# CHAPTER 10: EVALUATION OF ALTERNATIVES

This chapter provides an assessment of how well the alternatives considered in this EIS satisfy project Purpose and Need based on local evaluation criteria. The evaluation is intended to provide the public, interested agencies and decision-making organizations key summary information by which to compare the overall performance of alternatives.

VTA intends to propose a project in the SVRTC for federal New Starts capital funding (49 USC Section 5309 [Capital Investment Grants]). Certain actions must be completed before a formal request to qualify a project for New Starts funding can be made to the Federal Transit Administration (FTA), which administers the program. At this time it is anticipated that the BEP Alternative would be the New Starts candidate project and a funding request, in conjunction with submittal of the supporting New Starts Criteria report, would be made in 2009. Following receipt of the request, FTA would evaluate the merits of the proposed New Starts project, issue a rating of the project with respect to various performance criteria, and recommend whether or not the project should advance to the next phase of the project development process (preliminary engineering, final design, or construction) and be eligible for Section 5309 funds.

FTA New Starts criteria are defined by law and their specification and reporting are set forth in FTA-issued guidance (see, for example, *Reporting Instructions for the Section 5309 New Starts Criteria*, July 2008). Several of the criteria are similar to certain local evaluation criteria presented in this chapter. However, VTA will develop the New Starts-specific evaluation criteria for the proposed federal project when the New Starts Criteria report is prepared for submittal to FTA. VTA also intends to report these criteria in future public documents prepared for the SVRT corridor. To this end, it is anticipated that New Starts project performance criteria will be incorporated into the final EIS.

## 10.1 OVERVIEW OF EVALUATION METHODOLOGY

Alternatives are measured and compared both qualitatively and quantitatively when possible using an evaluation methodology that has been applied throughout the project development process. An initial screening of a wide range of alternatives was performed as part of the major investment study process, using a set of evaluation criteria that are listed in Chapter 2. Many of the proposed alternatives were eliminated from further consideration as a result of that process.

This document presents a more detailed evaluation of a limited subset of alternatives, based on a similar set of criteria as described below. The evaluation examines how each of the three alternatives considered in this EIS performs in terms of meeting the project Purpose and Need statement presented in Chapter 1. Most criteria included in this evaluation chapter were derived from the Silicon Valley Rapid Transit Corridor MIS/EIS/EIR Major Investment Study (MIS) Final Report (November, 2001). The MIS criteria are listed in Section 2.1.1 of Alternatives. In certain instances, their definitions were modified to better correspond with current project information made available through the EIS process. The final criteria provide an objective means of determining each alternative's consistency with locally defined goals and objectives. These criteria, grouped under five categories, include:

## Mobility Improvements

- Ridership
  - Total transit boardings in the Silicon Valley Rapid Transit Corridor (SVRTC), average weekday (2030)
  - VTA total boardings including BART extension, average weekday (2030)
  - New transit riders, weekday average (2030)
- Travel time savings
  - Change in transit user travel times, average weekday (hours)
  - Point-to-point auto versus transit total travel time, a.m. peak hour (minutes)
- Travel speeds
  - Average freeway peak hour speed at county screenline (a.m./p.m.)
- Congestion relief
  - Change in annual vehicle miles of travel (VMT)
  - P.M. peak period (3 hours) auto trips removed
- Regional connectivity and mobility
- Environmental justice
  - Low income households within ½- and one mile of stations
  - Zero-auto households within ½- and one mile of stations
  - Job opportunities within ½- and one mile of stations

## Environmental Benefits/Adverse Effects

- Air quality: Change in annual National Ambient Air Quality(NAAQ) pollutant emissions
- Air quality: Change in greenhouse gas emissions in tons of $CO_2$ equivalents
- Mobile (vehicle) energy consumption: Change in annual gallons of gasoline equivalents
- Displacements: Number of residences
- Displacements: Number of businesses
- Historic properties: Number of parcels and structures affected
- Acres of wetlands/habitat affected
- Adverse traffic effects: Number intersections adversely affected before and after mitigation of LOS
- Adverse construction effects

## Operating Efficiencies

- Passenger boardings per vehicle mile (VTA bus, VTA LRT, BART Extension)
- Change in total VTA bus, VTA LRT and BART extension operating costs
- Operating cost per passenger boarding (VTA bus, VTA LRT, BART Extension)
- Operating cost per passenger-mile (VTA bus, VTA LRT, BART Extension)

## Land Use

- Transit supportive land use policies and zoning regulations
- Potential for transit-oriented development
- Other land use considerations
- Economic development effects

## Local Financial Commitment and Public Acceptance

- Percent capital funds from local sources
- Community and stakeholder acceptance

# 10.2 SUMMARY OF BEP AND SVRTP PERFORMANCE: LOCALLY ESTABLISHED EVALUATION CRITERIA

This section summarizes performance of the No Build Alternative, BEP Alternative, and the SVRTP Alternative in five areas, applying the previously described evaluation criteria.

