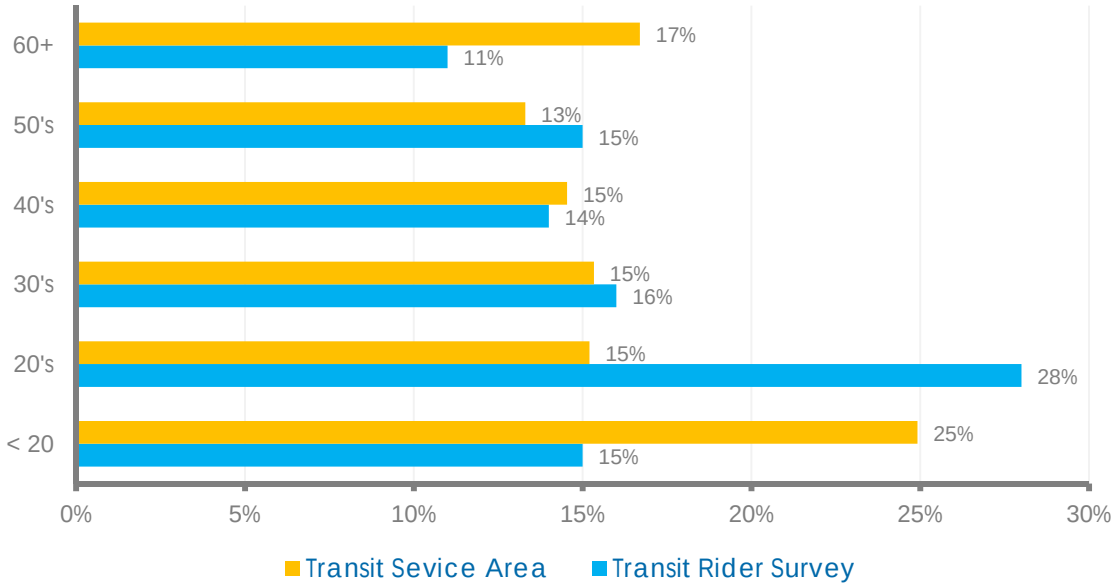
Sources: AC Transit 2012 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

3. Age

AC Transit's rider survey results show a relatively young population using its service. About 43 percent of respondents are in their 20s or younger and nearly three-quarters are under 50 years of age. Those above the age of 60 comprise 11 percent of AC Transit riders, and those below the age of 20 constitute 15 percent of AC Transit riders.

For people in their 30's to 50's, the percentage of riders compared to that of the population in the service area is very similar. There are fewer riders over 60 years of age and less than 20 years compared with the service area's population. Riders in their 20s are nearly twice the percentage of that age group in the service area population (see Figure 13).

Figure 13: Age of AC Transit Riders



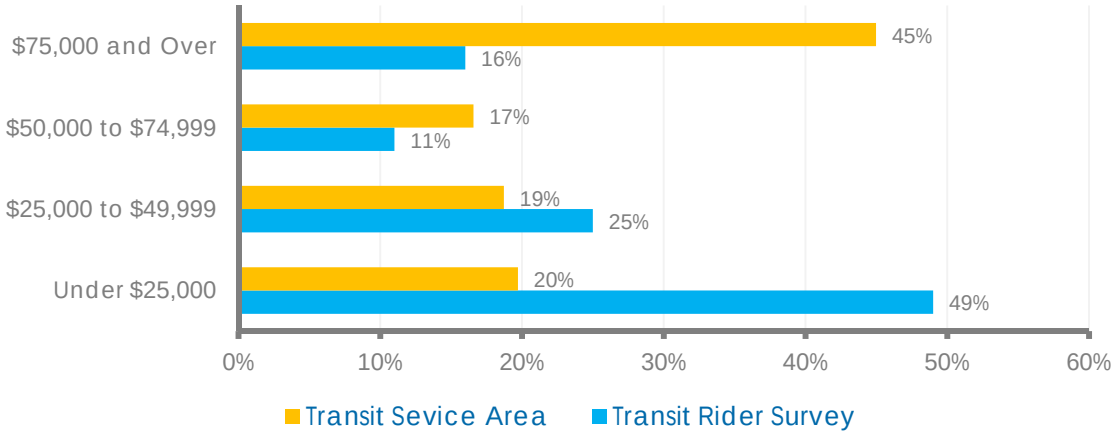
Note: Totals may not add up to 100 percent due to rounding.

Sources: AC Transit 2012 Passenger Study; 2012 American Community Survey (5-year Data Profiles))

4. Household Income

AC Transit riders are disproportionately from low income households. Nearly half of riders reported an annual household income below $25,000 and about 75 percent of riders indicated an annual household income less than $50,000. These same groups represent about 40 percent of service area households (see Figure 14).

Figure 14: Annual Household Incomes of AC Transit Riders



Note: Totals may not add up to 100 percent due to rounding.

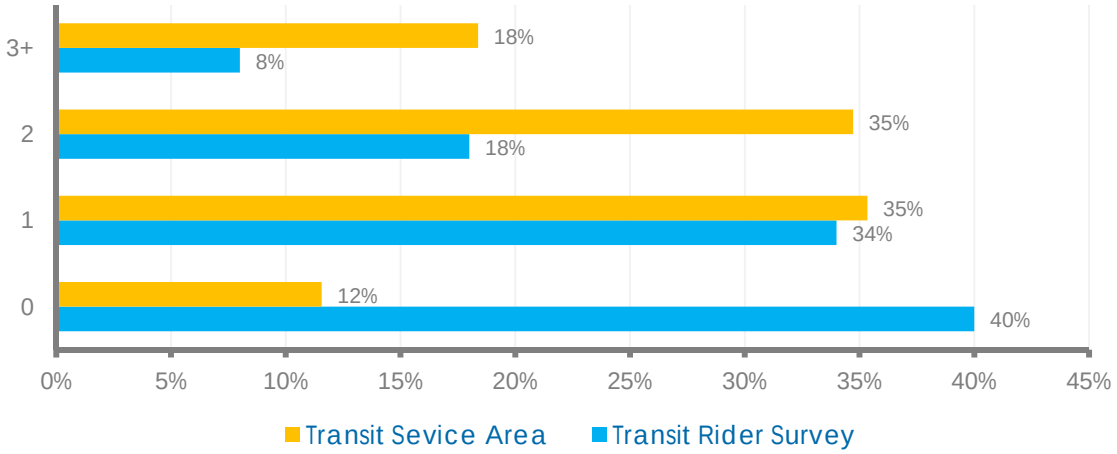
Sources: AC Transit 2012 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

5. Vehicle Ownership

AC Transit carries a high proportion of transit-dependent riders. Forty percent of AC Transit riders indicated that they were from households with no vehicles, while one-third of the surveyed passengers said they have only one car in their household. Conversely, only 26 percent of AC Transit riders reported that they were from households with two or more vehicles.

The vehicle ownership of households in the service area is quite different than AC Transit riders, with a much higher percentage of service area households owning multiple cars (see Figure 15).

Figure 15: Number of Vehicles in AC Transit Riders' Households



Note: Totals may not add up to 100 percent due to rounding.

Sources: AC Transit 2012 Passenger Study; 2012 American Community Survey (5-year Data Profiles))

B. BART

1. BART Rider Summary

Characteristics of BART riders traveling to and/or from Alameda County were developed using data from the 2008 BART Station Profile Study. A large number of BART passengers travel between the East Bay and San Francisco. The agency defines its "Metro Core" area as locations where transit can be highly competitive for all trips in a contiguous area. This includes BART's service area between Daly City and Richmond, MacArthur and Bay Fair stations. BART's transbay service area includes some parts of the Metro Core, namely the inner East Bay (i.e., West Oakland, downtown Oakland) and San Francisco. BART's recent capacity studies have recommended short- and long-term capital investments in the inner East Bay.[10]

[10] BART, Sustainable Communities Operations Analysis, June 2013.

BART has a total of twenty stations within Alameda County, and the agency views each station as unique, collecting rider information that is specific to each station. In an effort to mirror Alameda CTC's sub-county planning designations (North, Central, South and East), this report selected a singular BART station to reflect the planning designations. The stations were selected based on assumed compatibility to represent each sub-county area. Based on this assumption, Downtown Berkeley, 12th Street/Downtown Oakland, and Coliseum/Oakland Airport stations were selected to represent North County, Hayward station for Central County, Fremont station for South County, and Dublin/Pleasanton station for East County. Three stations were selected for North County, as this planning area encompasses a wider range of land uses and densities.

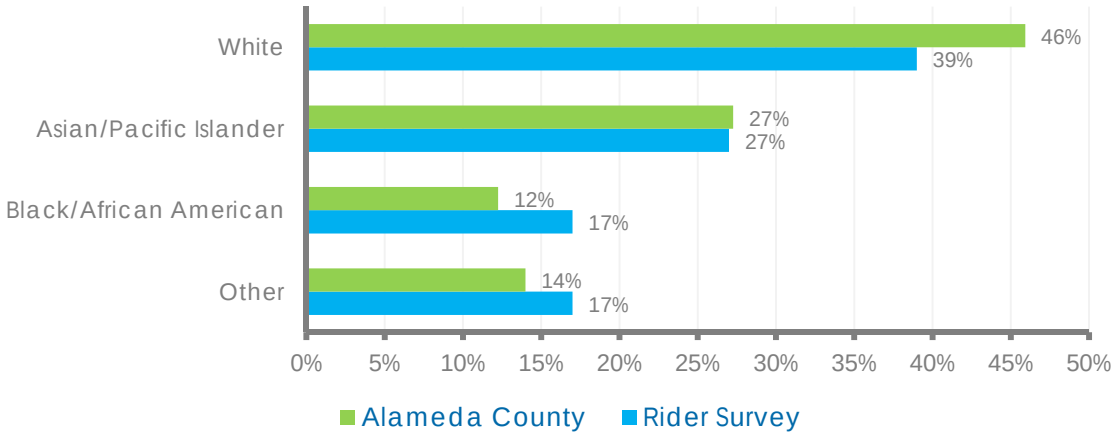
The extent of the transit service areas for BART stations in Alameda County, particularly the service areas for the stations in Dublin and Pleasanton, makes it infeasible to compare BART transit rider characteristics with the characteristics of the full population within the service area. Because the catchment area is large, the comparison was made to the demographics of Alameda County as a whole.

According to the 2008 BART Station Profile Study, the largest proportion of BART riders using stations in Alameda County were non-White (61 percent), fell within the 25-to-44 year age range (46 percent), and had annual incomes over $75,000 (48 percent). About 96 percent of BART riders were aged 18 to 64, which are traditional working ages and may reflect the commuter rail nature of the BART system. Over half of BART passengers and Alameda County residents were non-White (61 percent and 54 percent, respectively); however riders who identify as White make up the greatest proportion (39 percent) of any single race/ethnicity. Income levels between BART riders and Alameda County residents are comparable and do not vary more than three percentage points. (Vehicle ownership data was not available for BART patrons.)

2. Race/Ethnicity

Approximately 40 percent of BART users at the selected stations in Alameda County identified themselves as White, 27 percent selected Asian or Pacific Islander as their race/ethnic background, 17 percent indicated they were Black or African American, and nearly 13 percent reported they were of Hispanic origin. When compared to other transit providers, the surveyed BART riders more closely reflect the overall demographics of the Alameda County population (see Figure 16).

Figure 16: Race/Ethnicity of BART Riders



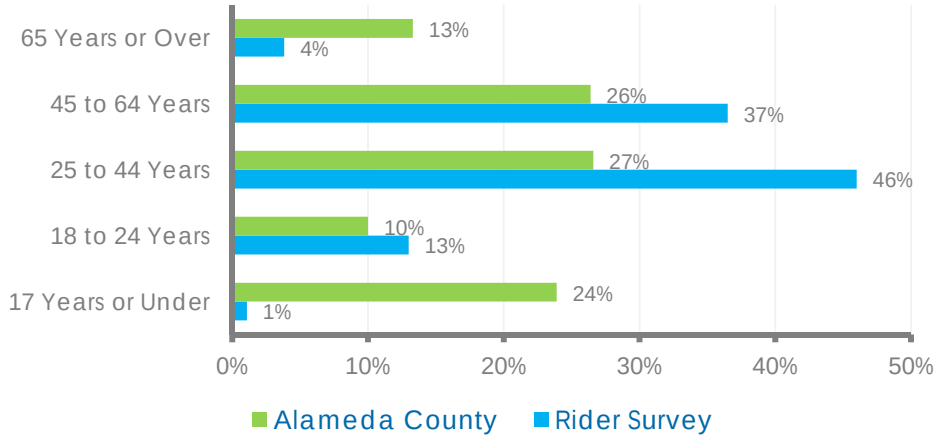
Note: Totals may not add up to 100 percent due to rounding.

Sources: BART Station Profile Study (2008); 2012 American Community Survey (5-year Data Profiles)

3. Age

In 2008, nearly half of BART riders in Alameda County (46 percent) were between the ages of 25 and 44 years old, about 37 percent were between the ages of 45 and 64 years old, and approximately 14 percent were 18 years or younger (see Figure 17).

Figure 17: Age of BART Riders



Notes: BART did not survey riders under 13 years of age.

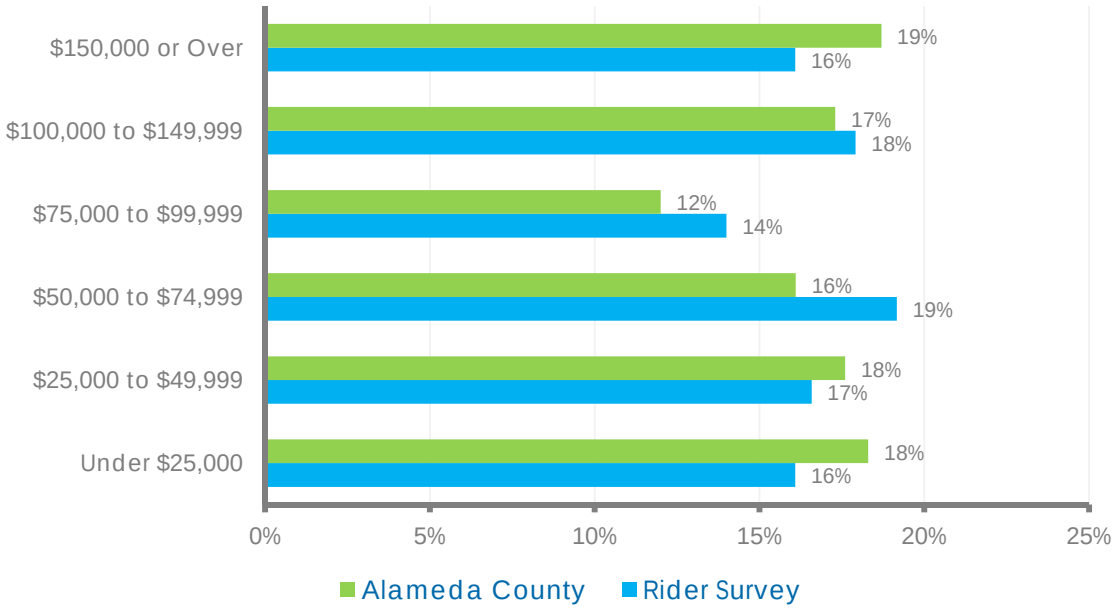
Totals may not add up to 100 percent due to rounding.

Sources: BART Station Profile Study (2008); 2012 American Community Survey (5-year Data Profiles)

4. Income

All household income levels were roughly equally represented by BART riders at the selected BART stations in Alameda County. The income distribution also fairly closely reflects the general population of Alameda County; unlike other transit systems which tend to disproportionately serve lower-income populations (see Figure 18).

Figure 18: Annual Household Income of BART Riders



Note: Totals may not add up to 100 percent due to rounding.

Sources: BART Station Profile Study (2008); 2012 American Community Survey (5-year Data Profiles)

5. Vehicle Ownership

Information regarding household vehicles in BART riders' homes was not available.

C. WETA San Francisco Bay Ferry

1. Ferry Rider Summary

The rider characteristics presented in the following section for the ferry system represent riders from all ferry lines, not just riders traveling to or from Alameda County. The extent of the transit service areas for the ferry makes it infeasible to compare ferry service rider characteristics with the characteristics of the full population within the service area. Therefore, this section presents demographic characteristics of ferry service riders and compares that data to the demographics of Alameda County.

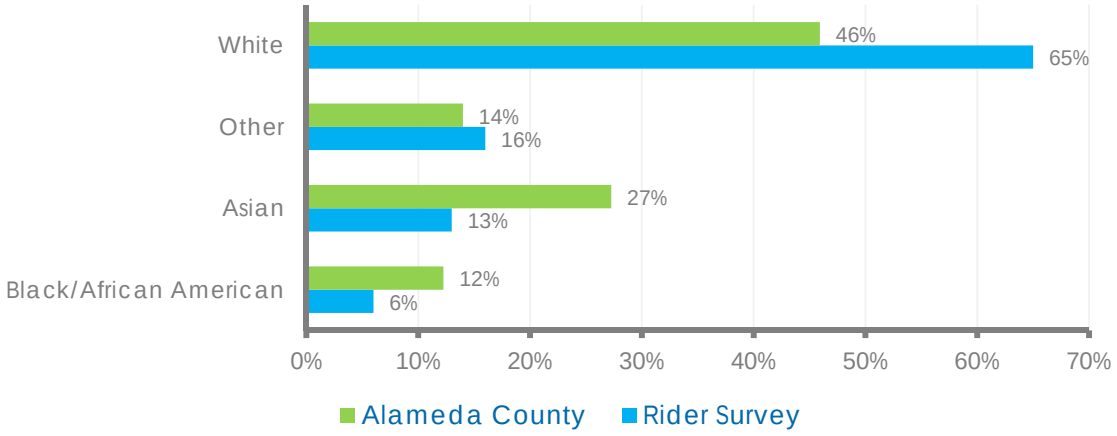
WETA's Draft 2013 SF Bay Ferry Passenger Study provides an overview of the agency's rider characteristics. Most WETA patrons are White (65 percent), over 40 years of age (61 percent), have an annual income of $75,000 or more (74 percent), and have access to one or more household vehicles (98 percent). This contrasts with Alameda County's much lower percentages of people who are White (46 percent), over 40 (45 percent), have an annual income of $75,000 or more (48 percent), and access to one or more household vehicles (90 percent).

2. Race/Ethnicity

As summarized in Figure 19, about two-thirds of ferry riders (65 percent) identified themselves as White, while less than 20 percent of the respondents identified with each of the other race/ethnic groups (13 percent Asian, 16 percent "Other", and six percent Black or African American).

These characteristics differ from bus riders' demographics, but are similar to the BART rider characteristics, which also show a higher percentage of Whites and Asians using transit than the population of Alameda County as a whole. This may also reflect the broader markets served by WETA, which includes Marin County and Solano County riders.

Figure 19: Race/Ethnicity of Ferry Riders



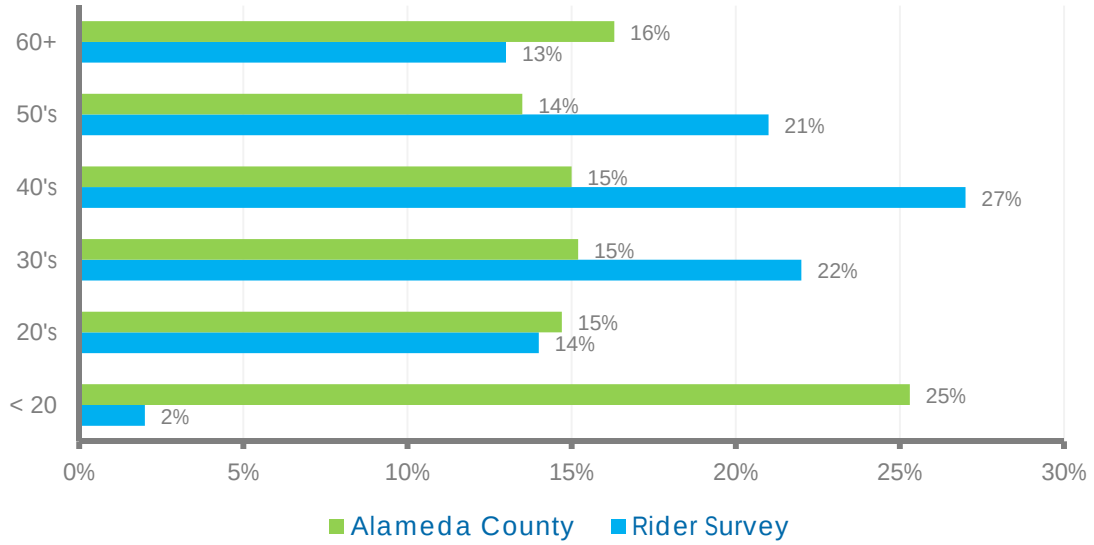
Note: Totals may not add up to 100 percent due to rounding.