## 10.2.1 MOBILITY IMPROVEMENTS

Evaluation criteria have been established to measure the outcomes of proposed major transit investments. The outcomes are the ridership on the project and overall transit system, the faster and therefore shorter travel times that are possible, the benefits that extend to other modes, and the populations that benefit from the improved service. In most cases, these outcomes are quantifiable. An alternative performs better if it generates more riders than other alternatives, reduces travel times, and serves populations with limited or no other travel options (e.g., transit dependent/mobility disadvantaged individuals). Table 10-1 lists the measures that have been identified for capturing mobility benefits of EIS build alternatives.

### Ridership

Total ridership, measured in terms of weekday boardings on BART and other transit services serving Santa Clara County and the SVRTC[1], would increase by almost 130 percent between 2007 and 2030, from 515,000 to 1,182,000, under the No Build Alternative conditions. The BEP Alternative would increase 2030 boardings by an additional 4 percent and the SVRTP Alternative by 6 percent. Total weekday boardings on VTA bus and LRT and boardings on BART generated by the BEP and SVRTP alternatives would increase more, by 13 percent and 22 percent, respectively. This higher ridership is a result of riders on other SVRTC transit services finding VTA services and BART more convenient to use and shifting services accordingly. The number of BART riders using the SVRTP Alternative is forecast to be approximately 98,800, or over two times the riders on the BEP Alternative. Total new transit riders (linked trips) generated by the SVRTP Alternative are just under twice the new riders on the BEP Alternative. The ridership measures support the conclusion that the SVRTP Alternative offers substantially more benefits than the BEP and No Build alternatives.

[1] Transit operators and services include BART, ACE commuter rail, Caltrain commuter rail, Capitol Corridor intercity rail, Dumbarton Rail Corridor service (proposed), VTA local and express bus, and VTA light rail.

## Travel Times and Speeds

Savings are measured relative to the 2030 No Build Alternative. The SVRTP Alternative is projected to save SVRTC transit users 57,300 hours of total travel time every weekday, approximately 32 percent more hours than are saved under the BEP Alternative

For point-to-point travel during congested peak periods, the SVRTP Alternative would allow faster transit travel compared to the BEP Alternative for trips to/from downtown San Jose. For commuters and other travelers into Santa Clara County traveling to (and from) the major activity centers represented by downtown San Jose and the heart of Silicon Valley, a major purpose and need for high-speed transit improvements in the area, the SVRTP Alternative provides greater access and therefore greater overall benefits. Similarly, the SVRTP Alternative is superior to the BEP Alternative for trips from east San Jose/Alum Rock to/from downtown San Francisco and downtown Oakland. By 2030, with few exceptions, transit travel times to/from downtown activity centers would be substantially less than single-occupant auto travel times.

**Table 10-1: Mobility Evaluation**

| Objective/ Performance Measure | No Build Alternative | BEP Alternative | SVRTP Alternative |
|---|---|---|---|
| Total Transit Boardings in Study Area, Average Weekday (2030) | ○ | ◐ | ● |
| | 1,181,700 | 1,234,400 | 1,254,800 |
| VTA Total Boardings including BART Extension, Average Weekday (2030) [BART Extension Riders] | ○ | ◐ | ● |
| | 433,800 [0] | 508,000 [46,458] | 538,100 [98,751] |
| New Transit Riders, Average Weekday (2030) | ○ | ◐ | ● |
| | 0 | 27,135 | 48,597 |
| Travel Time Savings: Change in Transit User Travel Times, Average Weekday (hours) | ○ | ◐ | ● |
| | 0 | -43,608 | -57,349 |
| Travel Time Savings: Point-to-Point Auto versus Transit Total Travel Time, A.M. Peak Hour (minutes) | ○ Auto vs. Transit | ◐ Auto vs. Transit | ● Auto vs. Transit |
| -Pleasanton to downtown San Jose | 81 vs. 85 | 80 vs. 83 | 80 vs. 69 |
| -Union City to downtown San Jose | 49 vs. 62 | 48 vs. 48 | 48 vs. 35 |
| -Alum Rock to downtown San Fran. | 127 vs. 113 | 125 vs. 88 | 124 vs. 76 |
| -Alum Rock to downtown Oakland | 80 vs. 118 | 79 vs. 80 | 78 vs. 68 |
| Travel Speeds: Average Freeway Peak Hour Speed in MPH at County Screenline (a.m. / p.m.) | ○ | ◐ | ◐ |
| | 17.6 / 11.7 | 18.5 / 13.1 | 19.3 / 13.9 |

**Table 10-1: Mobility Evaluation Cont'd**

| Objective/ Performance Measure | No Build Alternative | BEP Alternative | SVRTP Alternative |
|---|---|---|---|
| Congestion Relief: Change in Annual Vehicle Miles of Travel | ○ | ◐ | ● |
| | 0 | -83,200,000 | -146,400,000 |
| Congestion Relief: P.M. Peak Period (3 Hours) Auto Trips Removed [Average Daily] | ○ | ◐ | ● |
| | 0 | 5,600 [18,300] | 10,000 [32,500] |
| Regional Connectivity and Mobility | ○ | ◐ | ● |
| Environmental Justice: Low Income Population within ½ Mile [1 Mile] of Stations (2000 Census) | NA | ◐ | ● |
| | | 744 [7,450] | 7,128 [37,746] |
| Environmental Justice: Zero Auto Households within ½ Mile [1 Mile] of Stations (Census, 2000) | NA | ○ | ◐ |
| | | 125 [1,329] | 1,819 [7,941] |
| Environmental Justice: Job Opportunities within ½ Mile [1 Mile] of Stations (2030 Forecast) | NA | ◐ | ● |
| | | 17,183 [46,130] | 89,336 [160,178] |
| ● - Most Favorable ◐ - Moderately Favorable ○ - Least Favorable | | | |