Sources: Draft SF Bay Ferry 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles))

3. Age

Approximately 70 percent of WETA riders ranged between 30 years and 60 years of age. The majority of ferry riders fall into an older age range than most riders of other major Alameda County bus services such as AC Transit, LAVTA and Union City Transit. This reflects a likely preponderance of commuters using this service (see Figure 20).

Figure 20: Age of Ferry Riders

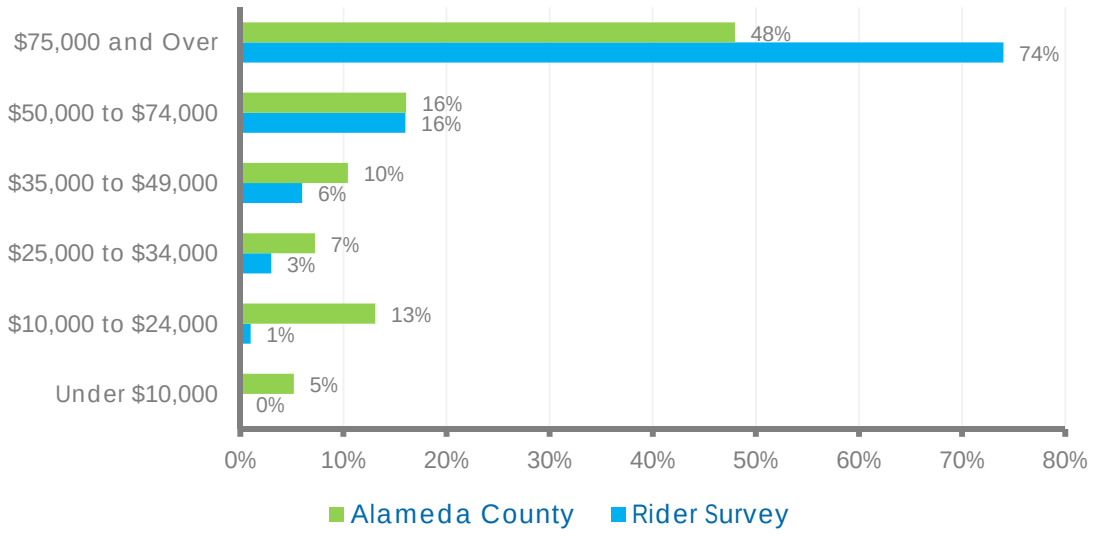


Note: Totals may not add up to 100 percent due to rounding.
Sources: Draft SF Bay Ferry 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

4. Income

While a significant proportion of Alameda County bus riders fall into low-income groups, the vast majority of WETA riders (approximately 74 percent) reported annual household incomes of $75,000 or more. This characteristic is unique among the transit systems serving Alameda County (see Figure 21).

Figure 21: Annual Household Income of Ferry Riders

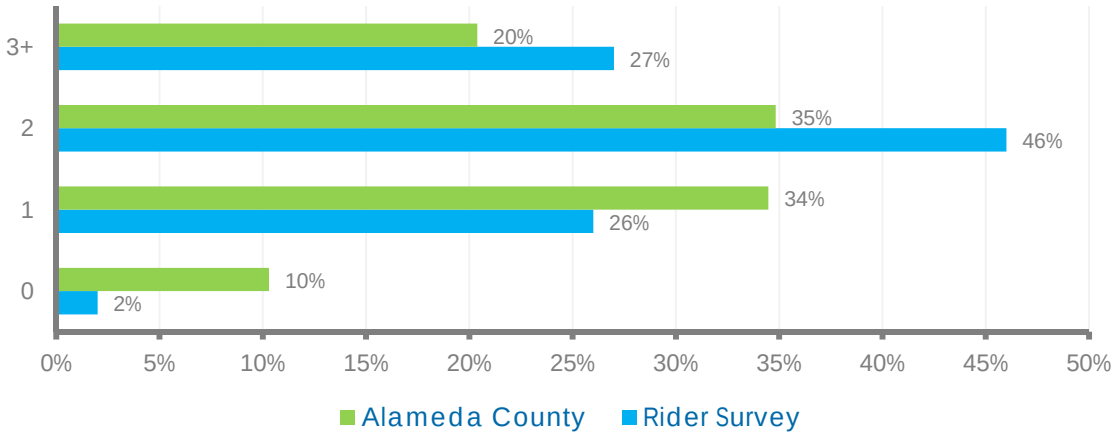


Note: Totals may not add up to 100 percent due to rounding.
Sources: Draft SF Bay Ferry 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

5. Vehicle Ownership

A very small proportion of WETA riders reported they lived in households with no vehicles. Most WETA riders (46 percent) were from households with two vehicles, while another 27 percent of WETA riders were from household with three or more vehicles. Ferry riders tend to have a very low transit dependency when compared to other transit riders in Alameda County (see Figure 22).

Figure 22: Number of Vehicles in Ferry Riders' Households



Note: Totals may not add up to 100 percent due to rounding.

Sources: Draft SF Bay Ferry 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

D. Union City Transit

1. Union City Transit Rider Summary

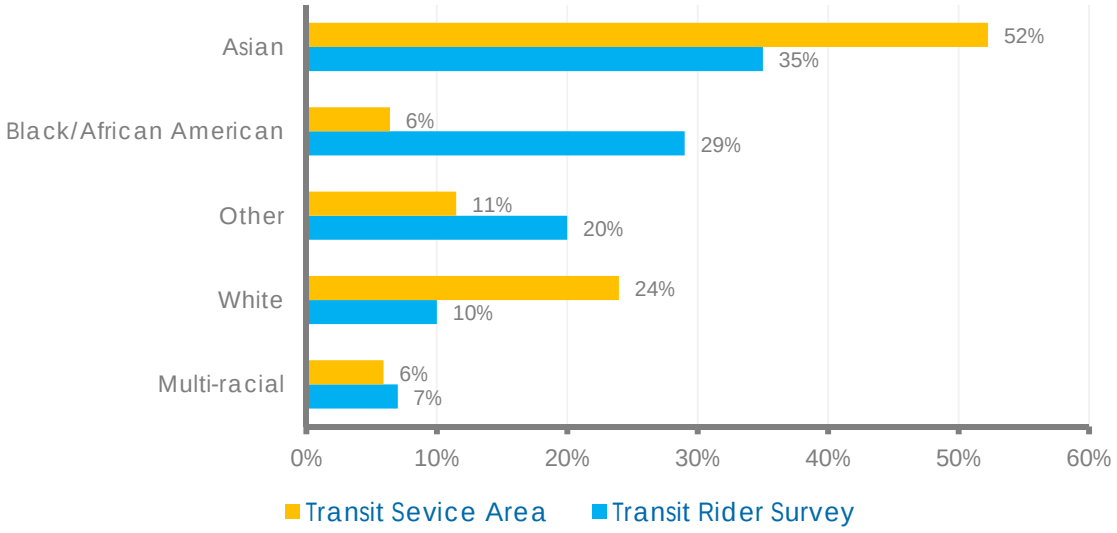
The 2013 Union City Transit Passenger Study provides an overview of characteristics of this operator's riders. Generally, most Union City Transit patrons are non-White (90 percent), have lower incomes (43 percent have an annual income of less than $25,000), and have access to one or more household vehicles (74 percent). The majority of both Union City Transit passengers and residents in the service area are non-White (90 and 76 percent, respectively). The age distribution of Union City Transit riders is similar to the overall population in the service area. However, there was wide variation in the upper and lower income levels between Union City Transit riders and residents in the service area, including the $75,000 and over range (19 and 56 percent, respectively); the $10,000 to $24,999 range (25 and 10 percent, respectively); and the under $10,000 range (18 and three percent, respectively). About 26 percent of Union City Transit passengers do not have access to a car, in contrast to five percent of residents in the service area.

2. Race/Ethnicity

As summarized in Figure 23, approximately 35 percent of the Union City Transit riders surveyed identified themselves as Asian, and another 29 percent identified as Black/African American. Approximately 27 percent of riders noted they were multi-racial or another ethnicity.

Similar to AC Transit and Wheels riders, Union City Transit ridership includes a higher percentage of Black or African American and Other riders compared to the general population in the service area, while the percentage of riders that are White or Asian is disproportionately low.

Figure 23: Race/Ethnicity of Union City Transit Riders



Note: Totals may not add up to 100 percent due to rounding.

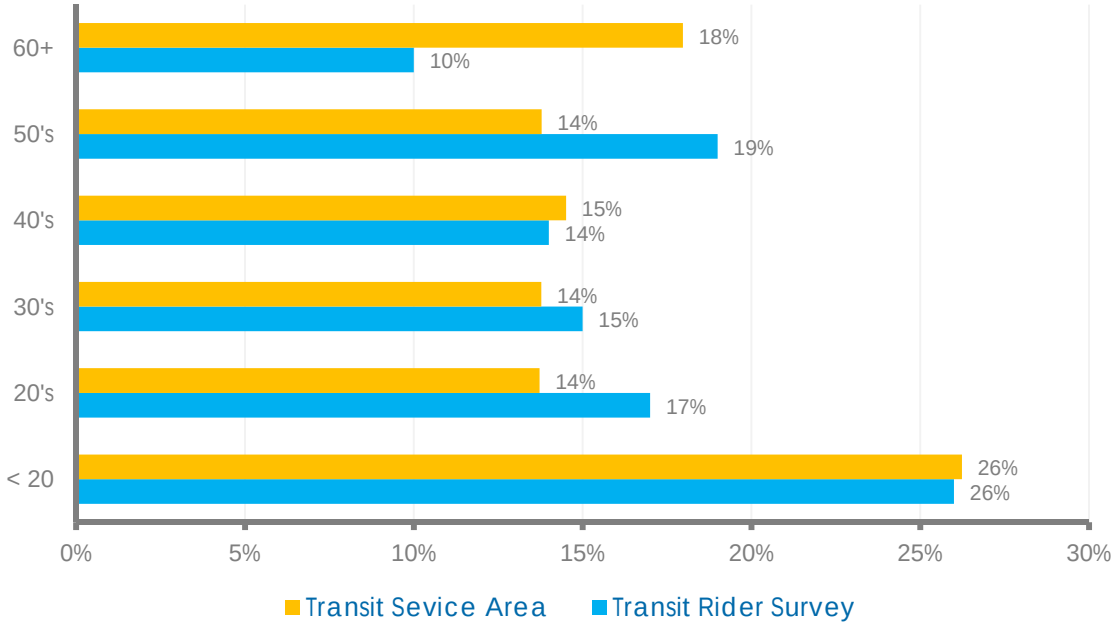
Sources: Draft Union City Transit 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

3. Age

Most survey respondents were of working-age, between 25 and 64 years old. Twenty percent of Union City Transit passengers are under 20 years of age; this is comparable to the percent of young residents in the service area. This is likely due to the fact that Union City Transit provides bus service for students rather than relying on school district "yellow school bus service" (see Figure 24).

Compared with AC Transit and LAVTA, the age distribution of Union City Transit riders is more similar to the overall population in the service area. The age groups with the most differences are the 20s and 50s groups, which have higher percentages of riders and the 60+ age group, which is lower.

Figure 24: Age of Union City Transit Riders



Note: Totals may not add up to 100 percent due to rounding.

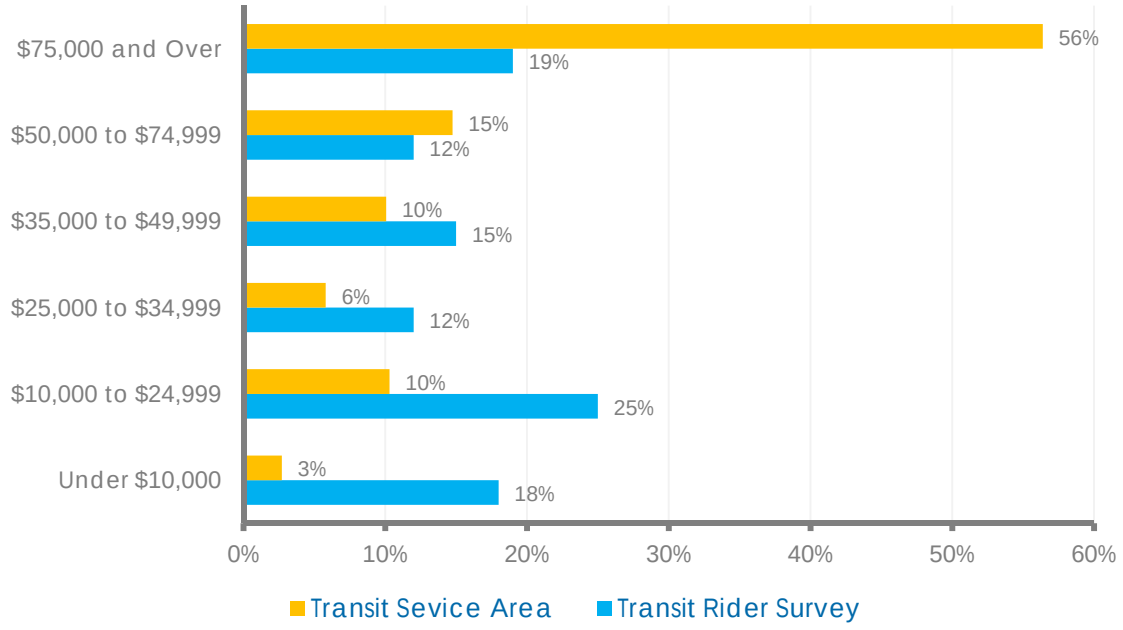
Sources: Draft Union City Transit 2013 Passenger Study; American Communities Survey (2012)

4. Income

Generally, Union City Transit riders had lower incomes compared to people in the general service area (see Figure 25). A large proportion of survey respondents (43 percent) indicated that their household income was less than $25,000. Nearly 27 percent of surveyed riders had household incomes ranging between $25,000 and $49,999. According to the 2012 American Community Survey, the median income in Union City was $83,629 (which is higher than the Bay Area median income of $75,990).

The percentage of Union City Transit riders with incomes less than $50,000 is disproportionate to their percentage of the general population in the transit service area, while the percentage of riders with incomes over $75,000 is disproportionately low.

Figure 25: Annual Household Incomes of Union City Transit Riders



Note: Totals may not add up to 100 percent due to rounding.

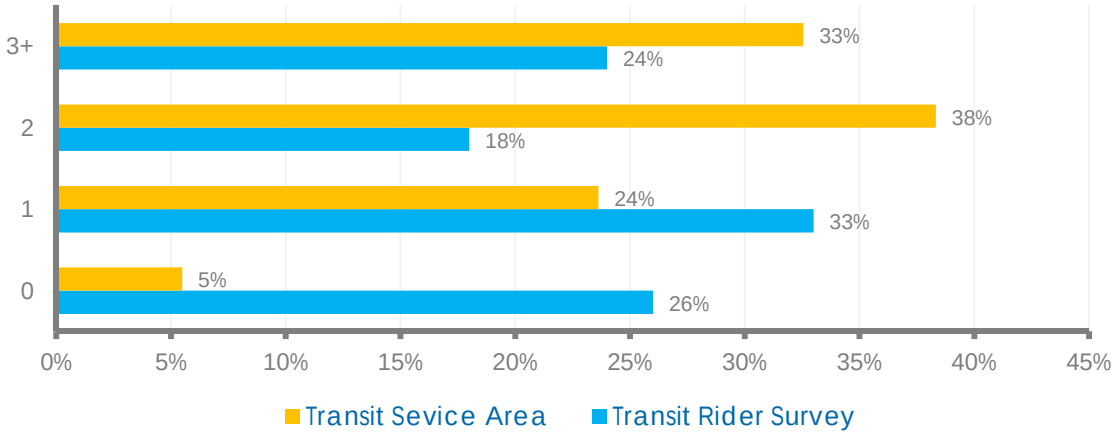
Sources: Draft Union City Transit 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

5. Vehicle Ownership

Survey results indicate that nearly 26 percent of Union City Transit riders are from households with no vehicles (see Figure 26). In contrast, only five percent of households in Union City have no vehicles (lower than the Bay Area average of 10 percent zero-vehicle households). The "no vehicle" households are largely concentrated in areas that have the best coverage by Union City Transit service.[11] Similar to AC Transit and Wheels riders, Union City Transit riders have disproportionally fewer vehicles available in their households than city residents as a whole.

[11] Union City Transit, Short Range Transit Plan 2013

Figure 26: Number of Vehicles in Union City Transit Riders' Households



Note: Totals may not add up to 100 percent due to rounding.

Sources: Draft Union City Transit 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

E. LAVTA Wheels

1. Wheels Rider Summary

Findings from LAVTA's Draft 2013 Wheels Passenger Study provide an overview of demographic characteristics of users of Wheels service. Generally, the greatest proportion of Wheels riders are non-White (58 percent), between the ages of 20 and 39 (45 percent), have an annual household income between $10,000 and $25,000 (25 percent), and have access to at least one household vehicle (65 percent). In contrast, there is a lower percentage of non-White residents in the Wheels service area (30 percent). Residents in the service area also have higher annual incomes (with 67 percent earning $75,000 or over compared to 19 percent of Wheels passengers) and access to household vehicles (97 percent and 65 percent, respectively).

2. Race/Ethnicity

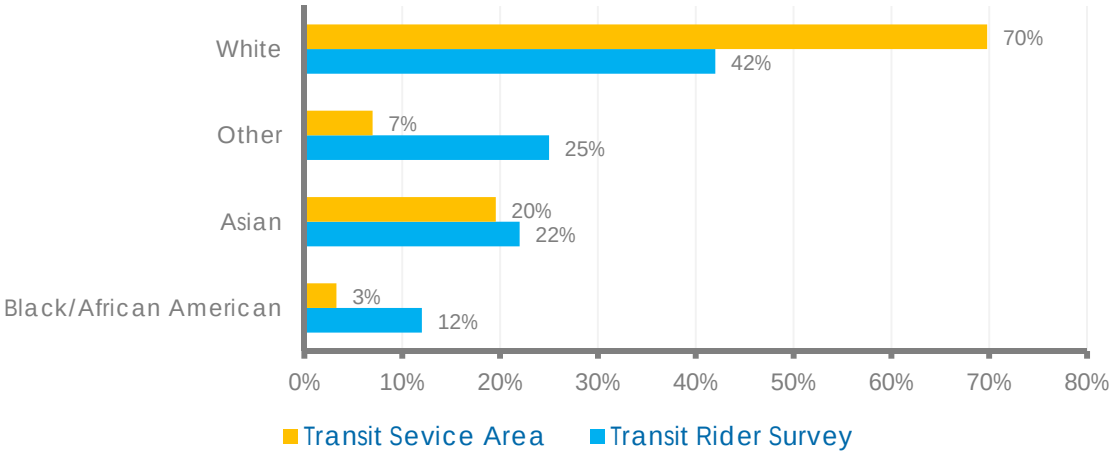
In the Draft 2013 Wheels Passenger Study, the largest proportion of Wheels riders (42 percent) identified themselves as White, 22 percent indicated they were of Asian origin, 25 percent selected "other" as their race/ethnic background, and 12 percent selected Black/African American (see Figure 27). In the survey, nearly 35 percent of respondents identified themselves as of Hispanic origin.[12]

The percentage of African American or Black riders is about four times that of the service area population, and similarly the percentage of riders that

[12] Although the LAVTA passenger survey indicates 35 percent of riders identified themselves as having Hispanic origin, it does not reflect how this corresponds with riders' responses when they were asked to select their U.S. census race category (shown in Figure 27).

responded "other" for race or ethnicity is more than four times their percentage amongst the general service area population.

Figure 27: Race/Ethnicity of Wheels Riders



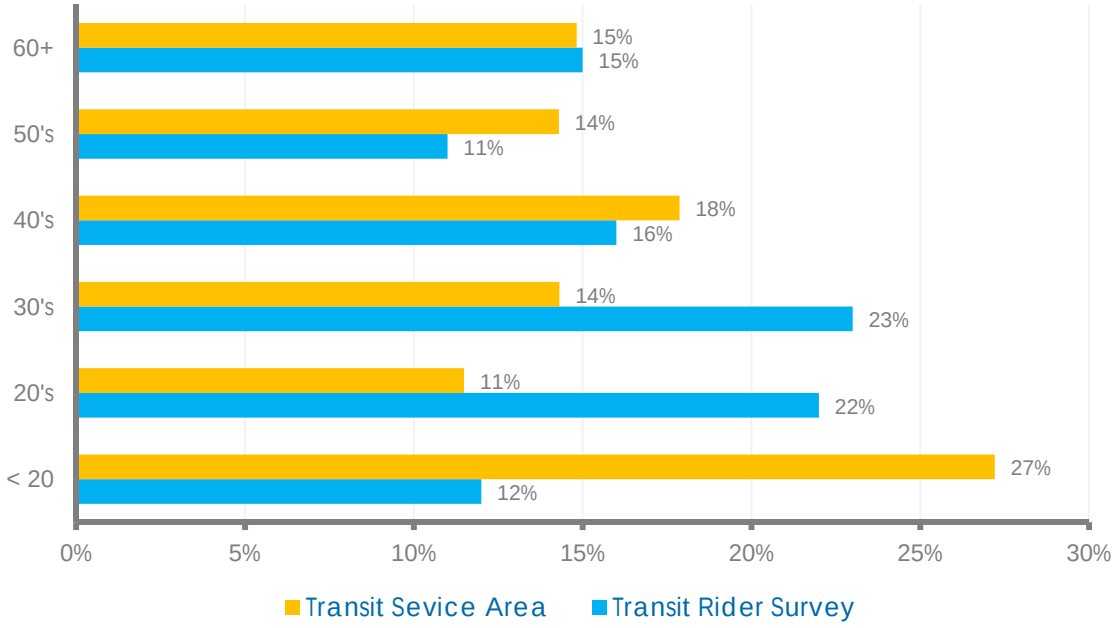
Note: Totals may not add up to 100 percent due to rounding.

Sources: Draft Wheels 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles))

3. Age

According to survey results, the majority of Wheels riders (45 percent) were between the ages of 20 and 40, while 12 percent indicated they were below the age of 20. The age distribution of Wheels riders is quite different from that of the service area population. The service area population has a significantly greater proportion of people under age 20 (27 percent compared with 12 percent for transit riders), but lower proportions in their 20's and 30's as compared with Wheels riders. Approximately 42 percent of Wheels riders were 40 years or older (see Figure 28).

Figure 28: Age of Wheels Riders



Note: Totals may not add up to 100 percent due to rounding.

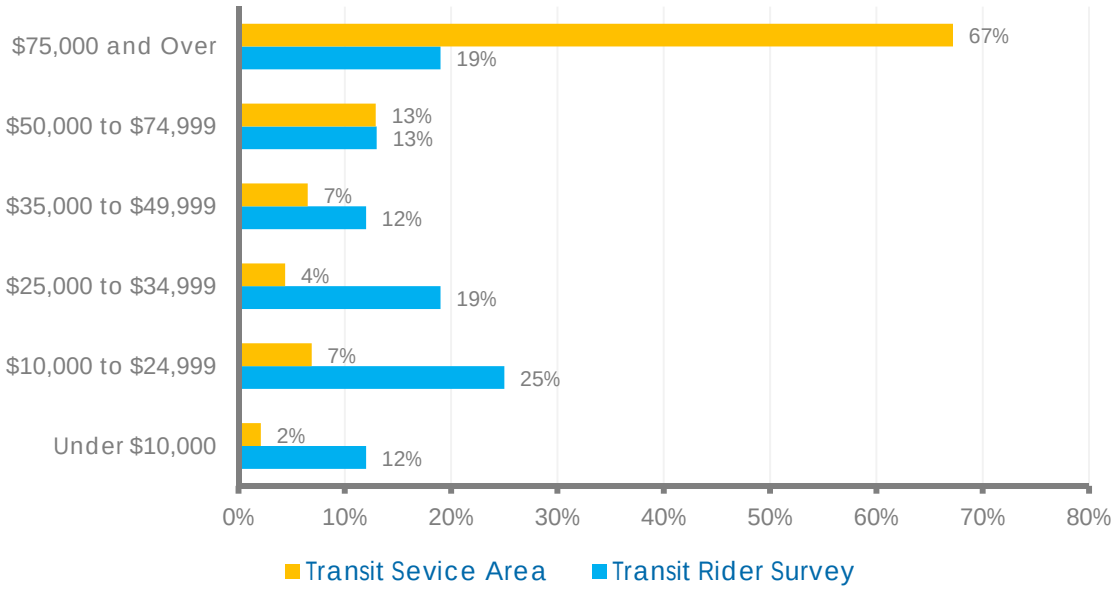
Sources: Draft Wheels 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

4. Income

Most Wheels riders have household incomes significantly lower than the median household income in the service area. The median income in the Wheels service area, which includes the cities of Dublin, Pleasanton, and Livermore, is higher than the Bay Area median household income of $75,990.[13] Approximately 55 percent of Wheels riders come from households with an annual income below $35,000. Nearly 12 percent of riders have annual household incomes ranging between $35,000 and $49,000. Only 30 percent of riders come from households with annual incomes higher than $50,000, whereas 80 percent of service area residents have annual household incomes of $50,000 or more (see Figure 29).

[13] Bay Area Census, http://www.bayareacensus.ca.gov/bayarea.htm, June 19, 2015,

Figure 29: Annual Household Income of Wheels Riders



Note: Totals may not add up to 100 percent due to rounding.

Sources: Draft Wheels 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

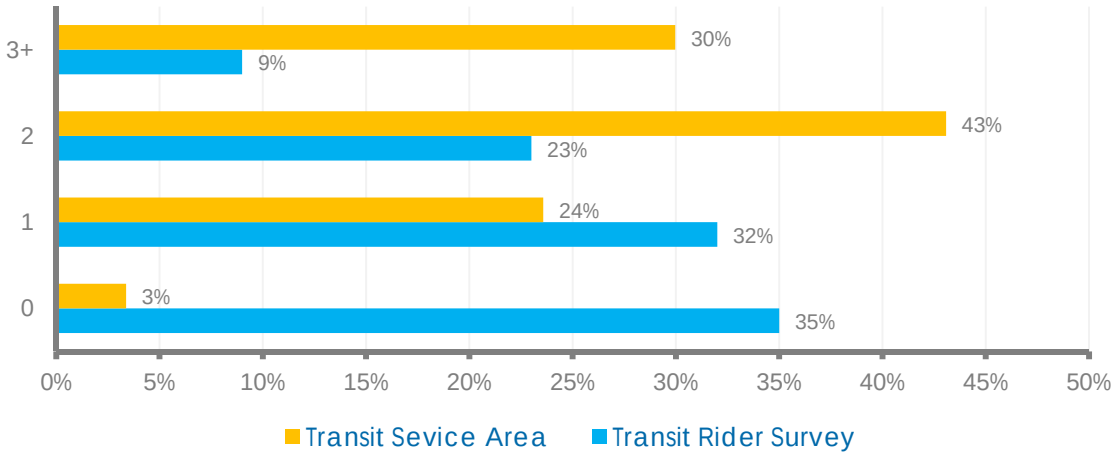
4. Vehicle Ownership

The percentage of zero-vehicle households (three percent) in the Wheels service area is lower than the Bay Area average of 10 percent.[14] Approximately 35 percent of weekday Wheels riders come from households with no vehicles and nearly 56 percent of Wheels riders do not have a driver's license. Thirty-two percent of riders come from a household with one vehicle, and nearly 30 percent come from a household with two vehicles or more.

The vehicle ownership of households in the service area is quite different compared with Wheels riders, with a much higher percentage of service area households owning multiple cars (see Figure 30).

[14] LAVTA, Short Range Transit Plan 2012

Figure 30: Number of Vehicles in Wheels Riders' Households



Note: Totals may not add up to 100 percent due to rounding.

Sources: Draft Wheels 2013 Passenger Study; 2012 American Community Survey (5-year Data Profiles)

4.3. Summary of Transit Rider Characteristics

All the operators that primarily operate in Alameda County share a number of characteristics among the transit riders that use their system. With the exception of BART and WETA, the operators discussed in this section generally provide community, local, intra-county, and regional bus services. Outside of regional bus services (such as the transbay routes operated by AC Transit), bus ridership is typically focused on intra-county and local travel. Common transit ridership characteristics include:

- Approximately 30 percent of transit riders for all operators have annual household incomes of less than $50,000, defined as lower income;
- At least 30 percent of transit riders for all operators except WETA have one or zero vehicles in their households, indicating that a large proportion of transit riders are transit dependent;
- The median income of transit riders for each bus operator is less than the average income level of the service area that the operator serves;
- WETA has the highest reported income levels among survey respondents, with AC Transit reporting the highest proportion of low income riders; and
- BART's rider demographics (income and race) most closely match or exceed the county's demographics compared to all other operators.

These statistics highlight a bus ridership that relies heavily on transit and may not have access to a vehicle. Transit dependent riders typically make more local than regional trips.

In addition to sharing some of the same transit rider characteristics, individual operators also have unique characteristics of their own, such as:

- Union City Transit has the highest percentage (26 percent) of youth ridership, while BART has the lowest (one percent)
- Wheels has the highest percentage (15 percent) of adults over 65 riding its system, while BART has the lowest (four percent)
- BART has the highest percentage of 25-45 year olds (83 percent); and
- WETA has the highest percentage (74 percent) of riders with household incomes greater than $75,000

BART's rider demographics demonstrate that while BART does provide local service within Alameda County, many of its riders use the system as a regional commuter service, which is evidenced by the low percentage of youth and seniors, riders who typically do not make long distance trips. Conversely, AC Transit, Wheels, and Union City Transit carry much higher proportions of youth and seniors, indicating that those trips are focused on bringing people to schools and locally based activities and destinations.

The different characteristics highlighted here speak to the different types of riders that each operator serves and also reflects the unique communities in which they operate. Alameda County is a large county with a diverse set of geographic sub-regions that function differently based on location, local land uses and the built environment itself. The transit ridership characteristics highlighted in this report are a reflection of those similarities and differences.

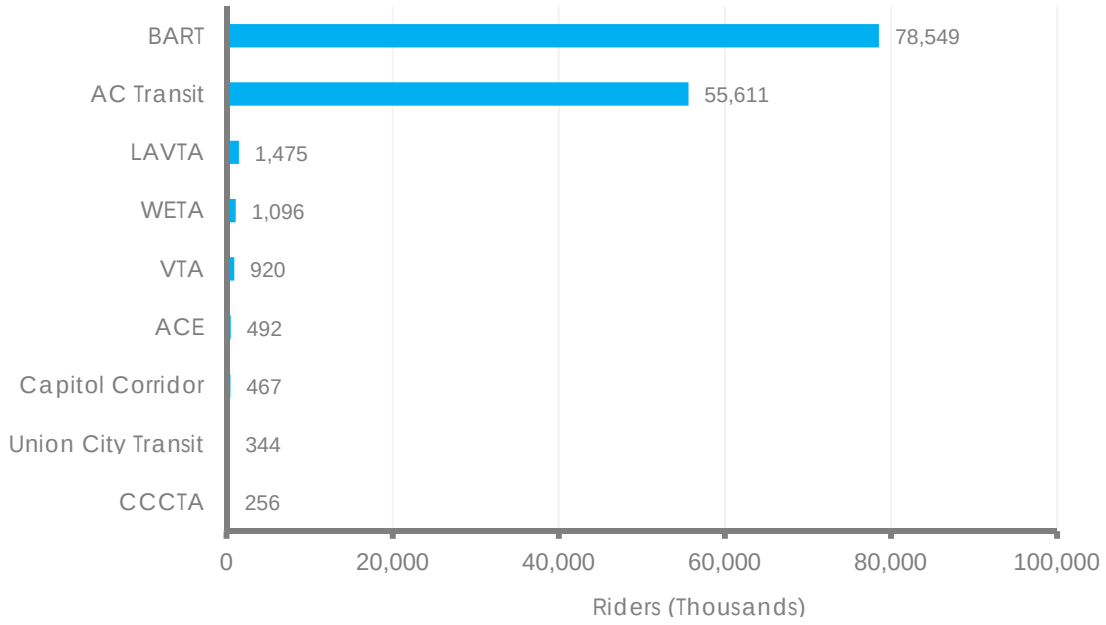
5.0. Detailed Transit Ridership Profiles

The following section provides an overview of the services provided within Alameda County by transit operators. Data on ridership and productivity measures were collected from each individual operator. As mentioned earlier in the report, data from regional service providers, such as ACE, BART and Capitol Corridor, were isolated to capture Alameda County-only trips.

5.1. System-Level Ridership by Operator

BART carries the most passengers annually of all operators with service in Alameda County, followed by AC Transit. The ridership on the regional services of ACE, Capitol Corridor and WETA are much lower than those of AC Transit and BART. The local operators provide local service within their service areas, with some trips as feeder service to the regional operators. Figure 31 highlights ridership by operator.

Figure 31: Annual Ridership in Alameda County by Operator



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

5.2. System-Level Transit Ridership by Trip Type

Each operator uses its own set of service classifications to define its service network. For the purposes of this report, all transit routes serving Alameda County were categorized into one of four "tiers" or trip types:

1. *Regional trips* are routes that have either an origin or destination within Alameda County and an origin or destination in a different county.

Examples of these types of trips include San Francisco–Oakland Transbay trips, Alameda County–San Mateo County trips via the San Mateo Bridge, or Alameda County–Santa Clara County trips via the Dumbarton Bridge. Operators that provide regional trips include AC Transit, ACE, BART, Capitol Corridor, County Connection, LAVTA, VTA and WETA.

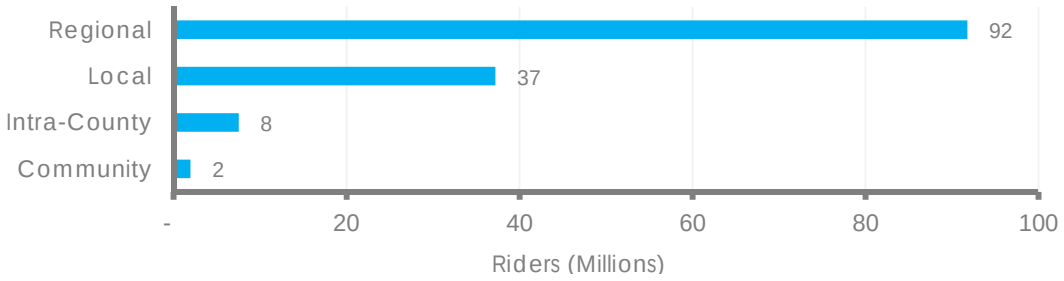
2. *Intra-county trips* are longer distance routes with an origin and destination within Alameda County. Intra-county trips can be typically defined by routes that travel between two or multiple cities, such as AC Transit's Route 72 (which travels between and within the cities of Oakland, Emeryville, Berkeley, Albany, El Cerrito, Richmond, San Pablo) and LAVTA's The Rapid route (which travels between the cities of Livermore and Pleasanton). Operators that provide intra-county trips are AC Transit, ACE, BART, Capitol Corridor, and LAVTA.[15]
3. *Local trips* are short-distance routes compared to intra-county trips, and typically operate within an individual city. Local trips may also serve two different cities or jurisdictions but maintain short route lengths. Operators that provide local trips include AC Transit, BART, LAVTA and Union City Transit.
4. *Community trips* are routes that serve individual communities within cities or jurisdictions and have very short route lengths or operate only during certain periods of the day. Community trips typically provide trips to specific destinations, such as schools or to shopping centers. Operators that provide community trips include AC Transit, LAVTA and Union City Transit.

Organizing routes into these trip-type categories facilitates an understanding of how different types of trips become the building blocks for developing an overall service network. Each trip type is a layer within the service network and is aimed at providing service to different markets, all while maintaining connectivity between the different trips through transit hubs or transit transfer points.

Figure 32 shows the majority of transit riders traveling to, from, or within Alameda County use transit to make regional trips, i.e., they are using transit to travel to/from Alameda County. Local trips are the second largest transit trip types associated with Alameda County.

[15] Capitol Corridor and ACE also serve a limited number of intra-county trips. Data required to estimate the share of intra-county trips served by Capitol Corridor and ACE was not available.

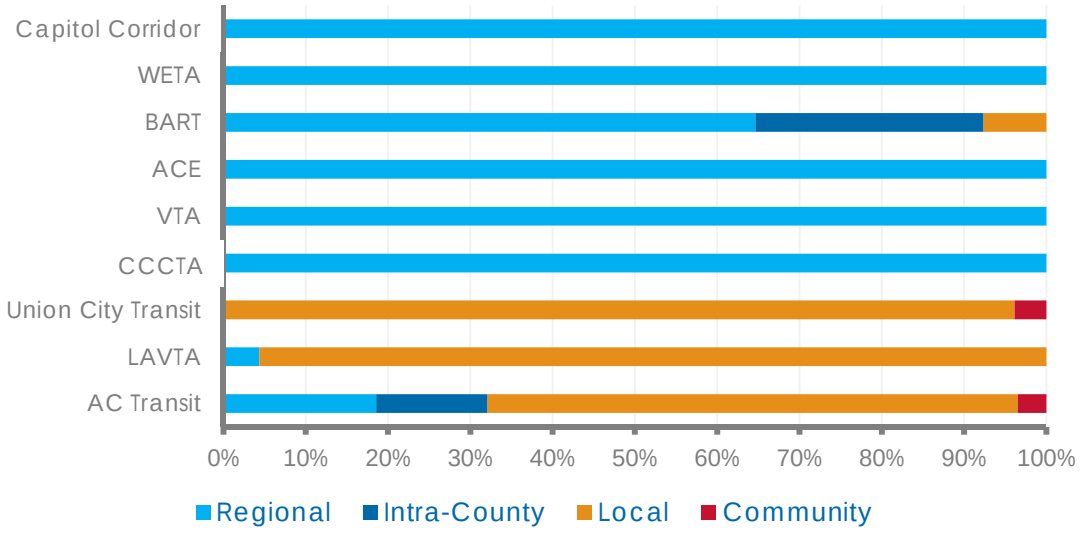
Figure 32: Annual Ridership in Alameda County by Trip Type



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 33 provides a breakdown of ridership by operator and service type. All ridership associated with ACE, Capitol Corridor, County Connection, VTA, and WETA is regional because these operators only run regional routes in Alameda County. BART provides regional, intra-county, and local service in Alameda County. The majority of ridership on Union City Transit, LAVTA, and AC Transit is local, because these operators primarily offer local service in Alameda County.

Figure 33: Annual Ridership in Alameda County by Operator and Service Type



Notes: BART trips between two stations in the same city were categorized as local trips.

Capitol Corridor and ACE also serve a limited number of intra-county trips. Data required to estimate the share of intra-county trips served by Capitol Corridor and ACE was not available.

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

6.0. Transit Performance and Productivity

This section highlights transit service performance in Alameda County by operator, trip type and corridor. The trip type and corridor definitions reflect those outlined in Sections 5.2 and 5.3. Detailed line-by-line performance data for transit operators providing service in Alameda County can be found in Appendix A.

In this report, transit service performance is measured in two main categories: service quality and service productivity. Performance metrics are used to measure how well a transit operator is providing service quality and service productivity. This information is often reported by an agency in quarterly and/or annual performance report as well as synthesized in an SRTP that is prepared every five to 10 years. Additionally, agencies that receive funding from the Federal Transit Administration report this information to be included in FTA's National Transit Database (NTD). Table 7 provides a brief description of the performance metrics used in this report.

Service performance for each operator and trip type was evaluated in this report against three areas of analysis: service quality, productivity and financial effectiveness.

Table 7: Transit Service Performance Metrics

Performance Metric	Description	Evaluation Standard
Service Quality		
On Time Performance	Operate actual transit services as a percentage of scheduled transit or service times at key time points	Operate X% of scheduled bus, rail or ferry trips on-schedule (as defined) X% of the time for bus, X% for rail, X% for ferry
Service Performance – Effectiveness		
Passengers per revenue vehicle hour	Average number of passengers being carried during an hour of service	A low value indicates that a route is under performing and a low volume of passengers is being carried for every hour of service delivered. Community routes that operate throughout the day with limited ridership would have low passengers per revenue vehicle hour. A high value indicates that a route is being well used and that seats are occupied; very high values indicate that additional service is warranted to provide more capacity
Passengers per revenue vehicle miles	Average number of passengers being carried for every mile of service	A low value indicates that a route is under performing and a low volume of passengers is being carried for every mile of service delivered. Low volumes may reflect a one-directional peaked service. A high value indicates that a route is being well used in both directions of service; very high values indicate that additional service is warranted to provide more capacity

Continued on next page

Table 7: Transit Service Performance Metrics
(Continued from previous page)

Performance Metric	Description	Evaluation Standard
Service Performance – Efficiency		
Cost per revenue vehicle hour	Average cost to operate transit service for every hour of service	A higher value indicates a high cost for every hour of service provided and indicates that a route may be a candidate for adjustment or modification
Cost per revenue vehicle mile	Average cost to operate transit service for every mile of service	A higher value indicates a high cost for every mile of service delivered and indicates that a route may be a candidate for adjustment or modification
Cost per seat mile	Average cost to operate transit for every seated mile in service	A higher value indicates a higher cost to provide service and provides a comparable basis for evaluating different transit modes
Blended Metric		
Subsidy per passenger (or farebox recovery)	Measures the amount of expenses not covered by revenue for every passenger boarding	Lower rates indicate that a route may be more self-sufficient in terms of generating fare revenues than routes with higher rates. The subsidy typically varies depending on the ridership levels for each route and the fare charged. The higher the ridership on a route, the lower the subsidy required per passenger.