Source: VTA, 2008

Both the BEP and SVRTP alternatives would divert auto travel to transit in two of the San Francisco Bay region's more heavily congested freeway corridors, I-880, and I-680. The benefits in terms of improved auto speeds were measured near the Santa Clara County boundary with Alameda County. The weighted average speed for p.m. peak hour traffic (2030) under the No Build Alternative would be 11.7 mph, improving moderately under the BEP Alternative to 13.1 mph and slightly more under the SVRTP Alternative to 13.9 mph. Although noticeable, the benefits tend to be limited because any freeway capacity that becomes available during peak periods due to mode shifts tends to be readily filled by auto trips diverted from other facilities or other periods. Unfortunately, the future freeway system in the study corridor is likely to always be congested during peak periods although the proposed transit improvements would increase overall corridor capacity and expand modal options. For these reasons the benefits of both the BEP and SVRTP alternatives are considered to be moderately favorable in terms of improving average auto speeds.

## Congestion Relief

Both the BEP and SVRTP alternatives would reduce total vehicle miles of travel (all modes combined) in the region, mainly by reducing the number of auto trips. By 2030 the SVRTP Alternative is expected to reduce VMT compared to the No Build condition by 146 million miles annually. The BEP Alternative would reduce VMT by approximately 83 million miles annually (equivalent to 57 percent of the VMT reduction projected under the SVRTP Alternative).

Another perspective on the congestion reduction benefits associated with proposed transit improvements is the reduction in auto trips during peak periods. By 2030 the commute period will likely span three hours during the afternoon. The SVRTP Alternative is projected to eliminate 10,000 trips from the regional roadway network by prompting a mode shift from auto to transit, and the BEP Alternative would eliminate approximately 5,600 trips during the p.m. peak three hours of travel.

## Mobility Improvements and Environmental Justice

The extension of BART service, as opposed to other transit modes, provides Santa Clara County a direct connection to the San Francisco Bay Area's main regional rail network. The existing BART network and a programmed extension to Warm Springs in Alameda County connect three out of four of region's largest cities—San Francisco, Oakland, and Fremont. The BART network also serves the residential and commercial growth areas of Alameda and Contra Costa counties, many of whose residents, at least in Alameda County, are employed in Santa Clara County. The SVRTP Alternative would directly connect the region's largest city, San Jose, and portions of the region's most dynamic employment corridor, Silicon Valley, to BART regional rail. It is superior to the BEP Alternative in that the BEP Alternative would not offer direct connections to San Jose and the south core of Silicon Valley. The higher number of new transit riders generated by the SVRTP Alternative is another indicator of its favorable effect on mobility.

Santa Clara County is quite affluent yet includes sizeable numbers of low income, limited mobility populations. Low income populations (defined as individuals in families with incomes less than twice the federal poverty level[2]) served by the BEP and SVRTP alternatives increase considerably as the station catchment areas are enlarged from ½-mile to one mile, reflecting the fact that initially, the BART alignment and stations, with the exception of downtown San Jose, would be in existing railroad and industrial corridors. Ongoing infill and industrial to residential conversions will expand the population base closer to proposed stations. A ½-mile distance to stations is convenient for walk and non-motorized access. A one-mile distance is less convenient for walk but can be well served by shuttle/circulator services.

[2] In the San Francisco Bay Area, due to the high cost of living, individuals in poverty are defined as those whose family incomes are less than two times the national average family incomes used to establish poverty thresholds. In 1999, the basis of the 2000 Census, this was $17,029 for a family of four. Twice this level is $34,058.

The vast majority of households in the county have at least one auto available. Therefore, the number of zero-auto households served by proposed BART stations is low under both the BEP and SVRTP alternatives. As with low income populations, the number of zero-auto households increases substantially when expanding the catchment area around stations to one mile, although on an absolute scale the number of zero-auto households is not that large.

Transit dependent populations, as indicated by low income and low auto ownership, tend to be more heavily concentrated in eastern Santa Clara County, including east San Jose, and would be provided improved transit access to the region's main employment centers under both alternatives. The SVRTP Alternative would offer more mobility benefits to these disadvantaged populations mainly due to its greater accessibility (six BART stations as opposed to two) and rapid rail connections to the county's major employment centers in downtown San Jose and Santa Clara. By 2030, approximately 90,000 jobs would be within ½-mile and 160,000 would be within one mile of proposed BART stations under the SVRTP Alternative. Approximately 17,000 and 90,000 jobs would be within ½- and one mile, respectively, of BEP Alternative stations. To access jobs in downtown San Jose and Santa Clara, riders on the BEP Alternative would need to transfer to express buses and shuttle/feeder services.