Source: FTA, National Transit Database.

6.1. Service Quality

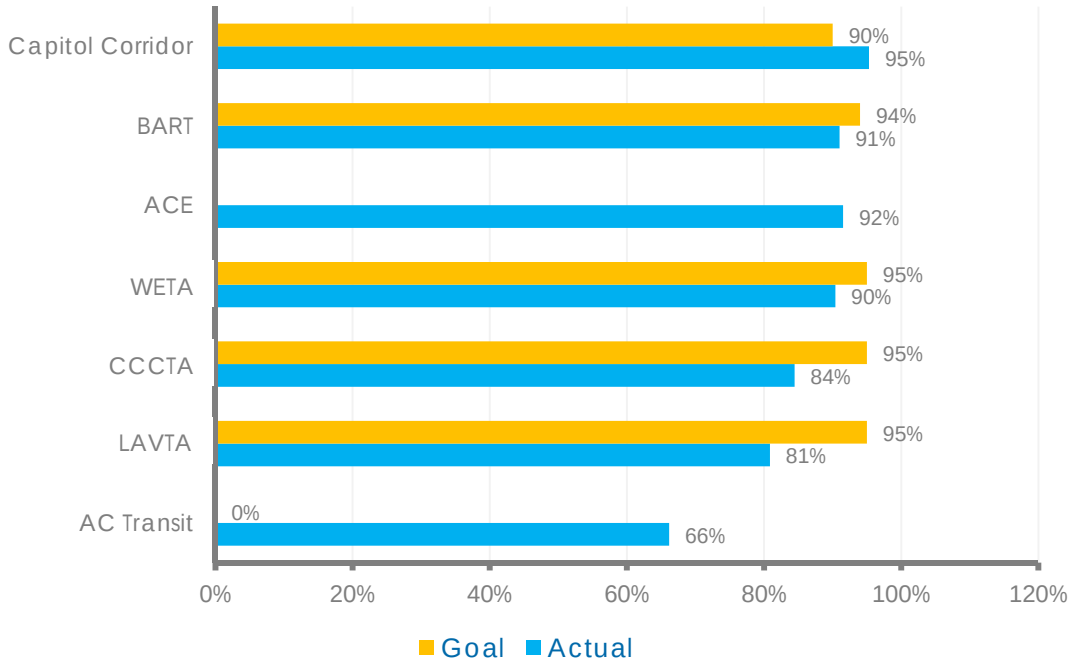
A. On-Time Performance

Compared to the on-time performance goals outlined in their respective short-range transit plans (SRTPs), only Capitol Corridor meets its on-time performance target of 95 percent. Figure 34 below shows the actual on-time performance for each operator, with BART, ACE and WETA SF Bay Ferry close to matching their SRTP targets, followed by County Connection and LAVTA Wheels. AC Transit has the lowest rate of on-time performance of all the operators shown. The agency does not have adopted service standards for on-time performance. This performance measure is not reported in the National Transit Database.

As shown in

Figure 35, none of the trip types has an on-time performance level above 74 percent. Intra-county routes have the worst on-time performance, while the regional routes have the highest on-time performance. Lower on time performance of intra-county routes is likely a result of the combination of the long distance trips on surface roads, lack of exclusive rights-of-way, and the unpredictability of road incidents. Regional service, which benefits from transit priority treatments and exclusive rights-of-way fairs better in on-time performance.

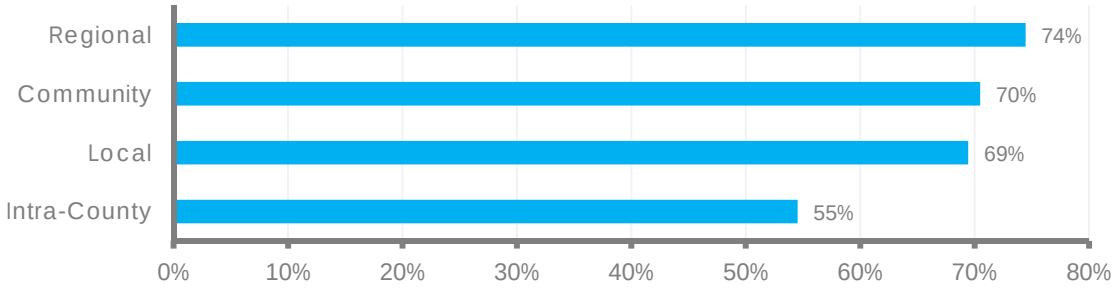
Figure 34: On-Time Performance by Service



Note: Actual on-time performance for Union City Transit and VTA routes serving Alameda County are not available. On-time performance goals for AC Transit, Union City Transit, and VTA routes serving Alameda County are not available.

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 35: On-Time Performance by Trip Type



Note: Actual on-time performance for Union City Transit and VTA routes serving Alameda County are not available.

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

6.2. Service Performance – Effectiveness

Service effectiveness measures are important indicators for understanding how effective the operator is at delivering service to its customers.

A. Passengers per Revenue Vehicle Hour

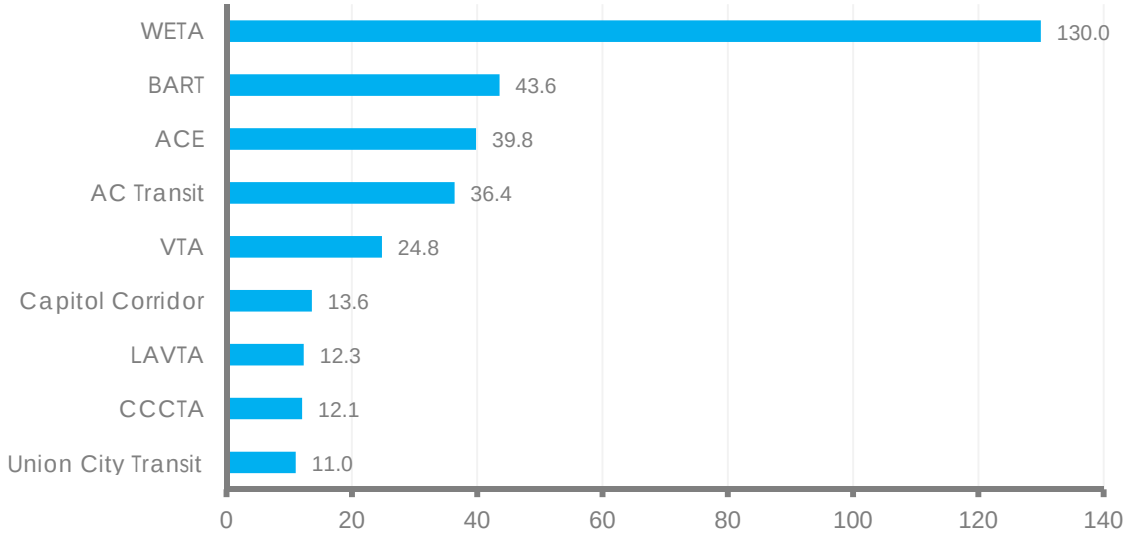
Figure 36 summarizes the operators' passengers per revenue vehicle hour. WETA SF Bay Ferry carries a significantly higher number of passengers per hour of service than all other transit operators that serve Alameda County. This can be attributed to the nature of ferry service, where WETA carries a high number of passengers per vessel during the peak commute period hours of operation.

The national average of passengers per revenue vehicle hour varies greatly by transit mode. Unlinked passenger trips per vehicle hour are highest for ferries at 186.8, followed by 117.6 for heavy rail, and 35.3 for buses.[16] With the exception of AC Transit, performance for operators serving Alameda County tends to fall below the national averages.

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 37 shows passengers per revenue vehicle hour by trip type. Intra-county trips carry the most passengers per revenue vehicle hour, closely followed by regional service. Intra-county trips often operate primarily during hours of peak demand. This allows them to maximize ridership during the limited hours they serve in comparison to services like BART that offer all-day service. Community routes carry the least number of passengers per revenue vehicle hour, and also operate only a limited number of revenue hours per day.

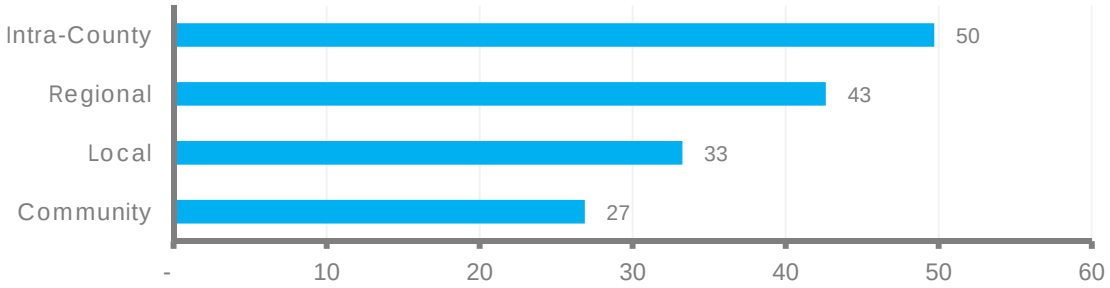
Figure 36: Passengers per Revenue Vehicle Hour by Service



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

[16] 2012 National Transit Profile Summary – Full Reporting Agencies, Federal Transit Administration

Figure 37: Passengers per Revenue Vehicle Hour by Trip Type



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

B. Passengers per Revenue Vehicle Mile

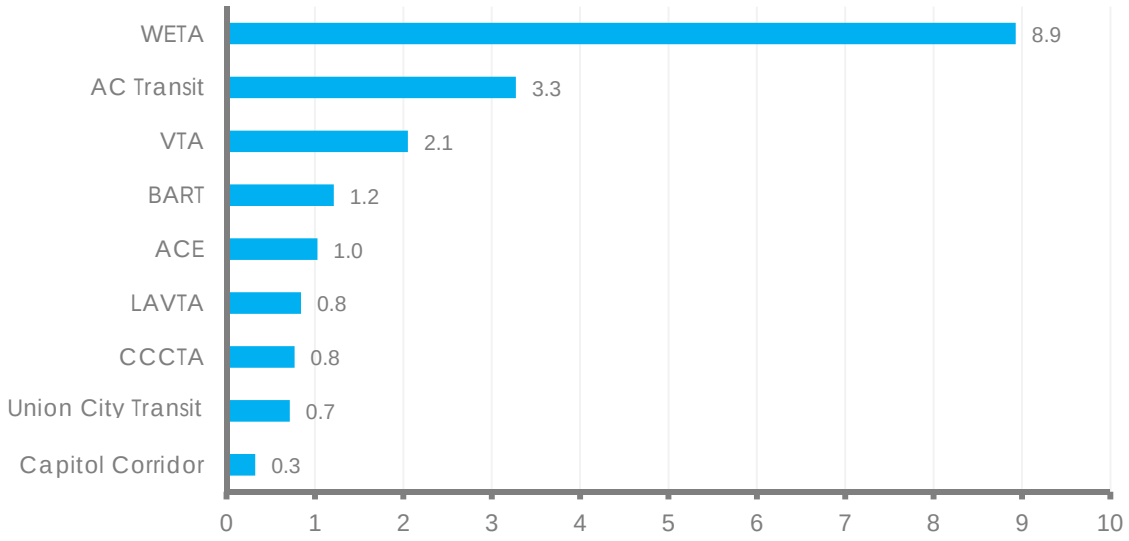
Figure 38 shows the passengers per revenue vehicle mile by operator. SF Bay Ferry carries the highest number of passengers, due to the higher capacity available on its vessels and more direct water routes when compared to the other operators. AC Transit carries the highest number of passengers per revenue vehicle mile among all bus operators. Union City Transit carries the least number of passengers per revenue vehicle mile for bus operators, which reflects the higher number of short distance routes in the Union City service network compared to AC Transit. Capitol Corridor carries the least number of passengers per revenue vehicle mile overall.

The national average of passengers per revenue vehicle mile varies by transit mode. Unlinked passenger trips per vehicle mile are highest for ferries at 20.3, followed by 5.9 for heavy rail, and 2.9 for buses.[17] With the exception of AC Transit, performance for operators serving Alameda County falls below the national averages.

Figure 39 shows the passenger per revenue vehicle mile by trip type. Intra-county transit services carry the highest number of passengers at almost five passengers per revenue mile, while the regional routes carry the least at a little over one passenger per revenue mile. This indicates that the intra-county routes are the most productive by this metric, with a high number of passengers carried for each revenue mile of service.

[17] 2012 National Transit Profile Summary – Full Reporting Agencies, Federal Transit Administration

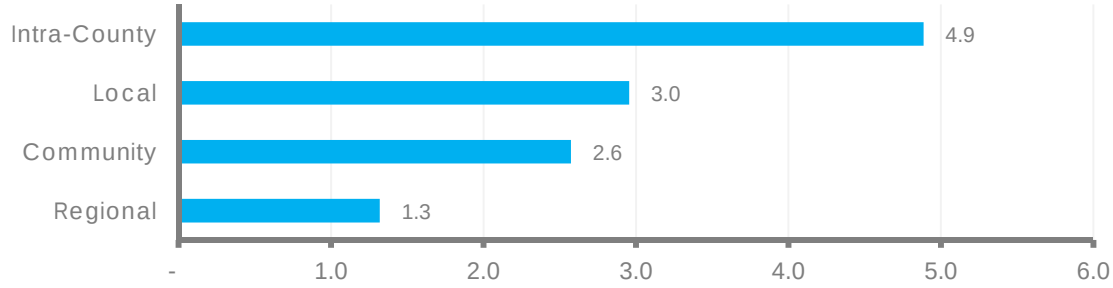
Figure 38: Passengers per Revenue Vehicle Mile by Service



Note: Only ridership associated with Alameda County included for BART, Capitol Corridor, ACE, and SF Bay Ferry.

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 39: Passengers per Revenue Vehicle Mile by Trip Type



Note: Only ridership associated with Alameda County included for BART, Capitol Corridor, ACE, and SF Bay Ferry.

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

6.3. Service Performance – Efficiency

Service efficiency measures are important indicators for understanding how efficient the operator is at delivering each unit of service to its customers.

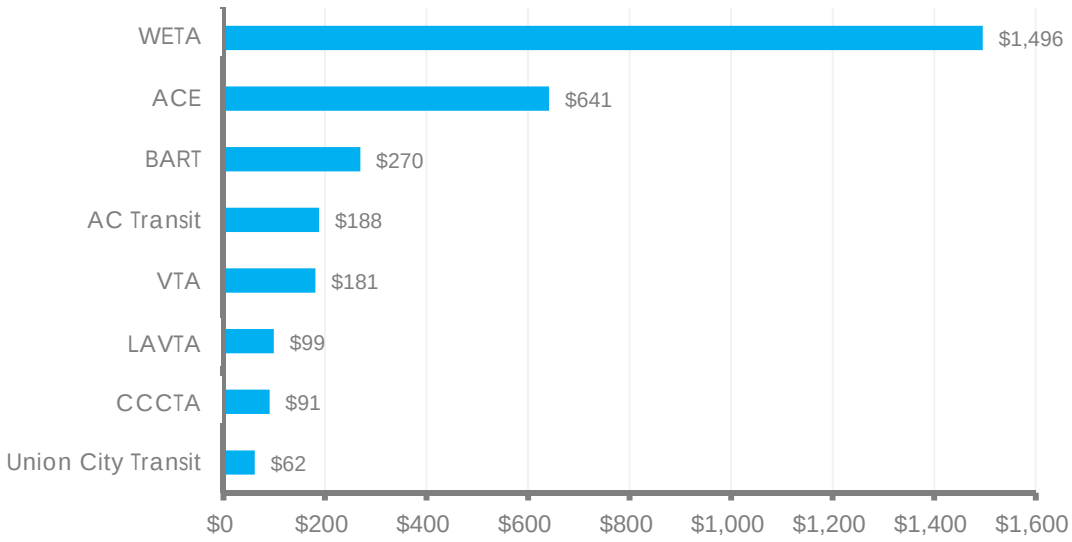
A. Cost per Revenue Vehicle Hour

Figure 40 highlights the cost per revenue vehicle hour by operator. WETA SF Bay Ferry has the highest cost per revenue vehicle hour for all operators, which reflects the nature of operating ferry service with higher vessel costs compared

to land-based transit. Union City Transit has the lowest cost per revenue vehicle hour for bus operators, which is three times less than the cost of one hour of AC Transit service. This highlights the wide range of cost structures that exist between bus operators and the differences between directly employed operations staff and contracted operations staff.

The national average of cost per revenue vehicle hour varies by transit mode. Operating expenses per vehicle revenue hour are highest for ferries at $1,569, followed by $219 for heavy rail, and $128 for buses.[18] Performance for Alameda County operators varies greatly. The WETA SF Bay Ferry service and the smaller bus operators – LAVTA Wheels, Union City Transit, and County Connection – all out-perform industry averages in terms of cost per revenue vehicle hour of service provided. ACE, BART, AC Transit, and VTA all exceed the national average for costs per revenue vehicle hour of service.

Figure 40: Cost per Revenue Vehicle Hour by Service

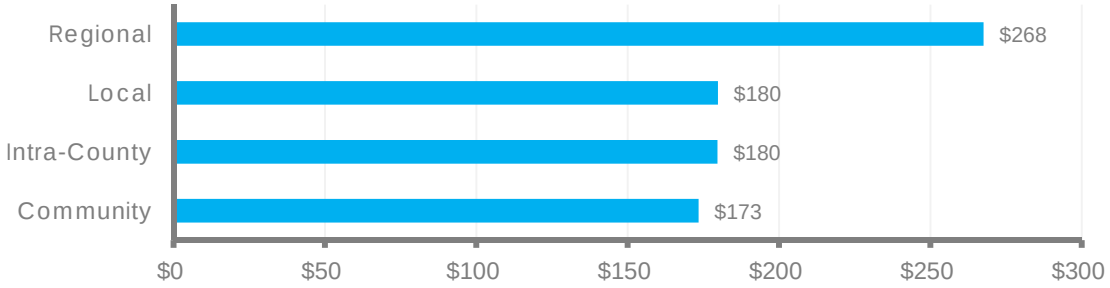


Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 41 highlights the cost per revenue vehicle hour by trip type. Regional service is the most expensive to operate at $268 per vehicle hour, largely due to the inclusion of ferry service in this category and the more expensive nature of express bus service. The three other trip types have similar costs per revenue vehicle hour, likely due to the fact that each of these trip types involve bus operations and maintenance costs that are all influenced by the same factors, such as hourly costs and farebox recovery ratios.

[18] 2012 National Transit Profile Summary – Full Reporting Agencies, Federal Transit Administration

Figure 41: Cost per Revenue Vehicle Hour by Trip Type



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

B. Cost per Revenue Vehicle Mile

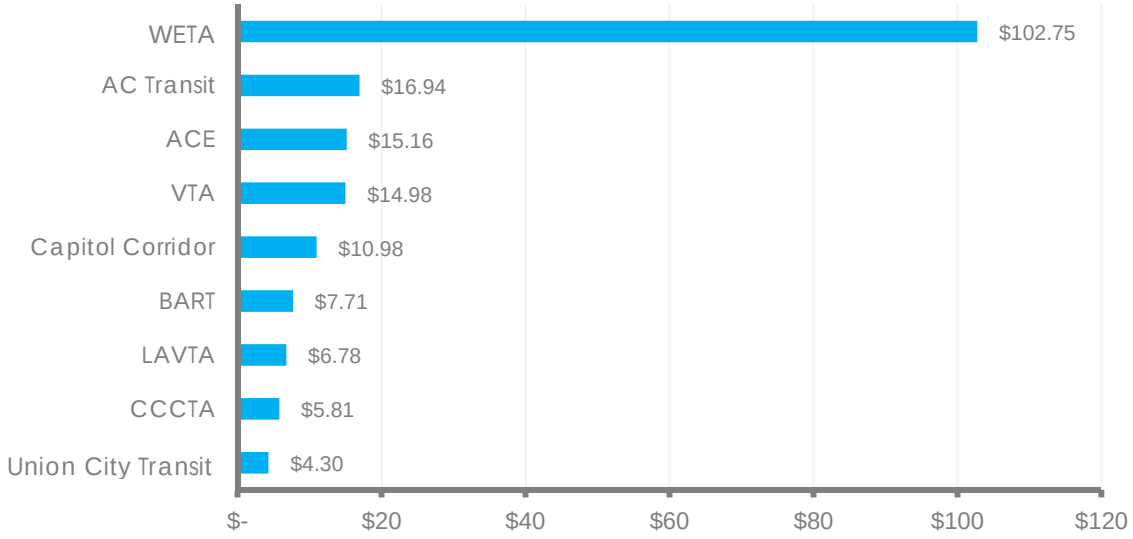
Figure 42 shows the cost per revenue vehicle mile by operator. WETA SF Bay Ferry has the highest cost per revenue vehicle mile for all operators at $102.75 per revenue vehicle mile. Among the bus operators, Union City Transit has the lowest cost at $4.30 while AC Transit has the highest cost at $16.94 per revenue vehicle mile.

The national average of cost per revenue vehicle mile varies by transit mode. Operating expenses per revenue vehicle mile are highest for ferries at $170.30, followed by $10.90 for heavy rail, and $10.50 for buses.[19] Performance on this standard varies by operator in Alameda County. WETA SF Bay Ferry, ACE, Capitol Corridor, BART, LAVTA Wheels, County Connection, and Union City Transit are all performing better than the national averages in this category, while AC Transit and VTA costs are higher than the national averages.

When organized into trip types, the intra-county routes have the highest cost per revenue vehicle mile, closely followed by community routes (see Figure 43). The high cost for intra-county routes ($17.66) may be due to the correlation between long distance trips these routes make and the associated maintenance and operations needs that arise. The high cost of community routes ($16.61) may be due to the relatively high cost of providing service for a very short distance trip. The regional trip type has the lowest cost per vehicle mile ($8.28), due to the greater distance covered by these trips and the lower costs experienced by BART.

[19] 2012 National Transit Profile Summary – Full Reporting Agencies, Federal Transit Administration

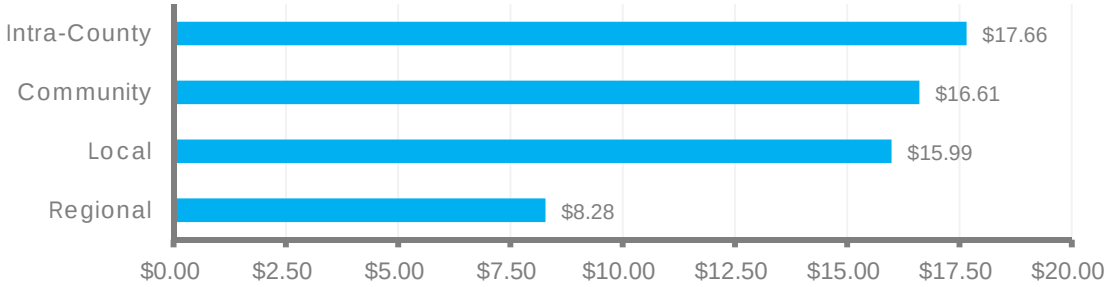
Figure 42: Cost per Revenue Vehicle Mile by Operator



Note: Information is not available for Capitol Corridor

Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 43: Cost per Revenue Vehicle Mile by Trip Type

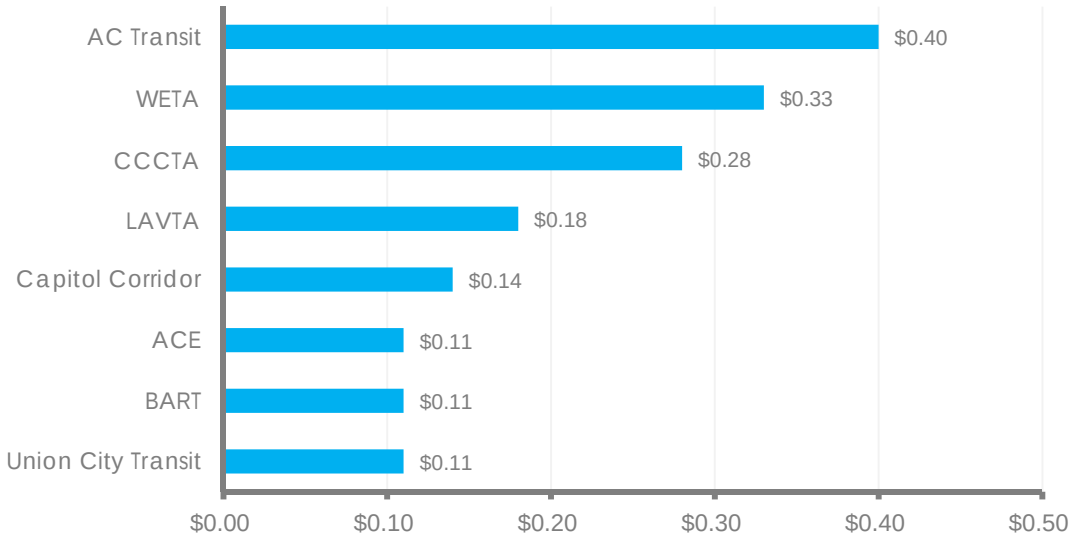


Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

C. Cost per Seat Mile

Figure 44 shows the cost per seat mile by operator – how much it costs an operator to transport one seat (e.g., passenger) one mile. This metric allows the operators to be compared despite differences in mode, route length, and trip type. ACE, BART and Union City have the lowest cost per seat mile at 11 cents, with AC Transit having the highest cost per seat mile at 40 cents. This performance measure is not reported in the National Transit Database.

Figure 44: Cost per Seat Mile by Service



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

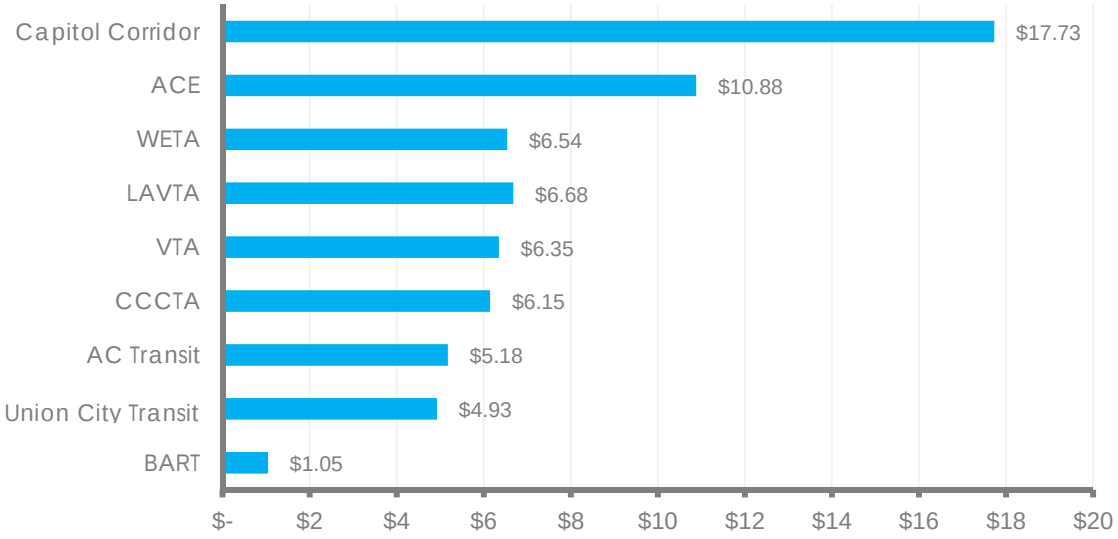
6.4. Blended Metric

A. Subsidy per Passenger

Figure 45 shows subsidy per passenger by operator. Overall, ACE service has the highest subsidy per passenger at $10.88, which can be attributed to higher maintenance costs associated with the train vehicles and track. BART does have similar maintenance requirements as ACE, but its ridership is much higher, lowering the subsidy at the per passenger level. Among bus operators, Union City Transit has the lowest subsidy at $4.93 and LAVTA the highest at $6.49. This performance measure is not reported in the National Transit Database.

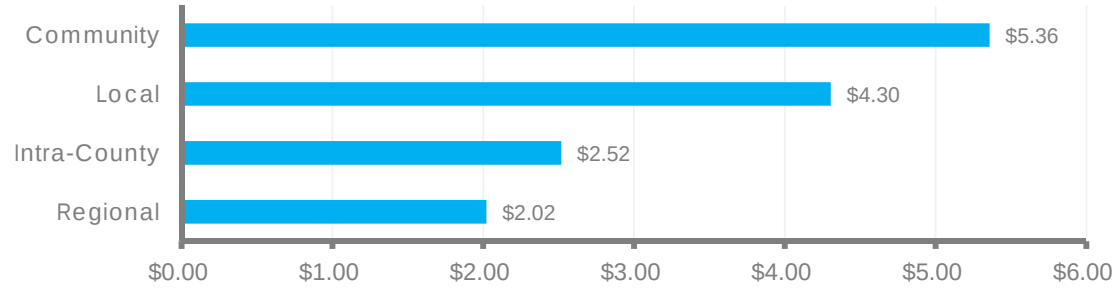
As shown in Figure 46, community service requires the highest subsidy among trip types, at $5.36 in subsidy per passenger. Community routes are often found to require higher subsidies as they typically are operated a small number of hours a day to serve schools or special destinations, and often carry passengers that pay reduced fare. Conversely, the regional routes have the smallest subsidy per passenger at $2.05, where passengers are often charged premium fares that offset the higher operating costs. This is the result of the fact that Community trips have a high cost per revenue vehicle mile and low ridership, while regional trips have a relatively low cost per revenue vehicle mile and high ridership.

Figure 45: Subsidy per Passenger by Operator



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

Figure 46: Subsidy per Passenger by Trip Type



Source: Data provided by transit operators. See Footnote 1 in Section 2.0 Report Methodology.

6.5. Summary of Transit Performance and Productivity

Alameda County has a range of transit services that transport people by a variety of modes. Each mode and operator has individual performance and productivity measures briefly described above.

When compared by operators, there were stark differences that emerged, especially in the category of cost. While most of the operators use the same metrics to measure performance and productivity levels, differences in operating mode yield differences in costs. Examples of cost disparity include:

- WETA SF Bay Ferry has the highest cost per passenger revenue mile (high ferry operations and maintenance costs compared to rail and bus);

- ACE has the highest subsidy per passenger (high maintenance costs with smaller ridership); and
- AC Transit has the highest cost per seat mile (high operational cost with large proportion of local service).

While differences can be found when comparing financial productivity measures by operator, when the performance measures are compared by service type, overall county patterns emerge:

- Regional on-time performance is the highest among the service types, likely benefitting from service operating on exclusive rights-of-way or high occupancy vehicle lanes;
- Intra-county on-time performance suffers due to buses operating in mixed flow on local roads and arterials;
- Community routes have the highest subsidy per passenger due to short service spans and lower farebox recovery. This is a trend that many operators locally and nationally experience.

While comparisons can be made of the operators against a set of standard metrics, it is not a straightforward comparison given the differences between the services offered, including mode, type of service, contracted costs, and ridership. AC Transit has the second highest ridership in the county, but it provides the most diverse type of services in a large service area, which influences its hourly cost. Wheels and Union City Transit have relatively low operating costs, but employ contract operators and have a smaller service area.

7.0. Gaps in the Transit System

Transit service coverage and the apparent gaps in service can be measured using two primary metrics:

- Network coverage and connectivity including connections between trip origins and destinations, transit operators, and first- and last-mile connections at key transit hubs
- Operational characteristics, e.g. hours of service operation or frequency of service

7.1. Network Coverage and Connectivity

A. Coverage

Within Alameda County, the inner East Bay corridor between Albany and Oakland has the densest geographic transit service coverage. Sixteen different routes and three individual operators (AC Transit, BART, and WETA) provide transit service along this corridor in Alameda County and to San Francisco and Contra Costa counties. This dense network coverage corresponds to the denser residential and employment land use patterns in the older inner East Bay cities. The density of the transit network coverage diminishes in the lower density areas of Central, South, and East County. There are fewer trunk services and providing fixed-route transit in areas with lower potential ridership becomes more costly. For example, there is limited service between Fremont and Pleasanton along the I-680 corridor.

1. Regional Transit Gaps

As previously stated, about two-thirds of transit trips originating in or destined to Alameda County are regional (see Figure 6). These are trips that occur between Alameda County and adjacent counties, including those to and from San Francisco. For trips outside of Alameda County, a high level of coverage is provided transbay to San Francisco. Although this is not the most significant regional destination for all trips to and from Alameda County (it is second compared to Contra Costa County), it is the market with the richest transit service due to congestion on the San Francisco Oakland Bay Bridge, the concentration of employment sites in downtown San Francisco, and the cost and (lack of) availability of parking in San Francisco.

The transit gap between Alameda County and San Francisco is related to transit supply and reliability of service. The existing supply of transit does not meet demand, particularly during commute hours, resulting in crowding on trains and buses. BART passengers are also reporting a decline in the satisfaction of service. The system is in dire need of renovation, which makes keeping up with the

increasing demand challenging.[20] Transit capacity at peak hours is stretched thin as evidenced by standing-room only conditions on both BART trains and AC Transit buses. Non-peak periods also see a lot of passengers in the transbay corridor, especially in instances where BART is not able to run 10-car trains due to the need to maintain its rolling stock. These conditions will only worsen as ridership is projected to grow, i.e., BART will likely carry more than 800,000 daily passengers by 2050, which is about 1.5 times more than what the agency transports today.[21] MTC is will begin a core capacity study in summer 2015 to develop alternatives that address transit supply issues in the transbay corridor.

Trips to and from Contra Costa County and Santa Clara County make up the first and third largest shares, respectively, of all Alameda County regional trips. However, currently only a few transit routes provide service that connects Alameda County to Contra Costa County and Santa Clara County. Capitol Corridor, BART, and one Wheels route connect Contra Costa County and Alameda County. Four VTA routes operate service between Santa Clara County and Fremont, and Capitol Corridor connects northern, central and southern Alameda County to Santa Clara County.

Trips to and from Alameda County and San Joaquin constitute smaller travel markets. ACE provides service between San Joaquin County, the Tri-Valley area in eastern Alameda County and Santa Clara County. Regional transit service to San Mateo is limited to the Dumbarton Express. The number of trips in this corridor is expected to continue to grow, though the percentage of trips to Santa Clara and San Mateo County will remain about the same.[22]

Outside of San Francisco, the counties adjacent to Alameda County generally have lower-density land uses with dispersed trip destinations that may not be able to support a robust fixed-route transit network with a high level of coverage. Some of these trips are currently being served by private employers such as Google, Genentech, and Apple, who operate their own fleet of buses to serve their employees. Focus for the service gaps in these regional markets will be on how to effectively concentrate access to transit stations/stops through park-and-ride and other first and last mile connections for both public and private transit operators. This will be further explored in a subsequent task.

Some of these regional gaps will be addressed by planned projects such as the BART extensions to Livermore and San Jose. However, depending on the distribution of major origins and destinations within each county, which will be analyzed in greater detail in the next phase of this study, local service additions

[20] 2014 BART Customer Satisfaction Study, BART Marketing and Research Department, Corey, Canapary & Galanis Research.
[21] MTC, Regional Rail Plan, 2007
[22] Alameda CTC Countywide Travel Demand Model, Comparison of 2010 and projected 2040 travel, 2014.

to these major planned transit projects may be needed to provide sufficient and competitive transit connectivity.

2. Intra-county Transit Gaps

While there is a relatively high number of transit providers in Alameda County, gaps in transit service persist at the intra-county level. Some of these gaps are related to the lower-density and more dispersed nature of land uses in some parts of Alameda County. However, given the County's anticipated growth, there may be areas where transit demand will shift in the next several years as residential and commercial densities grow or become more concentrated in some locations in the county. For example the growth of moderate to higher density land uses in Emeryville, downtown Oakland, the Oakland waterfront around Brooklyn Basin, and in Dublin suggest that additional transit service will likely be warranted in these areas.

Analysis of emerging markets will be covered in the next phase of this study, including an analysis of the viability and development potential of designated Priority Development Areas (PDAs), designated infill sites where greater housing and commercial density could be accommodated near transit stops.

3. Local and Community Transit Gaps

Transit gaps related to local and community trips often involve first- and last-mile connections. These are the "book ends" of all trips taken by transit, where the user must get to/from the transit stop or station and get to/from her final destination (e.g., workplace, home). Where these distances are short and walkable, many transit users can walk or bike the first or last mile. However, where distances are longer (i.e., more than one-quarter mile) or where walking or bicycling conditions are not amenable, a motorized option would be preferred. The need for first- and last-mile connections are often met by free shuttles funded by public money or by shuttles operated by private providers, which are discussed in Section 8.0.

4. Paratransit

Americans with Disabilities Act (ADA) requires transit agencies to provide paratransit services to people with disabilities who cannot use fixed-route bus or rail service. As this civil rights legislation has requirements for transit operators to meet minimum complementary paratransit service levels, there are no "official" paratransit service gaps. Paratransit services that are not related to ADA, including first- and last-mile transit connections, are sometimes filled by programs provided by local providers, as noted in the preceding paragraph.

B. Connectivity

With the exception of BART, it is can be difficult to travel throughout Alameda County on transit relatively quickly and conveniently. Connections between

operators can be costly and time-consuming. For AC Transit and LAVTA, which have relatively large service areas, the transfers between buses within each of the service areas can also slow travel time. In addition, AC Transit patrons must pay each time they board a bus as local transfers are no longer available. The first- and last-mile connections are also challenging in locations without a concentration of residential activity and with dispersed employment locations as coverage may not be as good as in more densely developed areas.

The lack of an integrated fare system and a uniform transit map for the multiple operators in Alameda County compound the connectivity problem. Transit users must use different maps for each operator, pay a new fare each time they transfer between operators and also each time they board a new AC Transit bus. Different fare payments systems may also be required as the Clipper Card has not yet become fully integrated into all of the Alameda County transit operations.

In addition, while BART stations and other activity centers serve as transit hubs throughout the county, the transit schedules are not always timed to facilitate customer transfers between operators. Poor reliability can also affect transfers, even within the same transit system, as congestion delay bus services and cause patrons to miss their connections. This extends the time of travel and is a deterrent to transit use for those patrons that have other options.

For the first-mile trip connections, shuttles are available to residents in a few limited areas, for example the Emery-Go-Round and Oakland's B shuttle provide connections to BART stations as well as to employment centers. In other areas, many of the first-mile connections are served by the provision of major parking facilities as well as connecting bus transit service. For BART, many of these parking facilities are at capacity during a typical weekday. The parking capacity in addition to the line capacity, limits BART use in some locations.

Private shuttle operations serving specific employment centers may also be providing first- and last-mile connections in some areas of the county. For example, Kaiser Permanente offers shuttle services to the Kaiser health care facilities in Oakland from the MacArthur BART station. Other private employers are providing door-to-door transit services or providing pick-ups at designated park-and-ride lots and delivering passengers to the employment site.

These private services are supplementing public transit service and are being offered at no cost to the public or generally to the users. The cost of providing these services can be expensive, however, and they could potentially be provided more effectively if there were cooperation and coordination among service providers. Like transbay bus service, transporting workers who work regular daytime hours often means that transit moving in the non-peak direction during peak hours is not well-patronized yet still accrue significant costs. Additionally, the majority of the private shuttle providers offer the service for free and thereby do not recoup any expenses.

7.2. Operational Gaps

Some areas within Alameda County may have a sound transit network, but the level of service is low and there are few transit preferential treatments on surface streets to facilitate transit operations. As a result, the potential of the transit market is constrained. For example, if transit is operating at 30 to 60 minute headways and service is provided only during peak hours or does not continue into the evening and late night hours, then the flexibility for using transit service as a viable alternative to the auto diminishes significantly. During commute hours, the speed of transit travel may be constrained by the congestion occurring on surface streets, making a transit trip with multiple stops much longer than a comparable trip by auto.

AC Transit provides major trunk line services that operate at 10 to 15 minute headways. There are also locations, such as the Broadway corridor in downtown Oakland, that operate as major transit corridors, and therefore have frequent headways and transit choices that make transit use a viable option. However, according to the preliminary transit market assessment completed, there are many strong transit markets in Alameda County that are underperforming due to limited transit coverage or lack of high frequency, convenient, and reliable transit service. Examples of these corridors include connections between Emeryville, Brooklyn Basin/East Lake Merritt, and Grand Lake to downtown Oakland.

In the next phase of the study, during the development of transit networks, the service gaps will be identified in more detail.

8.0. Shuttles

The Countywide Transit Plan's Technical Memorandum #1's Inventory of Existing Plans, Studies, and Data includes a comprehensive inventory of major shuttles operating in Alameda County. These shuttles include both publically and privately funded and operated shuttles.