## 10.2.2 ENVIRONMENTAL BENEFITS/ADVERSE EFFECTS

The build alternatives could generate both environmental benefits and adverse environmental effects. Adverse effects may be temporary (e.g., during the construction of a project) or long term (e.g., cause a permanent change in conditions). Adverse effects once identified would likely to be mitigated, and it is therefore reasonable to assess effects with proposed mitigation measures in place.

Table 10-2 lists the various environmental factors included in the evaluation.

**Table 10-2: Adverse Environmental Effects Evaluation**

| Objective/ Performance Measure | No Build Alternative | BEP Alternative | SVRTP Alternative |
|---|---|---|---|
| Air Quality: Change in Annual NAAQ Emissions, in Tons | ○ | ◐ | ● |
| -Reactive Organic Gases (ROG) | 0 | -10 | -21 |
| -Nitrogen Oxides (NOX) | 0 | 9 | -4 |
| -Carbon Monoxide (CO) | 0 | -76 | -160 |
| Air Quality: Change in Greenhouse Gas Emissions in Tons of $CO_2$ Equivalents | ○ | ◐ | ● |
| | 0 | -4,138 | -16,153 |
| Mobile (Vehicle) Energy Consumption: Change in Annual Gallons of Gasoline Equivalents[3] | ○ | ◐ | ● |
| | 0 | -3,125,000 | -6,017,000 |
| Displacements: Number of Residences | ● | ● | ◐ |
| | 0 | 2 | 3-15 |
| Displacements: Number of Businesses | ● | ◐ | ○ |
| | 0 | 47-58 | 78-103 |
| Historic Properties: Number of Parcels [Structures] Affected | ● | ● | ◐ |
| | 0 | 0 | 2-3 [4-8] |
| Acres of Wetlands/Habitat Affected | ● | ◐ | ◐ |
| | 0 | 0.56 | 0.56 |
| Adverse Traffic Effects: Number of Intersections Adversely Affected Before [After] Mitigation of LOS | ● | ◐ | ○ |
| | 0 | 14 [9] | 32 [26] |
| Adverse Construction Effects | ● | ◐ | ○ |
| ● - Most Favorable ◐ - Moderately Favorable ○ - Least Favorable | | | |

Source: VTA, 2008

[3] Change in annual gallons of gasoline equivalents based on bus/auto/truck Direct BTUs (110,400 Direct BTUs equivalent per gallon of gasoline)

## Air Quality and Energy

Relative to the No Build Alternative conditions, the BEP and SVRTP alternatives would reduce annual emissions of key National Ambient Air Quality (NAAQ) pollutants, including reactive organic gases, oxides of nitrogen, and carbon monoxide. These pollutants are associated with auto and truck travel, which are both reduced by a mode shift to transit. Relative to the total emissions of these pollutants from SVRTC traffic, the tonnage reduction would be considered moderately favorable under the BEP Alternative and most favorable for the SVRTP Alternative.

The reduction in greenhouse gas emissions, measured in terms of tons of $CO_2$ equivalents, would be more substantial. The benefits from the SVRTP Alternative are a reduction of approximately 16,000 tons annually compared to a reduction of approximately 4,000 tons for the BEP Alternative.

Similar to air quality emissions, the reduction in SVRTC VMT associated with the build alternatives would lead to a reduction in transportation energy consumption. The SVRTP Alternative generates a higher reduction in VMT and therefore higher fuel savings. Relative to regional travel, however, the benefits of both the SVRTP and BEP alternatives would be considered moderate.

## Displacements and Historic Structures

The No Build Alternative would not result in the displacement of any residences or businesses or affect historic structures in the SVRTC.

The BEP Alternative would displace two residential units, a limited adverse effect given the size and complexity of this alternative. Depending on the alignment option, the SVRTP Alternative would require the removal of from three to 15 residential units, with the high end of the range considered a moderate adverse effect. Under both alternatives, adverse effects on business are more substantial, with the BEP Alternative having a moderate adverse effect and the SVRTP Alternative having the least favorable effect on business activity. The SVRTP Alternative would displace from 66 to 78 percent more business unit than the BEP Alternative.

With respect to adverse effects on historic properties (either their removal or causing a permanent change in their setting or character), the BEP Alternative would have no adverse effects and the SVRTP Alternative only a moderate adverse effect.

## Habitat

Because the proposed BEP Alternative and SVRTP Alternative improvements are proposed within an already heavily urbanized area, adverse effects on wetlands and other natural habitats would be very minor under both the BEP and SVRTP alternatives.

## Traffic

Both the BEP and SVRTP alternatives would divert travel from autos to transit and thereby reduce the number of auto trips relative to the No Build Alternative. There would be a small reduction in peak hour trips on study corridor freeways. (Any available freeway capacity tends to fill readily due to a roadway system that will be over capacity on many links in 2030.) However, approximately three freeway segments in the vicinity of the Berryessa Station under the BEP Alternative would experience peak hour degradation in level of service that exceeds the Santa Clara County Congestion Management Program impact threshold. Depending upon either the a.m. or p.m. peak, approximately four to five segments near the Berryessa and Alum Rock stations under the SVRTP Alternative would experience peak hour degradation in service exceeding thresholds. The adverse effects result from the concentration of traffic proceeding to/from each BART station.

Both alternatives would alter arterial and local street circulation in the vicinity of proposed BART stations and increase congestion at intersections used by park-and-ride and kiss-and-ride traffic and, to a limited extent, feeder, and express buses. The potential adverse effects of increased station area traffic were measured relative to a 2030 No Build Alternative under "With Improvements" conditions, wherein it was assumed intersections would be improved to a reasonable level through retiming, restriping, and lane additions that would be possible within the available right-of-way, before considering the effects of BART station traffic.

The number of intersections that would experience substantial effects when station traffic is included in 2030 volumes was determined to be a small percentage of the intersections analyzed after implementation of mitigation. Out of 66 intersections evaluated under the BEP Alternative for both a.m. and p.m. levels of service[4], both "with" and "without" BEP Alternative improvements, 14 intersections would be adversely affected by 2030, or 21 percent. When considering reasonable mitigation, the number of intersections experiencing adverse effects would decrease to nine, or 14 percent.

The SVRTP Alternative would result in a higher number of substantial adverse effects. Out of 127 intersections analyzed, this alternative would adversely affect LOS by 2030 before consideration of feasible mitigation measures at 32 (25 percent) and 26 (20 percent) would be adversely affected after introducing

[4] The Berryessa Station would be a line terminus under the BEP Alternative, and would generate more auto access traffic than as an intermediate station for the SVRTP Alternative. As a result, 18 additional intersections (compared to the SVRTP Alternative) were evaluated for LOS under 2030 traffic conditions. The intersections were evaluated for LOS during the a.m. and p.m. peak hours.

mitigation. For these reasons, the SVRTP Alternative was determined to have the least favorable effects relative to traffic while the BEP Alternative would have moderate adverse effects.

## Construction

Both the BEP and SVRTP alternatives involve major construction activity. Most of the improvements for the BEP Alternative, except improvements surrounding the Milpitas and Berryessa stations, would be alongside and/or within a former railroad corridor, therefore limiting spillover effects to surrounding uses. The BART guideway would be a combination of at-grade, retained cut, and aerial or retained fill segments. Eight grade separations of the guideway at east-west arterials are proposed. Station structures would be constructed largely within the right-of-way of the former railroad alignment although improvements for parking, auto, and feeder bus access, including intermodal transfer facilities, would extend into surrounding areas.

At the Berryessa Station, under the BEP Alternative, a storage yard and moderately sized maintenance facility are proposed. This facility, called the Las Plumas Yard Option, would be built in an existing, industrial area. The construction period, including testing and pre-revenue service start-up, would last approximately four to five years. Because most improvements would be within the existing railroad corridor, overall adverse construction effects of the BEP Alternative would be considered moderate.

The SVRTP Alternative would have the same types of adverse effects for the segment from Warm Springs to Berryessa Station, absent the Las Plumas Yard Option. The alignment south of Berryessa would transition from aerial/retained fill to a tunnel through central San Jose before returning to an at-grade configuration north of I-880 through the Santa Clara Station. Under the SVRTP Alternative, a yard and shops facility would be constructed at the line terminus on the former Union Pacific Railroad Newhall Yard and extend into former industrial sites now owned by the city of San Jose. The underground alignment through San Jose would be a combination of cut-and-cover tunnel (at the two portals, the three underground stations, and where vent shafts and track crossovers are proposed) and bored tunnel (between stations) for approximately 5.5 miles.

The underground portions of the SVRTP Alternative have the potential to cause substantial adverse construction effects due to street closures, truck traffic for the haul and delivery of materials, equipment generated noise, and other activities. VTA would work closely with business and residential communities to limit disruptions whenever possible to an acceptable level. (See Section 6.1 of Construction, for discussion of the Construction Education and Outreach Plan to be established by VTA to minimize the adverse effects of the SVRTP Alternative;

Section 6.3, of the Construction chapter identifies other construction mitigation measures for the corridor.) The SVRTP Alternative would take from eight to nine years to construct, beginning with utility relocations and continuing through test and start-up preparations for revenue service.

Because of the extent of proposed improvements, the potential for disruption of adjacent businesses and residences when the BART alignment is outside the former freight rail corridor and rail yard, and the long duration of construction, the potential effects of the SVRTP Alternative are considered least favorable.

## 10.2.3 OPERATING EFFICIENCIES

Major transit investments should improve operating efficiency—carrying more passengers per unit of service provided and carrying passengers at a lower unit cost. The change in total operating costs should be reasonable relative to the benefits of greater ridership and increased capacity. Four measures of operating efficiency have been established by which to compare performance of build alternatives, as shown in Table 10-3.