8.1. Public Shuttles

The BAAQMD funds many public shuttles through its Transportation for Clean Air program. These shuttles primarily connect passengers to employment or activity centers and/or institutions such as universities. While MTC is currently conducting a comprehensive study of shuttles in the Bay Area, a brief overview of publicly subsidized shuttles operating in Alameda County is presented below.

A. Broadway Shuttle

The Broadway shuttle is a free bus service that operates mostly on Broadway between the uptown area of downtown Oakland and Jack London Square. Operated by AC Transit, the shuttle is funded by Alameda CTC, City of Oakland, BAAQMD, SF Bay Ferry, and a handful of business associations. It runs on Monday through Saturday at a frequency of 10 to 15 minutes. The B shuttle's operating data can be found in Table 8.

Table 8: Operating Data for Broadway Shuttle

Performance Data	2013
Annual Ridership	760,632
Annual Operating Cost	$773,319
Annual Service Hours	9,588
Annual Service Miles	49,213

Source: City of Oakland

B. Emery-Go-Round

The Emery-Go-Round is a free shuttle service primarily funded by commercial businesses in Emeryville and Alameda CTC and managed by the Emeryville Transportation Management Association. Its three routes are available to Emeryville residents as well as visitors and employees of Emeryville businesses. The shuttle's operations are centered at the MacArthur BART station, transporting passengers to shopping centers, businesses, schools, residential complexes, and the Amtrak station in Emeryville. Service is provided on weekdays, and weekends. The Emery-Go-Round's operating data can be found in Table 9.

Table 9: Operating Data for Emery-Go-Round

Performance Data	2014
Annual Ridership	1,679,857
Annual Operating Cost	$ 2,149,000
Annual Service Hours	35,653
Annual Service Miles	318,836

Source: Emeryville Transportation Management Association

C. Alameda Estuary Crossing Shuttle

Free to the public, the Estuary Crossing Shuttle was created to provide a direct transit route for bicyclists and pedestrians traveling between the west end of Alameda and Oakland's downtown as well as students enrolled simultaneously at Laney College and the College of Alameda. The shuttle operates every 30 minutes on weekdays and is funded by Alameda CTC and BAAQMD. The Estuary Crossing shuttle's operating data can be found in Table 10.

Table 10: Operating Data for Alameda Estuary Crossing Shuttle

Performance Data	2014
Annual Ridership	76,000
Annual Operating Cost	$200,000
Annual Service Hours	2,030
Annual Service Miles	23,000

Source: City of Alameda

D. San Leandro Links

The San Leandro Links shuttle provides services to passengers between the San Leandro BART station and local businesses, shopping centers, and Kaiser Permanente medical center. The free service is provided on weekdays during the morning and evening peak periods at a frequency of 15 to 20 minutes. Funding for the shuttle comes from BAAQMD and businesses along the route. The service is contracted to MV Transportation. Links' operating data can be found in Table 11.

Table 11: Operating Data for San Leandro Links Shuttle

Performance Data	FY 2014-2015
Annual Ridership	165,108*
Annual Operating Cost	$337,142
Annual Service Hours	4,205
Annual Service Miles	Not available

Source: San Leandro Links. Annual ridership info is based on FY ridership 2009-2014

E. CSU East Bay Shuttle

California State University, East Bay (CSUEB) provides free shuttle services between its campus in Hayward and the Hayward and Castro Valley BART stations. The shuttles are funded by Alameda CTC, BAAQMD, and parking

citation fees. The shuttle operates when school is in session. While the shuttle is free to the public, boarding priority is given to riders with a valid CSUEB identification card. The CSUEB shuttle's operating data can be found in Table 12.

Table 12: Operating Data for CSU East Bay Shuttle

Performance Data	2014
Annual Ridership	386,107
Annual Operating Cost	$816,891
Annual Service Hours (approximately)	11,000
Annual Service Miles	136,244

Source: California State University, East Bay

8.2. Private Shuttles

Many businesses and institutions provide private shuttle services for their employees or patrons. With the advent of shuttle services operated by large information technology businesses in the region, the scale of private shuttle operations has grown tremendously over the last 10 years.

Most businesses do not share their shuttle operations data, and as a result there is no comprehensive and reliable database for private shuttle operations. MTC and the Bay Area Council are working on a study to prepare an inventory of existing shuttle operations. This study would allow the planning agencies in the region to address and accommodate private shuttles in their plans, and to collaborate with the operators of these services.

In order to avoid duplication of effort, this plan will rely on MTC's study to provide a clearer picture of existing private shuttle operations. In the interim, the Countywide Transit Plan team recently met with the operator of one of the larger private employer shuttle systems in the region. The operator identified Alameda County as the fastest growing market for its shuttle operations to Silicon Valley, and recognized long travel times due to congestion, and lack of park-and-ride locations as its major challenges in providing effective private shuttle service.

9.0. Market Analysis

As a first step in defining the future demand for transit, a transit market analysis was completed for Alameda County using a Transit Competitiveness Index (TCI). Technical Appendix B contains a full summary of the TCI, its application to assess market competitiveness for Alameda County, and the next steps in development of the transit network for the county. This section provides a brief summary of the TCI and the findings from the market analysis.

9.1. Overview of TCI

The TCI tool identifies the potential of travel markets to attract transit ridership and represents this potential as a single score or index. This approach aims to identify locations and markets where transit service can be competitive relative to cars.

The tool can be called "transit-agnostic," in that it is not sensitive to transit type or transit service quality. Instead, it is focused only on identifying the potential market demand for transit, and consequently it identifies areas with the potential to generate transit ridership due to their land use and demographic characteristics. Transit service quality is held constant to allow an understanding of whether underlying market conditions would generate sufficient transit ridership if transit service were provided.

9.2. General TCI Findings for Alameda County

The preliminary market assessment produced findings that show an overall transit-competitive landscape for travel within, into and out of Alameda County. Almost 54 percent of all Alameda County trips in 2010 were in strongly competitive transit travel markets, as are a smaller but still significant share of work trips (almost 43 percent). This pattern is anticipated to be the same in 2040, with an increase of at least four percentage points for both categories of trips (58 percent for all trips and 48 percent for work trips).

The initial TCI analysis also finds that the significant majority of transit routes in Alameda County currently operate in transit-competitive markets. This overall competiveness will increase in the future (2040), which may be the result of increased residential densities in these areas, overall increased congestion, decrease in vehicle availability per household, and/or smaller households. Many of these transit routes have mode shares below what the TCI estimates they should have given their high TCI scores – suggesting that an untapped transit market or latent passengers exist within or near these transit routes.

Technical Appendix B provides more detailed information about the TCI methodology and analysis. In the next phase of the study, the TCI results will be used to develop the future transit network for Alameda County.

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Appendix A Performance Data for Transit Operators Serving Alameda County

Ridership numbers in the tables in this appendix represent ridership associated with Alameda County only (i.e., to/from or within Alameda County).

RVM = Revenue vehicles per mile
RVH = Revenue vehicles per hour

AC Transit

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
1	4,135,230	55%	50	5	189	$ 19.18	$ 2.66
1R	3,197,691	53%	54	6	164	$ 16.91	$ 1.95
7	233,268	72%	23	2	181	$ 14.11	$ 6.67
11	448,164	75%	28	3	192	$ 20.46	$ 5.70
12	784,345	72%	30	4	179	$ 22.43	$ 4.96
14	1,087,381	65%	37	4	183	$ 19.72	$ 3.85
18	2,673,222	65%	41	4	186	$ 19.03	$ 3.42
20	1,041,954	63%	38	4	177	$ 18.61	$ 3.52
21	645,054	71%	30	3	178	$ 15.19	$ 4.90
22	718,556	77%	34	3	177	$ 17.57	$ 4.18
25	264,239	72%	21	2	182	$ 19.10	$ 7.42
26	863,211	61%	31	3	179	$ 17.94	$ 4.58
31	545,690	71%	27	3	178	$ 16.82	$ 5.48
32	248,910	73%	22	2	178	$ 15.62	$ 7.05
37	126,715	80%	17	2	176	$ 16.08	$ 9.05
39	162,312	62%	46	4	176	$ 15.03	$ 2.72
40	3,286,453	70%	51	5	179	$ 19.08	$ 2.39
45	699,174	72%	28	3	179	$ 17.74	$ 5.39
46	124,324	65%	37	3	191	$ 15.68	$ 4.09
47	34,003	77%	17	2	179	$ 20.67	$ 9.34

Continued on next page

AC Transit (Continued)

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
48	111,307	75%	15	1	178	$ 15.62	$ 10.55
49	702,333	68%	31	4	177	$ 24.08	$ 4.55
51A	3,262,614	69%	53	7	146	$ 19.77	$ 1.68
51B	3,300,145	66%	72	13	136	$ 25.40	$ 0.81
52	848,292	69%	55	7	188	$ 24.61	$ 2.34
54	722,353	68%	54	5	179	$ 15.53	$ 2.24
57	2,421,884	54%	44	4	193	$ 18.99	$ 3.33
58L	279,995	64%	28	3	176	$ 16.80	$ 5.15
60	223,846	72%	22	2	178	$ 15.39	$ 7.10
62	1,118,135	66%	41	4	177	$ 19.06	$ 3.22
65	267,533	81%	30	3	178	$ 16.69	$ 4.76
67	109,972	66%	23	2	180	$ 15.77	$ 6.59
72	1,696,097	55%	38	4	188	$ 18.28	$ 3.88
72M	1,520,374	56%	38	5	139	$ 19.63	$ 2.54
72R	1,770,557	63%	42	4	189	$ 16.95	$ 3.37
73	1,027,149	75%	42	4	175	$ 15.05	$ 3.08
74	354,472	58%	22	1	225	$ 13.22	$ 9.12
75	137,872	52%	18	1	181	$ 11.84	$ 8.79
76	834,007	65%	39	3	203	$ 18.24	$ 4.17
83	148,764	77%	19	2	178	$ 15.61	$ 8.42
85	284,619	62%	26	2	290	$ 17.33	$ 9.98
86	213,660	85%	19	2	178	$ 17.19	$ 8.34
88	851,243	73%	33	4	178	$ 20.82	$ 4.24
89	371,589	69%	18	1	185	$ 14.45	$ 9.23
93	230,970	68%	22	2	176	$ 14.27	$ 7.01
94	43,301	70%	16	1	207	$ 14.04	$ 11.68
95	129,214	61%	25	2	203	$ 17.19	$ 7.15
97	1,386,843	65%	35	3	199	$ 16.95	$ 4.65
98	498,358	72%	26	2	176	$ 16.06	$ 5.77
99	901,127	59%	25	2	252	$ 15.21	$ 8.98

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AC Transit (Continued)

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
210	536,680	68%	23	2	180	$ 15.30	$ 6.63
212	257,149	66%	18	1	239	$ 16.10	$ 12.34
215	57,115	63%	8	1	195	$ 15.19	$ 24.67
216	97,995	62%	13	1	253	$ 15.81	$ 18.30
232	123,262	73%	16	1	276	$ 12.76	$ 15.88
239	141,326	71%	22	1	229	$ 13.78	$ 9.45
251	186,501	74%	17	3	92	$ 13.89	$ 4.42
275	77,039	72%	11	1	197	$ 13.95	$ 16.72
339	17,002	45%	17	1	185	$ 14.65	$ 9.56
376	110,725	57%	11	1	189	$ 13.41	$ 15.77
800	188,733	61%	23	1	189	$ 10.50	$ 7.19
B	63,756	58%	26	2	228	$ 14.46	$ 7.60
BSD	718,773	81%	89	16	184	$ 33.33	$ 0.97
BSN	168,814	80%	30	6	149	$ 30.74	$ 3.95
C	68,803	60%	25	2	298	$ 20.10	$ 10.78
CB	47,817	50%	26	2	299	$ 18.56	$ 10.54
E	67,475	63%	27	2	257	$ 14.24	$ 8.26
F	1,141,662	62%	41	4	129	$ 13.14	$ 2.08
FS	74,116	60%	43	3	308	$ 19.59	$ 6.13
G	87,399	53%	32	2	264	$ 17.67	$ 7.22
H	151,155	47%	30	2	265	$ 15.78	$ 7.65
J	118,214	56%	45	3	291	$ 18.05	$ 5.39
M	102,010	44%	12	1	116	$ 9.21	$ 8.54
NL	1,016,871	64%	31	3	138	$ 11.88	$ 3.28
NX	74,116	69%	40	2	349	$ 17.00	$ 7.65
NX1	57,646	45%	41	3	271	$ 17.50	$ 5.43
NX2	71,194	42%	33	2	264	$ 16.49	$ 6.94
NX3	82,883	59%	25	1	288	$ 15.58	$ 10.59
NX4	91,118	50%	25	1	262	$ 12.09	$ 9.42
NXC	8,766	22%	10	1	203	$ 12.00	$ 18.68

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AC Transit (Continued)

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
O	569,028	58%	29	2	167	$ 12.09	$ 4.70
OX	162,312	36%	31	2	294	$ 15.33	$ 8.24
P	189,940	61%	37	3	287	$ 22.07	$ 6.62
S	65,350	51%	17	1	293	$ 14.09	$ 16.27
SB	120,583	54%	25	1	322	$ 11.36	$ 11.56
U	134,419	61%	41	2	368	$ 20.30	$ 7.84
V	192,596	49%	32	2	265	$ 16.79	$ 7.22
W	133,356	62%	26	2	255	$ 15.86	$ 8.71
Z	19,392	64%	22	2	222	$ 15.85	$ 8.99
801	193,614	64%	20	1	202	$ 12.50	$ 8.91
802	44,337	57%	23	2	181	$ 15.64	$ 6.86
805	67,804	78%	16	1	183	$ 13.26	$ 10.03
840	50,991	71%	24	2	183	$ 13.65	$ 6.51
851	58,387	65%	17	1	188	$ 15.52	$ 10.28

Source: AC Transit, 2013 Annual Performance Report

ACE

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
1	119,700	96%	41	1	641	$ 16.33	$ 8.40
3	193,788	89%	67	2	641	$ 16.33	$ 5.19
4	153,468	94%	53	1	641	$ 16.33	$ 6.55
5	161,028	90%	55	1	641	$ 16.33	$ 6.25
6	185,472	89%	64	2	641	$ 16.33	$ 5.42
7	81,900	92%	28	1	641	$ 16.33	$ 12.28
8	158,760	92%	55	1	641	$ 16.33	$ 6.34
10	50,400	90%	17	0	641	$ 16.33	$ 19.96

Sources: Alameda CTC, 2013 Performance Report; National Transit Database, 2012

BART

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
Fremont - Richmond	10,643,191	91%	26	1	270	$ 8.11	$ 5.78
Millbrae - Pittsburg	18,124,703	91%	55	1	270	$ 4.73	$ 0.27
Millbrae - Richmond	16,745,624	91%	52	2	270	$ 9.50	$ 0.47
Daly City - Dublin Pleasanton	18,228,756	91%	38	1	270	$ 8.98	$ 2.51
Daly City- Fremont	14,806,624	91%	58	2	270	$ 8.03	$ (0.04)

Note: BART RVM and RVH represent Revenue Car Miles and Revenue Car Hours.
Sources: BART, Station Origin/Destination Data, August 2014; BART, FY 2013 Quarterly Performance Report; National Transit Database, 2012

Capitol Corridor

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
Auburn - San Jose	467,047	95%	17	0	2075	$ 49.40	$ 64.59

Note: Capitol Corridor RVM and RVH are Revenue Train Miles and Revenue Train Hours
Sources: Capitol Corridor, 2014 Station Ridership Activity; CCJPA, Business Plan Update, April 2014; June 7, 2013; Subject: Supplemental Materials for the CCJPA Board Meeting – June 12,2013

County Connection

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
35	111,521	Not Available	Not Available	Not Available	Not Available	Not Available	$ 5.20
36	60,466	Not Available	Not Available	Not Available	Not Available	Not Available	$ 8.11
92X	55,136	Not Available	Not Available	Not Available	Not Available	Not Available	$ 4.70
97X	29,034	Not Available	Not Available	Not Available	Not Available	Not Available	$ 8.45

Source: Laramie Brown, Central Contra Costa Transit Authority, 2014

LAVTA Wheels

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
1	35,628	92.1%	7	1	99	$ 7.48	$ 13.22
2	7,491	88.9%	5	0	99	$ 7.14	$ 19.23
3	14,177	67.8%	4	0	99	$ 6.16	$ 26.06
8	64,124	76.3%	8	1	99	$ 8.32	$ 10.91
9	10,446	80.4%	8	0	99	$ 5.44	$ 10.48
10	522,622	81.7%	17	1	99	$ 7.43	$ 4.50
11	4,240	86.8%	4	0	99	$ 5.96	$ 23.78
12	146,247	79.3%	10	1	99	$ 6.55	$ 8.60
14	28,552	82.8%	9	1	99	$ 9.57	$ 10.18
15	136,965	80.3%	16	1	99	$ 7.14	$ 4.97
20	16,040	83.8%	9	0	99	$ 4.31	$ 9.25
30	363,420	82.6%	12	1	99	$ 6.57	$ 7.12
53	35,738	85.6%	22	2	99	$ 8.82	$ 3.09
54	24,748	79.0%	18	1	99	$ 5.89	$ 4.26
70	64,530	60.3%	12	1	99	$ 4.34	$ 6.58

Source: LAVTA, FY 2014 Operating Statistics

Union City

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
1	98,218	Not Available	22	1	62	$ 3.87	$ 1.79
2=>3	40,835	Not Available	12	1	62	$ 4.36	$ 4.02
2=>8	3,093	Not Available	7	0	62	$ 4.36	$ 7.80
3=>2	28,827	Not Available	8	1	62	$ 4.77	$ 6.75
3=>4	6,317	Not Available	6	0	62	$ 4.65	$ 9.57
4=>8	39,921	Not Available	8	1	62	$ 4.33	$ 6.44
4=>3	5,528	Not Available	5	0	62	$ 4.52	$ 10.86

Continued on next page

Union City (Continued)

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
5	54,909	Not Available	14	1	62	$ 4.05	$ 3.36
6	2,827	Not Available	3	0	62	$ 4.71	$ 21.92
7	10,462	Not Available	3	0	62	$ 4.41	$ 20.46
8=>4	35,906	Not Available	8	1	62	$ 4.37	$ 6.93
8=>2	2,621	Not Available	6	0	62	$ 4.57	$ 9.90
9AM	8,766	Not Available	35	2	62	$ 3.44	$ 0.71
9PM	5,827	Not Available	15	1	62	$ 3.84	$ 3.05

Source: Stephen Adams, City of Union City, 2014

VTA

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
120	56,540	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
140	33,162	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
180	140,182	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
181	690,307	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Sources: National Transit Database, 2012; VTA 2014 Operating Statistics Summary; VTA FY 2014-2023 SRTP

WETA

Route	Annual Ridership	On-time Performance	Passengers/ RVH	Passengers/ /RVM	Cost/RVH	Cost/RVM	Subsidy/ Passengers
Alameda/Oakland-SF	768,476	87%	148	12	1373	$ 115.16	$ 4.31
South SF - Alameda/Oakland	80,439	95%	48	3	1874	$ 122.26	$ 32.10
Harbor Bay-SF	246,689	98%	156	7	1498	$ 67.05	$ 5.16

Source: Kevin Connolly, WETA, 2014

Appendix B Market Analysis

A transit market analysis was completed for Alameda County using the Transit Competitiveness Index (TCI). This section provides an overview of the TCI to identify how it was used to assess the transit market in Alameda County and summarizes the initial findings regarding the transit potential for the county.

Overview of TCI

To design an effective transit system, it is useful to identify locations and markets where transit service can be competitive relative to automobile use. The TCI is a tool that evaluates the conditions of a travel market to determine the potential for successful transit service. A travel market consists of all motorized modes of travel between nodes of activity, where a node of activity is either a trip production or attraction. For this study, each production or attraction is defined as a single traffic analysis zone (TAZ) or a grouping of TAZs in the Alameda CTC travel demand model.

The TCI measures the conditions that best determine the competitiveness of transit relative to auto in a specific travel market (i.e. production - attraction pairs). It provides a quantitative measure of the transit ridership potential by aggregating the conditions that contribute to successful transit service into a single number. The conditions are taken from the mode choice module of the Alameda CTC travel demand model and are therefore limited to the data contained in the countywide model. For Alameda County, these include land use density and diversity, roadway congestion, parking cost and search time, household characteristics, trip purpose, central business district characteristics, and tolls. These factors are weighted to reflect their ability to generate transit trips.

Factors that Contribute to Transit Ridership Increases

As transit demand is influenced by a combination of factors, it is a challenge to isolate the impact of any particular action or condition. At a very general level, transit use increases under the following conditions:

- Higher housing and employment density
- Increased employment;
- Having limited access to a car;
- An increase in gasoline prices;
- Lower costs for transit; and
- Limited and costly parking.