**Table 10-3: Operating Efficiencies Evaluation**

| Objective/ Performance Measure | No Build Alternative | BEP Alternative | SVRTP Alternative |
|---|---|---|---|
| Passenger Boardings per Vehicle Mile (VTA bus, VTA LRT, BART Extension; 2030) | ○ | ◐ | ◐ |
| | 1.01 | 1.09 (+8%) | 1.13 (+12%) |
| Change in Total VTA Bus, BRT, LRT and BART Extension Operating Costs ($2008 in millions) | NA | ◐ | ○ |
| | | $119 (+22%) | $166 (+31%) |
| Operating Cost per Passenger Boarding (VTA bus, VTA LRT, BART Extension; $2008) | ○ | ○ | ○ |
| | $4.13 | $4.31 (+4%) | $4.35 (+5%) |
| Operating Cost per Passenger-Mile (VTA bus, VTA LRT, BART Extension; $2008) | ○ | ◐ | ● |
| | $0.97 | $0.78 (-20%) | $0.69 (-29%) |
| ● - Most Favorable ◐ - Moderately Favorable ○ - Least Favorable | | | |

Source: VTA, 2008

### Passenger Boardings per Vehicle Mile

Passenger boardings per transit vehicle mile of service (all VTA modes combined) for the No Build Alternative are projected to average 1.01 in 2030. Boardings per vehicle mile (including boardings generated by the extension of BART service) would improve by 9 percent under the BEP Alternative and by 12 percent under the SVRTP Alternative. Increases in this performance measure are desirable, indicating each mile of transit

service either operated by VTA to provide its bus and LRT services or by BART for the extension of service into Santa Clara County (which would be financially supported by VTA), is generating more ridership. The overall benefits would be considered moderate under both alternatives.

### Operating Costs

Total annual operating costs for VTA bus, BRT, and LRT service and annual operating costs due to a BART extension into Santa Clara County would be approximately $656.2 million in 2030 under the BEP Alternative and $702.9 million under the SVRTP Alternative (all figures in constant 2008 dollars). Compared to the No Build Alterative, estimated to cost $537.2 million in 2030, the increase in operating costs is $119 million, or approximately 22 percent, under the BEP Alternative and $166 million, or 31 percent, under the SVRTP Alternative.

On a per passenger boarding and passenger-mile basis, the unit costs of service under the SVRTP Alternative would improve relative to the No Build Alternative and actually be lower. Although the improvement would be modest per passenger boarding, it is substantial per passenger-mile (decreasing by 29 percent) and considered a favorable effect. Under the BEP Alternative, Operating Cost per Passenger Mile also decreases relative to the No Build by 20 percent, and is considered a moderately beneficial effect. However, Operating Cost per Passenger Boarding would increase moderately under both of the build alternatives compared to the No Build Alternative.

The substantial improvement in unit operating costs when comparing Cost per Passenger Mile to Cost per Passenger results from the long trips that either alternative would serve. The typical BART rider on the BEP or SVRTP alternative would have a longer trip, on the order of 22 or 17 miles, respectively, than the typical VTA bus or light rail transit rider. The BART extensions add considerable passenger miles to the system. BART service is more cost-effective in serving longer person-trips.

## 10.2.4 LAND USE

The evaluation of land use, summarized in Table 10-4, considers an alternative's capacity to support existing and proposed land use plans and policies and to facilitate future growth that will encourage increased transit use (e.g., transit oriented development). Transit ridership tends to increase when transit facilities are well integrated into residential and commercial developments, thereby becoming more attractive to users. Development potential is often enhanced when direct access is possible via high capacity, high frequency transit.

**Table 10-4: Land Use Evaluation**

| Objective/ Performance Measure | No Build Alternative | BEP Alternative | SVRTP Alternative |
|---|---|---|---|
| Transit Supportive Land Use Policies and Zoning Regulations | ◐ | ● | ● |
| Potential for Transit-Oriented Development | ◐ | ● | ● |
| Other Land Use Considerations | ○ | ◐ | ● |
| Economic Development Effects | ◐ | ◐ | ● |
| ● - Most Favorable ◐ - Moderately Favorable ○ - Least Favorable | | | |

Source: VTA, 2008

## Transit Supportive Land Use

Communities in the SVRTC are undertaking efforts to better integrate land use and transit. Transit supportive zoning and land use plans, including transit area specific plans, and general plan elements, are in progress and will occur in many locations whether or not the proposed BART extension improvements are implemented. The policies and regulations apply equally as well to light rail and Caltrain station area development and planned BRT corridor and station improvements. Therefore, even under the No Build condition, benefits would be realized from these efforts.

However, local policies and regulation would have greater potential benefits when coordinated with station area planning for the BEP and SVRTP alternatives. In fact, communities have undertaken land use planning to provide regional transit-supportive density targets around, and provide improved multimodal access to, proposed BART stations.

The Milpitas BART Station and the Montague and Great Mall LRT stations are both within an area targeted for densification. The Milpitas Transit Area Specific Plan 2008 covers 437 acres and proposes 7,109 new housing units and approximately one million square feet of office, commercial/retail and hotel space. The Milpitas Midtown Specific Plan 2002 also covers the proposed BART station and calls for high density, transit-oriented development “overlay zone.” A convenient pedestrian connection between the BART and the Montague LRT Station would be provided.

The Berryessa Station in northeast San Jose is also in an area targeted for redevelopment and densification. The overall guiding policy is the city's general plan, which was recently amended to allow higher densities and mixed-uses in support of transit, along TOD corridors, and at BART station nodes. Station areas are seen as special strategy areas suitable for high density housing.

The BEP Alternative would be the catalyst to bring these plans to fruition. Although TOD is occurring and gaining broader acceptance around LRT stations, experience shows that BART stations increase TOD potential in surrounding areas considerably. The existing, often underutilized, industrial, and other light commercial uses can be developed to higher density residential and commercial/retail without adversely affecting existing residents or eliminating viable industrial enterprises. Market forces have made many of these uses no longer suitable, at least on a large scale, in Santa Clara County. They are prime locations for conversion.

The SVRTP Alternative would have the same potential to reinforce transit supportive land use plans in the areas surrounding the Milpitas and Berryessa stations and become a catalyst for new planning efforts. The alternative would also reinforce transit supportive land use plans and policies in the city of San Jose for the Alum Rock, Downtown San Jose, and Diridon/Arena stations and in the city of Santa Clara for the Santa Clara Station. The Downtown San Jose and Diridon/Arena stations would benefit from the city's Strategy 2000 policies, which call for major growth supportive of transit as part of a vision for downtown. The Diridon/Arena Strategic Development Plan promotes that station area as a critical transit hub and future extension of downtown San Jose. The city has been awarded a grant from the Metropolitan Transportation Commission to develop a multimodal area plan with higher densities around the Diridon/Arena Station.

In Santa Clara, the general plan supports LRT and Capitol Corridor connections to BART and calls for an extension of BART to Santa Clara. The Santa Clara Station Area Plan (for Caltrain, ACE, VTA bus, and future BART) proposes a mixed-use "urban center" around this expanding transit center and a people mover connector (APM) to Mineta San Jose International Airport. The 432-acre site plan would include just less than 2,500 housing units and 5 million square feet of office/commercial/hotel space.

Regional programs complement these community planning initiates. For instance, the Transportation for Livable Communities and Housing Incentive Program administered by the Metropolitan Transportation Commission provides grants to San Francisco Bay Area cities that plan and build high density housing within ⅓-mile of transit stations.

## Transit Oriented Development

The potential for transit oriented development (TOD) similarly exists under the No Build Alternative but would increase substantially with extension of BART service under both the BEP and SVRTP alternatives. BART stations would offer individuals access to a high capacity and fast transit service that connects directly to many other major activity centers in the San Francisco Bay Area, including downtown San Francisco and downtown Oakland. TOD planning is actively underway in the Milpitas and Berryessa station areas (BEP and SVRTP alternatives) and the Santa Clara Station area (SVRTP Alternative). The city of San Jose has received a grant to update the local strategic development plan for the Diridon/Arena Station into a multimodal transportation and land use plan for existing bus, light rail, Caltrain, ACE, Amtrak, and proposed BART and future high-speed rail. A visioning exercise was conducted for the Alum Rock Station, with the assistance of resources from San Jose State University, and a more detailed local area planning process focused on transit oriented development will begin soon. These activities demonstrate the appeal of mixed-use TOD in the vicinity of proposed BART stations.

## Other Land Use Considerations

The BEP and SVRTP alternatives would expand intermodal connections with VTA's LRT and bus transit network at key locations. For example, the Milpitas BART Station would include a transit center for VTA bus-to-rail connections and the station is located adjacent to the Capitol LRT Station. The Berryessa Station would include a bus/rail transfer center. The Alum Rock, Downtown/San Jose, and Santa Clara stations under the SVRTP Alternative would also include multimodal transit connections, as listed below.

| Station | Alternative | Transit Modes |
|---|---|---|
| Milpitas | BEP and SVRTP | LRT, Bus, BART |
| Berryessa | BEP and SVRTP | Bus, BART |
| Alum Rock | SVRTP | Bus, BRT, BART |
| Downtown San Jose | SVRTP | LRT, Bus, BRT, BART |
| Diridon/Arena | SVRTP | Caltrain, ACE, Bus, BRT, Capitol Corridor, Amtrak, BART |
| Santa Clara | SVRTP | Caltrain, ACE, Bus, BART, APM |

The topography and scarcity of developable land in the SVRTC require that alternative transportation modes to the auto, and access to housing in other areas, be available. Santa Clara County has a jobs-housing imbalance (more jobs relative to local households) that cannot be addressed simply by providing more housing in the county. Sustaining job growth requires accommodating commuters from Alameda County and other communities. The linear nature of development along the eastern side of San Francisco Bay, resulting from the geographic constraints of wetlands and bay on the west and undevelopable hills on the east, limits options for new north-south transportation facilities. A new freeway or major expansion of existing freeways is not feasible—without major disruption of existing land uses. The proposed BEP and SVRTP alternatives would follow an underutilized and, in segments, vacated freight

railroad corridor. The corridor offers a unique opportunity for providing new transportation capacity in a constrained, heavily developed area.

### Economic Development

The economic development effects of the BEP and SVRTP alternatives are largely proportional to the number of stations proposed—with stations being an indicator of transit access to jobs that would be possible under either alternative. Two stations are proposed under the BEP Alternative in areas still largely characterized by low density development. Jobs densities are light. Both the Milpitas and Berryessa stations offer considerable potential in conjunction with transit oriented development initiatives to generate more employment opportunities in the eastern portion of Santa Clara County. The SVRTP Alternative would offer the same economic development opportunities as the BEP Alternative and, with four more stations, expand opportunities into east San Jose, downtown San Jose and, through redevelopment of former railroad and industrial sites, in Santa Clara. Downtown San Jose continues to be targeted for major employment and residential expansion. The SVRTP Alternative can be a catalyst and facilitate these planning efforts. The SVRTP Alternative would offer high benefits relative to economic development in the study corridor while the BEP Alternative would have moderate benefits.