A travel demand model predicts how people respond to different transit options being offered in a location or corridor. The TCI, however, assesses the underlying market conditions and location characteristics, independent of current or proposed transit service. The goal is to focus on the conditions, such as land use density, parking pricing, and congestion that have the greatest effect on transit service demand. The TCI has the ability to look at each of these components independently to determine how they contribute to the transit competitiveness of a particular travel market.

The TCI also allows planners and decision makers to test changes to local conditions to determine how transit markets can be made to be competitive. For example, what conditions or combination of conditions (e.g. increasing parking costs and change in land use densities) would tip the travel market from uncompetitive to competitive? This ability to assess various local conditions facilitates an integrated approach to decision making.

TCI Assumptions and Applications

The TCI tool, developed for the Alameda CTC Countywide Transit Plan analysis, is a web-based tool that covers the nine-county Bay Area, but provides detailed analysis for travel within, into and out of Alameda County. The tool's coverage does not include San Joaquin County. The web tool, available to transit operators, allows the user to define travel markets, obtain TCI scores in matrix and chart format, review factors contributing to the TCI scores in each market, map TCI scores, and access underlying demographic data. Users can modify policy variables to assess how changes in land use, demographics, parking prices and availability, tolls, and congestion will affect TCI scores.

The Alameda CTC TCI tool is derived primarily from data obtained from the mode choice module within the recently updated Alameda CTC travel demand model. The model was updated in 2014 to include land use and socioeconomic forecasts, and transportation infrastructure from the recently adopted Plan Bay Area, which is the Bay Area's regional transportation plan (RTP). The TCI segments travel types and users throughout the Bay Area to accurately account for the different factors that influence travel behavior. For example, trip purpose is a significant driver of travel behavior as noted below.

The following specifications provide a general overview of the TCI variables:

- **Analysis years:** The Alameda CTC TCI provides a 2010 base year and a 2040 future year based on Plan Bay Area land use and socioeconomic forecasts.[23]
- **Geographic coverage and granularity:** The TCI covers all nine Bay Area counties with varying degrees of specificity for each county based on

[23] 2010 is the base year for the Countywide Travel Demand Model; consequently, it is also the base year for the TCI.

TAZs. Its granularity is defined by the number of traffic analysis zones (TAZ) in each county (see Table B-1). The Alameda CTC model has almost five times as many zones in Alameda County compared to the MTC model, half again as many in Contra Costa County, and 24 more in Santa Clara County. The TCI also has 26 zones in San Joaquin County where the MTC model has none.

Table B-1: 2010 to 2040 Total Trips and Work Trips

County	Alameda CTC TAZs	MTC TAZs
Alameda	1,580*	325
Contra Costa	248	171
Marin	51	51
Napa	27	27
San Francisco	190	190
San Mateo	156	156
Santa Clara	392	368
Solano	80	80
Sonoma	86	86
San Joaquin	26	n/a
Total	2,836	1,454

Note: The total number of TAZs touching Alameda County is 1,613, but the difference of 33 are TAZs that partially overlap into Alameda County

- Trip purpose: Trip purpose affects travelers' sensitivity to factors such as travel time and cost. For example, when traveling to work, arriving on time may be more important than cost to some while others may be more sensitive to reducing the cost of a recurring trip. The Alameda CTC TCI can separate travel within the nine-county region into two trip purposes:
    - **Home-Based Work trips** include all trips with a purpose of commuting between home and employment locations. Work trips are further separated into four household income levels to reflect the varying propensity to use transit by income level. Transit utility and TCI are calculated separately for each household income level.
    - **Other trips** include all non-journey to work and non-home-based trips. This can include travel for school, shopping, medical appointments, visiting friends, etc.
- Fixed Market Conditions and Policy Variables: The TCI incorporates twelve market conditions, four of these are fixed and cannot be changed by policy: vehicle availability, household income and two trip purposes (commute and other). In addition, three more variables cannot be changed even though a policy could change it because of the structure of the ACTC travel demand model: e.g., production density, attraction

density and core attraction (i.e., central business district designation). Five may be changed through a change in policy: parking costs, parking search time, travel time, tolls, vehicle operating costs (e.g., gas prices). As a result, These policy variables allow the user to change conditions to analyze the impacts of policy changes.[24]

General Findings for Alameda County

Before assessing specific travel markets such as corridors, an aggregate analysis of transit competitiveness was completed for all travel within Alameda County and trips from and to the other eight Bay Area counties for current (2010) and future (2040) travel markets. This aggregate analysis showed that, overall, Alameda County ranks high in transit competitiveness, and it shows at a very aggregate and average level where the most transit competitive origins and destinations are concentrated.

The following analysis discussion shows the steps undertaken to evaluate the competitiveness of all travel starting or ending in Alameda County, but with one trip ending or originating in one of the other eight Bay Area counties.

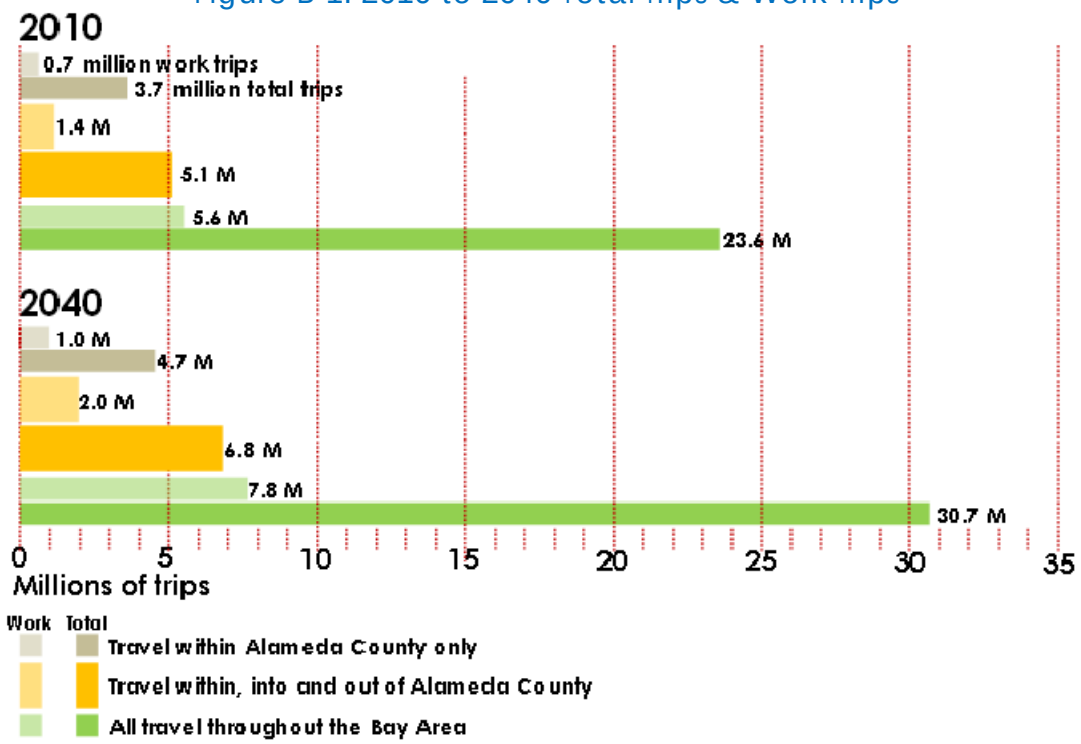
Assessing Demand The first step requires estimating the total number of trips that could be served by one of the nine transit agencies operating in Alameda County. Figure B-1 shows the total volume of this potential market in 2010 and 2040. For reference, the volumes of travel that stay within the county and travel throughout the nine-county region are included.

Assigning Competitiveness The next step is to determine how much of this total volume of travel occurs in competitive markets, borderline markets, and uncompetitive markets. This analysis provides two examples: Alameda County as a trip origin and as a trip destination.

The first example calculates a weighted average origin TCI score for each TAZ based on the market conditions between that TAZ and the travel to all other destination TAZs in the Bay Area, weighted by the volume of travel. The second example does the same calculation for each TAZ as a destination. The weighted average TCI scores are segmented into five groups based on transit competitiveness as shown in Figure B-2. Any score over 100 is considered a competitive transit market.

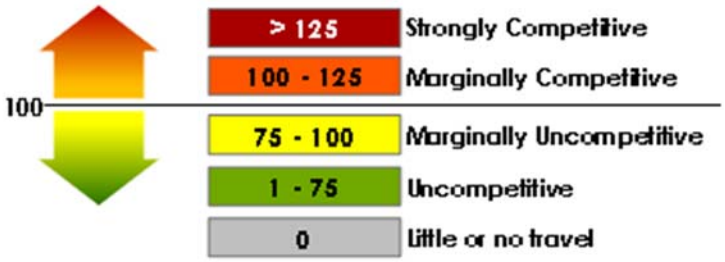
[24] The TCI changes to conditions are limited to analysis of specific travel markets (origin and destinations pairs). Changes to a large area or county-wide would require refreshing the underlying Alameda CTC travel demand model.

Figure B-1: 2010 to 2040 Total Trips & Work Trips



Source: Cambridge Systematics Alameda County TCI, 2014

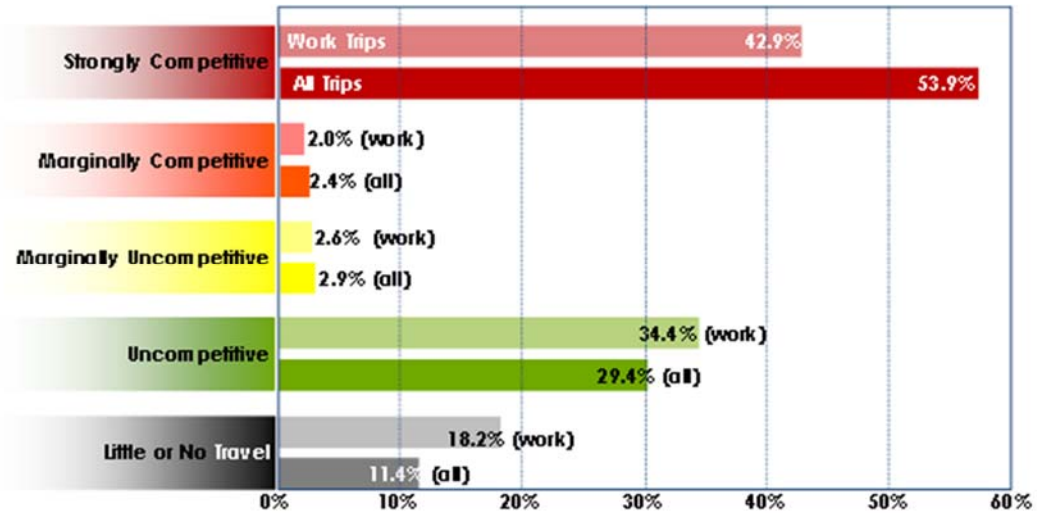
Figure B-2: Range of TCI Scores



Source: Cambridge Systematics Alameda County TCI, 2014

The results for the 2010 base year are displayed in Figure B-3. Almost 54 percent of all Alameda County trips in 2010 were in strongly competitive transit travel markets, as are a smaller but still significant share of work trips (almost 43 percent).

Figure B-3: Allocation of 2010 Travel within, into and out of Alameda County



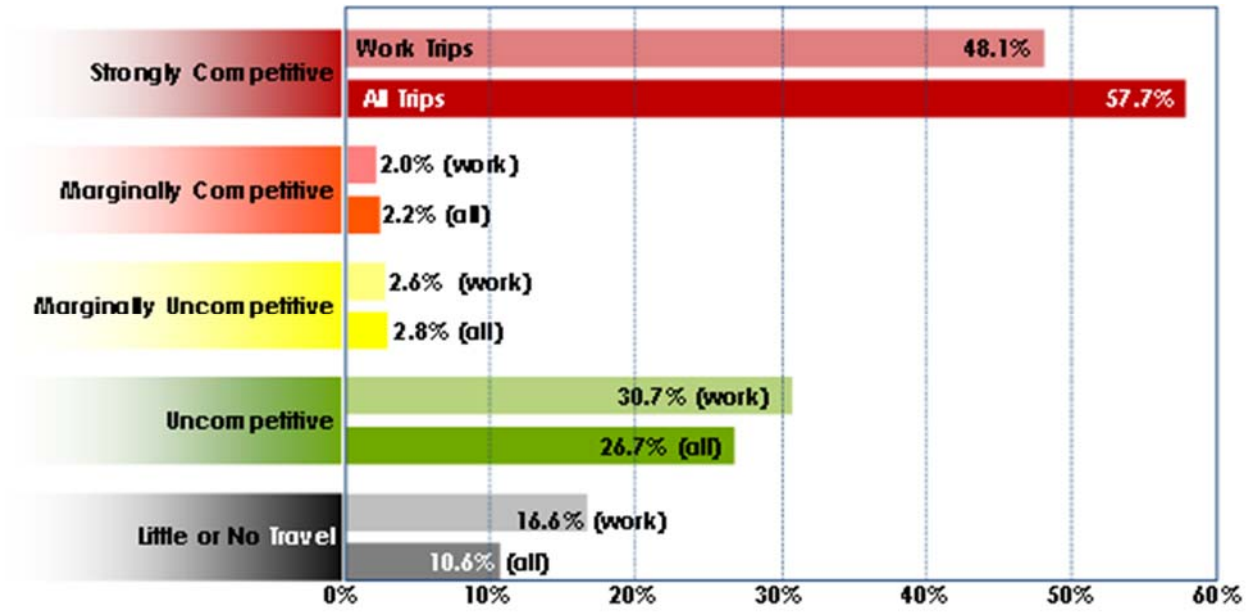
Source: Cambridge Systematics Alameda County TCI, 2014

Combined, travel in marginally competitive and uncompetitive markets (TCI scores from 75 to 125) amount to about 5 percent of travel. Almost 55 percent of work trips and 44 percent of all trips are in uncompetitive travel markets or are from or to TAZs with little or no travel.

Figure B-4 presents the same analysis for the year 2040. Note that the share of work trips in highly competitive markets increases more than five percentage points from below 43 percent to above 48 percent. All travel in strongly competitive markets also increases by nearly four percentage points to 58 percent by 2040. These shifts may be attributable to the aggressive concentration of future land use growth in the 43 Priority Development Areas (PDAs) within Alameda County and the 180-plus PDAs throughout the other eight counties. In addition, some of the increase may occur due to the increase in roadway congestion.

The smaller share for work trips in strongly competitive markets when compared to total trips may be because a significant share of jobs in Alameda County are located in lower-density office parks (e.g., Harbor Bay and Hacienda Business Parks and Lawrence Livermore Labs, etc.). Nevertheless, having 43 and 54 percent of all travel in strongly competitive transit markets compares favorably with other Bay Area counties and other urban regions such as Seattle, Austin, Dallas, suburban Chicago, and Salt Lake City. The aggregate TCI analysis of the Bay Area completed for the MTC Transit Sustainability Project (TSP) showed only 37 percent of all commuter travel and 33 percent of all travel in 2005 was in strongly competitive transit markets.

Figure B-4: Allocation of 2040 Travel within, into and out of Alameda County



Source: Cambridge Systematics Alameda County TCI, 2014

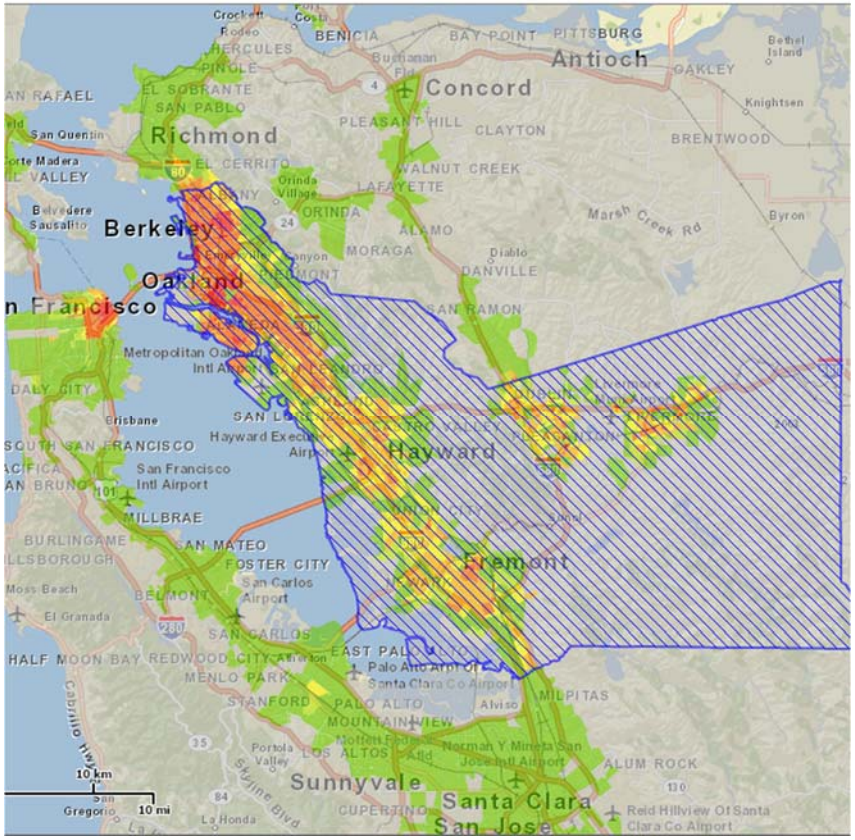
Areas with lower competitiveness scores may still have opportunities for successful transit. An area may be less competitive for transit when all originating travel is averaged together, but there may be some transit competitive origin-destination pairs at specific locations. Similarly, even an area that is a competitive origin in general may have a number of less competitive origin-destination pairs involving that location.

The Alameda County aggregate analysis is mapped for the entire region, so that the most competitive origins or destinations are visible. Figure B-5 shows the TCI score of each TAZ in the inner Bay Area as an origin for all travel into and within Alameda County in the years 2010 and 2040. The colors represent the likelihood that people would use transit for all of their trip purposes. The red and orange colors show strongly competitive origins, while the green colors show uncompetitive origins. Yellow represents origins whose TCI score is just above the threshold score of 100. Grey locations are areas with little travel demand and a TCI score that is effectively zero. Figure B-5 shows the competitiveness of transit at inner Bay Area destinations for all trips that originate in Alameda County. The destination for these trips could be in Alameda County or any of the other eight bay area counties, but the origins are all within Alameda County.

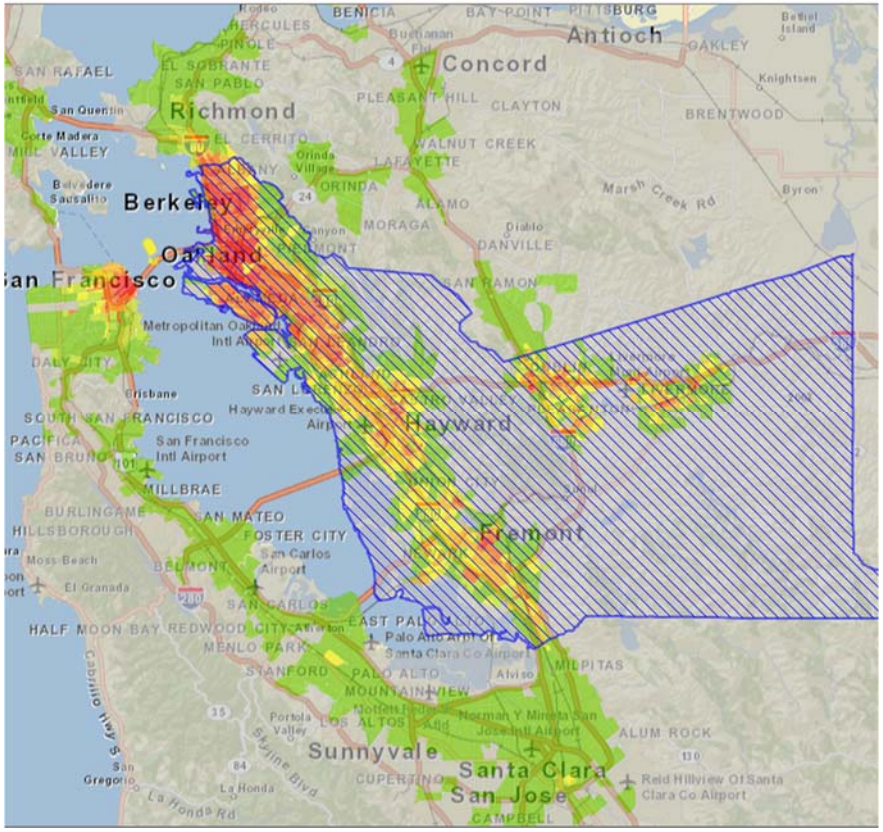
The increase in competitive origins between 2010 and 2040 is most apparent in Oakland, Berkeley and San Francisco. This subtle yet significant increase in competitiveness may be the result of increased residential densities in these areas, overall increased congestion, decrease in vehicle availability per household, or smaller households.

Figure B-5: Competitiveness of Bay Area Destinations for All Trips Originating in Alameda County

2010



2040



Source: Cambridge Systematics Alameda County TCI, 2014

Figure B-6 presents parallel maps to Figure B-5, but shows the competitiveness of inner Bay Area origins (including origins in Alameda County) for all travel to destinations within Alameda County. The destinations are more competitive than the origins shown both in 2010 and 2040. As in the previous maps, the changes between 2010 and 2040 are subtle at this scale. Figure B-6 shows the competitiveness of transit at the origin of all trips that are destined for Alameda County. The origin for these trips could be in Alameda County or any of the other bay area counties, but the destinations are all within Alameda County.

San Francisco and the inner East Bay from Richmond south through Hayward show relatively continuous areas of competitive transit markets, but the areas grow more competitive (red shading) from 2010 to 2040. The Caltrain corridor shows a significant infilling of competitive zones from 2010 to 2040, when the corridor becomes almost continuously competitive. Areas with higher density in San Jose show strong competitiveness with more inconsistent competitiveness in other destinations across Santa Clara County in 2010. This pattern has been challenging to providing inter-county transit from Alameda County. Improving intercounty transit service has been a major consideration of MTC's TSP and other studies, especially long distance services from Alameda County into San Mateo and Santa Clara Counties. TCI analysis, however, indicates that the destinations in Santa Clara and San Mateo are very dispersed, low density, and have an abundance of free parking, thus providing transit competitive few opportunities.[25]

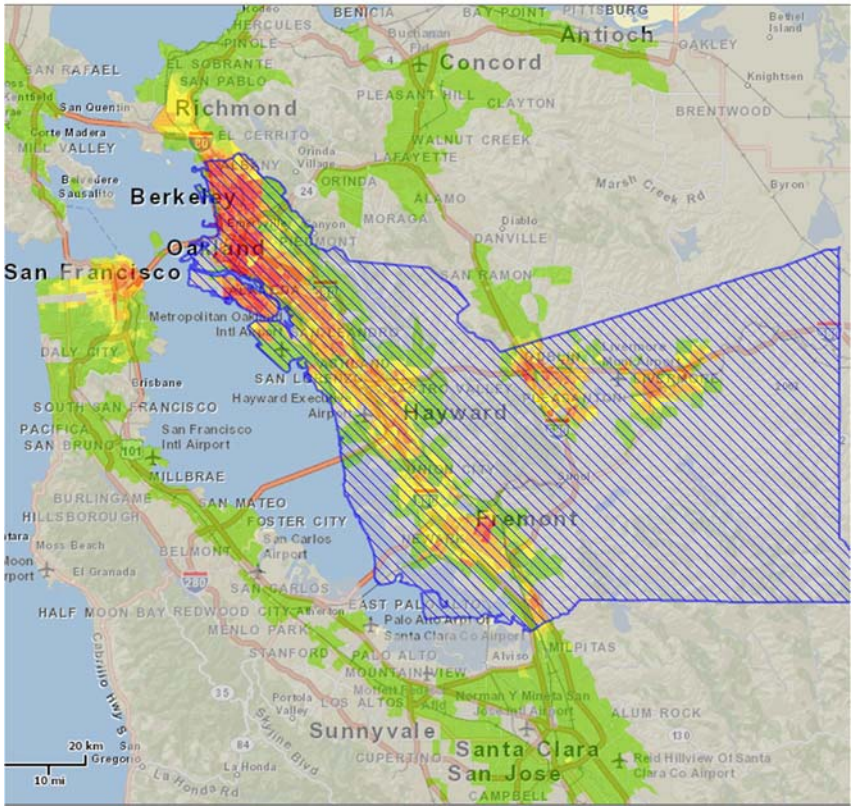
A comparison of the two maps reveals significantly lower concentrations of competitive destinations in Alameda County when compared to competitive origins. Since most people commute from dispersed residential locations to a relatively concentrated set of work locations; the competitive work-related travel is focused on the major employment centers in the region. This does not mean that transit competitive market pairs are not located in the lower-scoring areas, but competitive market pairs are more limited. This is one of the reasons for the success of park-and-ride facilities that serve as collectors in lower-density residential areas as well as employer shuttles that provide tailored last-mile services to spread out office parks and industrial areas, which would not ordinarily be suitable for extensive fixed-route transit.

In summary, these aggregate analyses only show an overall competitive Bay Area landscape for travel within, into and out of Alameda County. These maps and the aggregate analyses are not intended for evaluating the competitiveness of specific corridors or nodes of activity. That type of evaluation requires detailed analysis using the TCI tool's full functionality to select specific TAZs as activity nodes and evaluate the travel between them. This node-to-node analysis will be the basis for selecting a core transit network

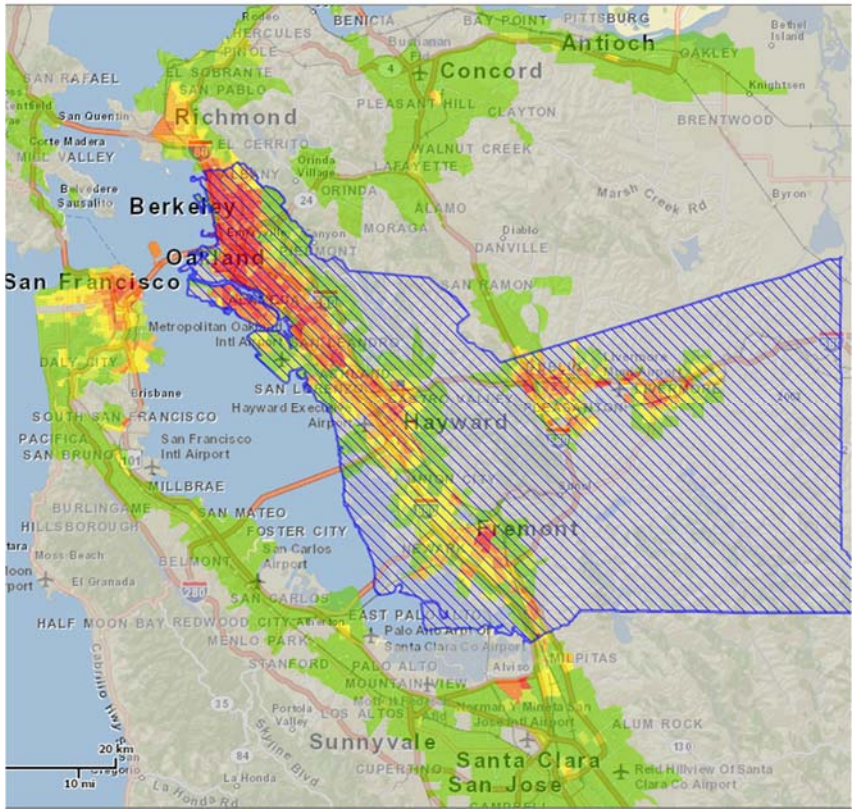
[25] The TCI analysis did not include San Joaquin County as it is outside the Bay Area.

Figure B-6: Competitiveness of Alameda County Destinations for All Trips Originating in the Bay Area

2010



2040



Source: Cambridge Systematics Alameda County TCI, 2014

and major corridors as the basis for an alternatives analysis in the next phase of the Transit Plan development.

Validation of TCI Findings for Existing Travel Markets

Transit competitiveness cannot be validated with empirical observations as may be done with travel demand model results that can be compared to actual traffic counts or transit ridership. While one can observe the conditions TCI uses to calculate a score, the non-linear relationships between these conditions make validation impossible. A feasible substitute for validation, therefore, involves comparing TCI evaluations to the results experienced transit planners would expect. For this test of reasonableness, we have evaluated two travel markets: the San Pablo Corridor and AC Transit Route 99. Each evaluation, presented below, involves an assessment of the corridor market conditions that drive the TCI and measurement of how well the major transit route performs in the corridor.

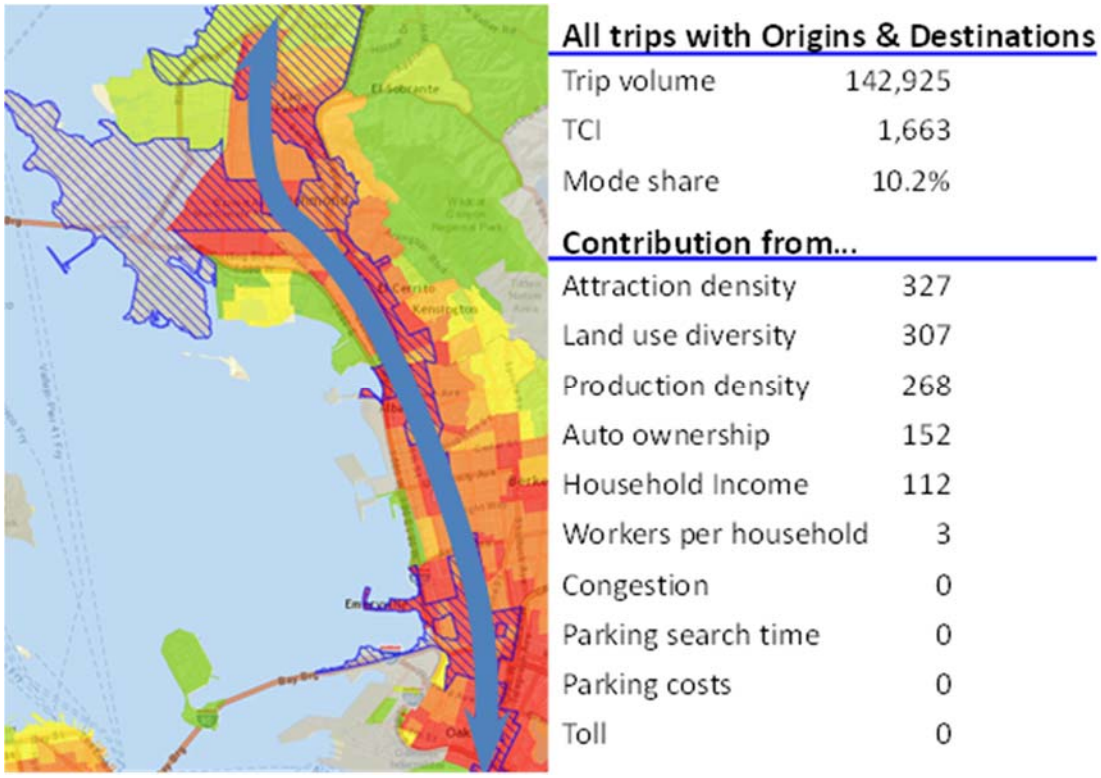
AC Transit's San Pablo Avenue Corridor

Routes 72, 72M, and 72R serve the 14-mile San Pablo Avenue transit corridor traversing the cities of San Pablo, Richmond, El Cerrito, Albany, Berkeley, Emeryville, and Oakland. This TCI analysis measures the transit competiveness for all 143,000 daily trips and 17,556 commute trips in 2010 within the 91 TAZs along San Pablo Avenue. The analysis produced a TCI score of 1,663 for all trips (more than 16 times higher than the minimum threshold of 100) and a TCI score of 445 for commute trips.

The conditions that contribute to this very competitive travel market are shown in Figure B-7: high residential (origin) and commercial (destination) land use densities, diverse land use mix, below median car ownership, and lower household incomes. The small contribution associated with workers per household indicates that the condition in the corridor is close to the median for the county. The zero contribution from congestion indicated that average delay throughout the day is not severe. The zero contributions for parking cost (average of 48 cents per stay) and parking search time (2.2 minutes) indicate these conditions are close to the countywide median.

AC Transit runs three bus lines that traverse the San Pablo Avenue corridor (72, 72M, 72R). The 72R Rapid service operates on a 12-minute headway and runs from 6 AM until 7:00 PM on weekdays. The 72L and 72 operate less frequent local service along the corridor. The Alameda CTC travel model reports a 2010 transit mode share of just over 10.2 percent. The travel model's mode share is not an observed statistic (it is generate by the model itself), so actual mode share could be significantly higher or lower. The 10.2 percent transit mode share for all trips increases to 24.4 percent for commute trips (also in 2010), which indicates that

Figure B-7: 2010 All Trips Origins or Destinations within San Pablo Corridor



Source: Cambridge Systematics, 2014

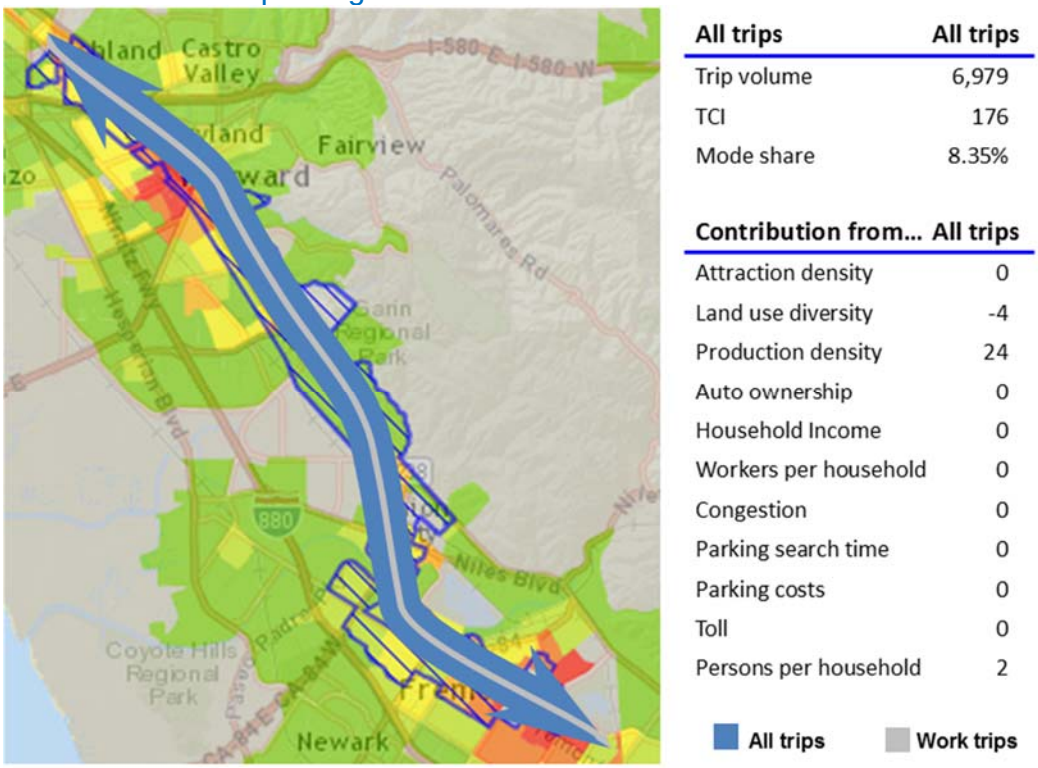
commute trips are easier for transit to capture and that the service in the corridor is configured for peak period travel during the work week.

AC Transit's Route 99 Service Area

AC Transit's Route 99 runs between Bay Fair BART and Fremont BART via Mission Blvd., Hayward BART, South Hayward BART, Union City BART, Decoto Road, Fremont Boulevard, and Walnut Avenue. The TCI analysis measures the transit competiveness for all 48,537 daily trips and 5,000 commute trips in 2010 within the 35 TAZs along Route 99's path and four BART stations. The analysis produced a TCI score of 1,062 for all trips and 321 for work trips, which is more than 10 times and three times higher, respectively, than the minimum transit-competitive threshold of 100.

The two conditions that make the area transit competitive are the high commercial and residential land use densities (Figure B-8). Conditions that detract for the area's competitiveness are a lack of mixed land uses, higher than median car ownership, lower than median workers per household, and slightly higher than median household income. The zero contribution from congestion, parking cost and parking search time indicate these conditions are close to the countywide medians.

Figure B-8: 2010 All Trips Origins or Destinations within the Route 99 Service Area



All trips	All trips
Trip volume	6,979
TCI	176
Mode share	8.35%

Contribution from...	All trips
Attraction density	0
Land use diversity	-4
Production density	24
Auto ownership	0
Household Income	0
Workers per household	0
Congestion	0
Parking search time	0
Parking costs	0
Toll	0
Persons per household	2

Source: Cambridge Systematics, 2014

AC Transit Route 99 provides the majority of the transit service for this area, although the four BART stations could serve intra-corridor travel as well. Route 99 has 20-minute headways and runs from 5 AM until 11:20 PM on weekdays and with 30-minute headways during similar hours on weekends. The Alameda CTC travel model reports a 2010 transit mode share of just over three percent for all trips and 6.2 percent for work trips. A 6.2 percent mode share for commute trips indicates some deficiencies in the quality or quantity (i.e., frequency) of the service.

Possible TCI Applications

The examples above were chosen to demonstrate that the tool's results are reasonable and conform to an informed observer's expectations. Subsequent applications of the TCI tool will involve building scenarios for the Countywide Transit Plan and evaluating the nine high-capacity corridors designated in AC Transit's Major Corridors Study. The 2040 TCI analysis should also inform how the transit plan should account for future land use, travel patterns, household characteristics, and congestion. Going forward, three potential applications of the TCI are suggested for the Countywide Transit Plan:

- **Identifying underperforming transit service:** Much of Alameda County's western half (inner East Bay) provides very competitive transit markets.

These highly favorable conditions, however, do not assure high ridership. Some transit routes are underperforming despite their very competitive travel markets. While the Countywide Transit Plan is not intended to evaluate these discrepancies, some underperformance may be linked to systemic challenges that the Countywide Transit, Freight, and Arterial Plans are collectively tasked with addressing. These challenges might include how to better purpose arterials to serve high capacity transit and ensure on-ramps and intersections are planned and equipped to give transit priority. TCI analysis of underperforming transit routes may identify where these systemic challenges are critical.

- **Understanding uncompetitive travel markets:** The southern and eastern parts of the county present less competitive conditions: low density residential and commercial development, low congestion for peak hour reverse commutes, plentiful and low cost parking, and significant areas with low land use diversity. TCI analysis of travel markets into and within these uncompetitive areas should provide quantitative targets and policies to improve land use density and mix, parking pricing and supply, and transit priority treatments. It also provides an opportunity to consider alternative approaches to fixed-route transit to address accessibility.
- **Inter-county transit market opportunities:** About twice as many commute trips enter or leave the county each day as remain entirely inside the county, and this inter-county transit travel is about 27 percent more for all trip purposes than internal transit travel. TCI evaluation of these inter-county travel markets, therefore, would provide a better understanding of which are or will become significant transit opportunities and how to better serve these markets.

Finally, the TCI tool will be available for transit agencies and stakeholders to use as a planning tool for the duration of the Countywide Transit Plan. If utility is desired by Alameda CTC beyond the Transit Plan's completion, the TCI tool can be transitioned to an Alameda CTC website or a third party hosting service for long-term maintenance and technical support.

In the longer term, transit and regional planning agencies can work with the TCI tool to support on-going planning activities and future countywide and regional planning efforts. Experience to date with this process seems targeted at one or more of the following four objectives:

- **Allocation of resources within a transit agency:** The TCI tool facilitates prioritization of limited resources for transit capital and operations improvements in both the short- and long-term by targeting resources to achieve the most cost-effective and efficient results given the existing and future conditions. The TCI can support routine service planning activities such as design of route networks, developing plans to enhance regional

transit connections, and selecting service types that would be appropriate to serve different neighborhoods. The TCI tool is being used to identify competitive markets within Alameda County and between Alameda County and the eight other Bay Area counties that currently do not achieve high transit mode share and to probe the underlying factors contributing to a market being relatively more or less competitive for transit.

- **Screen and refine capital and service improvements:** The TCI tool can be used to screen proposed capital project proposals and prioritize investments and funding to ensure scarce resources are deployed in support of the most promising transit markets. The TCI tool evaluates travel markets for transit regardless of transit service levels, so agencies may screen proposed changes to existing service or expansions and evaluate their feasibility without having to develop specific alternatives. This provides a sketch planning tool, thus avoiding the need to code specific alignments, stop locations and a host of service attributes (e.g., frequency, vehicle type, service duration, fares, etc.) into a travel demand model and wait for run results.
- **Local jurisdictions' Role in Transit Competitiveness:** The TCI allows users to modify land use attributes such as housing and employment density and pricing factors such as cost and/or availability of parking. These scenarios demonstrate in quantitative terms what actions, such as increasing density, parking pricing, or transit priority treatments, have the greatest potential to affect transit competitiveness.