Economic effects associated with construction and ongoing operations of a BART extension were evaluated in a regional economic simulation model. The impacts/benefits were analyzed for a 15-year period, 2016 to 2030. A full extension of BART service, associated with the SVRTP Alternative, was determined to generate $6.0 billion in gross regional product, $2.3 billion in additional personal income, and $4.6 billion in travel time savings to commuters (all figures in 2005$). Construction jobs would be temporary, but the improved accessibility to job centers in Silicon Valley and Santa Clara County, including by residents of adjacent counties where housing is more affordable, would allow the local economy to grow more than if no SVRTP Alternative improvements were made. The economic impacts analysis determined that approximately 2,400 more permanent jobs would be created every year due to the travel efficiency gains—the improved access to employment centers—that result from the SVRTP Alternative.

The No Build Alternative would offer no comparable impetus for TOD and job growth in Santa Clara County.

## 10.2.5 LOCAL FINANCIAL COMMITMENT AND PUBLIC ACCEPTANCE

Two measures of financial commitment to the project were established. The criteria indicate if the proposed project is fundable, that is, there is a reliable source of capital and operating dollars and the project sponsor has a sound financial plan covering at least a 20-year time horizon. As a related concern, the public must support the proposed transit investment, as indicated by voter approved funding initiatives, for example.

**Table 10-5: Local Financial Commitment Evaluation**

| Objective/Performance Measure | No Build Alternative | BEP Alternative | SVRTP Alternative |
|---|---|---|---|
| Local Funding Commitment: Percent Capital Funds from Local and State Sources | NA | ● | ● |
| | | 70% | 88% |
| Community and Stakeholder Acceptance | ○ | ◐ | ● |
| ● - Most Favorable ◐ - Moderately Favorable ○ - Least Favorable | | | |

Source: VTA, 2008

## Local Funding Commitment

Santa Clara County voters have repeatedly approved special funding initiatives for local transportation improvements. In additional to general sales tax levies approved at the state level and allocated back to counties for primarily public transit (e.g., the Transportation Development Act of 1971, which created the Local Transportation Fund based on a statewide ¼ cent sales tax), Santa Clara County voters approved a permanent ½ cent sales tax for transit operations and capital in 1976. In1996, voters approved the Santa Clara County Measure B Transportation Improvement Program, which authorized the collection of an additional ½-cent sales tax for local transportation projects through 2006. In 2000, VTA sponsored a ½-cent sales tax measure that extends for 30 more years, from 2006 through 2036. The measure is dedicated to transit improvements and passed with 72 percent of the vote.[5]

[5] In 2006 a separate Santa Clara County initiative to increase the sales tax by ½ cent failed voter approval. It was not a transportation measure per se. VTA was not a sponsor of the initiative, which was a general tax increase.

Local sources of funds have ensured that numerous county transportation improvements are and will continue to be implemented despite uncertainty in state and federal funding. To construct the BEP Alternative, VTA is requesting federal New Starts funding of $750 million to augment the program and to be able to fund the remainder of the full 16.1-mile SVRTP Alternative with local funds. The percentage of BEP Alternative capital costs proposed to be covered by local funds is 70 percent (federal New Starts funds would cover 30 percent).

The proposed $750 million in New Starts funds for the BEP Alternative is also included as a funding source for the SVRTP Alternative, which incorporates the improvements under the BEP Alternative. Additional local funds would be required to fund the larger SVRTP Alternative, the non-New Starts share increasing to approximately 88 percent of total costs.[6] Because of the high percentage of local funds going to the BEP and SVRTP Alternatives, both of these alternatives are rated most favorable.

### Community and Stakeholder Acceptance

The public and business communities strongly support the extension of BART services into Santa Clara County. The 2000 Measure A, approved by almost three-quarters of county voters, included as its first major proposal to "(e)xtend BART from Fremont through Milpitas to Downtown San Jose and the Santa Clara Caltrain Station…" (2000 Measure A).

## 10.2.6 SUMMARY

Relative to the No Build Alternative, the BEP and SVRTP alternatives generate substantial benefits in terms of increased ridership and expanded mobility for corridor residents, improved air quality, lower growth in congestion in critical travel corridors, and enhanced economic development potential, among other benefits. For the majority of evaluation criteria in these areas, the SVRTP Alternative performs more favorably than the BEP Alternative in the level of benefits produced. For criteria established to capture adverse effects, including environmental, traffic, capital and operating costs, and adverse construction effects, the reverse is typically the case. The No Build Alternative would have limited or no adverse effects in these areas, the BEP Alternative have would minor to moderate adverse effects in a number of areas, and the SVRTP Alternative would have the most severe adverse effects. This is understandable given that the SVRTP Alternative involves substantial construction activity at considerable cost. The increased adverse effects of higher levels of transit must be weighed against the increased benefits.

[6] With regard to federal versus local funding splits, all non-New Starts sources of funds, including state and discretionary federal/other funds are defined as locally-provided funds and included in that percentage.